REPORT

Planning Responses for Flood Risk

PREPARED FOR
LOCKYER VALLEY REGIONAL COUNCIL

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Meridian Urban

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Executive Summary

Flooding is a formative characteristic of the Lockyer Valley. Periodic flooding supports the ecological function and economic productivity that underpins the socio-economic prosperity of the region as one of Australia's critical food bowls. However, this flooding can also adversely impact people, property, infrastructure and economic advancement.

This report outlines a policy framework for the integration of flood risk assessment outputs arising from the draft Community Precinct Risk Assessment (February 2022) prepared by WMA Water into the draft Lockyer Valley Draft Planning Scheme, which satisfies the State interest requirements of the State Planning Policy, July 2017 for natural hazards, risk and resilience. The project explored a range of issues for the region and the statutory instrument along the journey of hazard integration. Project highlights include:

PROJECT HIGHLIGHTS

- the magnitude and extent of flood impacts for the Lockyer Valley region is significant to the degree that it creates a barrier to achievement of a sustainable settlement pattern without substantial investment and commitment to long-term strategic land use planning
- a five-tiered flood hazard overlay has been developed from very low to extreme flood risk categories
- subject to further refinement approximately 80 allotments have been identified for inclusion in the Limited Development zone
- to promote development commensurate with risk, flood resilient precincts have been developed for Laidley and Withcott centres and a Valley rural floodplain precinct
- a strategic growth management plan is required to properly inform and direct development which facilitates a prosperous and safe region
- the planning instruments accompanying this report re-frame the strategic narrative for the rural zone. The region must embrace its rural floodplain and the primacy of agricultural as the land's highest and best use
- the planning instruments are drafted with strong responses to development in the floodplain which is limited and aligned with risk. Under the *Planning Act 2016*, code assessment provides greater certainty and ability to refuse inappropriate development
- integration of the strong policy responses, arresting development prior to growth planning and the need to arrest development on the floodplain involves drafting change across the entirety of the drafted planning scheme

The draft Community Precinct Risk Assessment prepared by WMA Water identifies that Lockyer Valley is subject to a generally high level of flood risk throughout the region. **Few communities within the local government area remain unaffected by flood risk**. Key risk drivers that differentiate this region from others (and therefore worsen the flood risk) include:

- high hydraulic (speed & depth) risk
- limited warning time (flash flood) – most of the region is categorised as a flash flood environment – this is the primary risk driver of concern that impacts land use suitability in the region given how it exacerbates risk to life, not just risk to property
- high levels of isolation or access issues – this is a core concern for future greenfield development
- generally higher community vulnerability than the State average.

The region's settlement pattern has developed over time in **a risk-blind manner**, which creates significant land use challenges for existing urban areas and regional growth aspirations. Future growth management planning and development assessment will need to be highly cognisant of the limitations the level of flood risk in the region presents. This report provides:

- a synthesis of regional and **policy context** that underpins the first principles developed with Council in framing its flood risk response within the Lockyer Valley Draft Planning Scheme
- **a place-based summary** of the planning issues arising from the flood risks identified by the draft Flood Risk Assessment
- **recommendations for changes** to be made to the Lockyer Valley Draft Planning Scheme to integrate the flood risk planning responses
- **drafted content** for consideration by Council in the finalisation of the Lockyer Valley Draft Planning Scheme for State interest review.

The first principles are mapped out from a core derived from best practice and the integrated planning model in the Brisbane Strategic Flood Plain Management Plan. Collectively, concepts and direction in best practice is taken forward through a regional lens of the South East Queensland Regional Plan and a local lens and expanded to provide examples of how this is applied in the Lockyer Valley.

At an LGA scale, **the impact of flood risk on existing urban-zoned land is profound**. The region is highly exposed to high flood risk across most urban zones. Of key concern are the levels of flood risk exposure in urban zones (whether with existing development or greenfield):

- 30% of Low density residential land is exposed to HR 1–3 hydraulic risk
- 36% of Low-medium residential land is exposed to HR 1-3 hydraulic risk
- 37.5% of Township land is exposed to HR 1-3 hydraulic risk – with 21% (which represents 56% of the total) affected at HR 1/2
- 56% of Major centre land is exposed to HR 1-3 hydraulic risk
- 63% of Local centre land is exposed to HR 1–3 hydraulic risk – with 42% (which represents 66% of the total) affected at HR 1-2; and
- 43% of Industry land is exposed to HR 1-3 hydraulic risk – with 27% (which represents 63% of the total) affected at HR 1/2

There are 10 precincts in section 6, each with a detailed flood profile. Each precinct features a flood behaviour narrative, and greater detail on specific settlements and townships of

hydraulic risk. Future scenarios and consequences are outlined along with a profile of population in relation to flood events. Each section is provided with statistical evidence of property by land uses and by potential hydraulic risk category. **Each locality is provided with recommendations for zone changes and statutory approaches**.

Considerable exposure to extreme risk is evident in Laidley and Withcott where **flood resilient precincts** are proposed due to intolerable risks faced by commercial and other land uses in those township centres. Vast areas of the floodplain, which is the heart and soul of the Valley, are exposed to extreme and very high risk. These areas must be protected from further urban encroachment and the primacy of agricultural uses can be used to arrest risk increases.

The project included eight formal workshop or presentation interfaces. Three of these were in 2022 with Councillors where finalisation of the risk tolerance was able to be tested. Four flood risk categories were formulated through discussion with Council. However, the spatial extent of the highest risk category did not align with Council's risk tolerance therefore the extreme risk was identified to enable clarity in potential back zoning. The extreme risk category made up the fifth tier in the risk categorisation and **back zoning candidates demonstrated 75% of the lot area impacted by extreme risk**. Approximately 80 allotments are identified for back-zoning subject to further refinement and analysis.

The engagement provided robust discussion and extension **into strategic implications of the extent and magnitude of flood in the valley** on the ability for the region to grow sustainably. The region has some legacy issues which require addressing through holistic policy approaches in order these can filter logically through the societal, regulatory and economic systems. See Figure A which illustrates some of the externalities which need to function to give effect to land use policy.

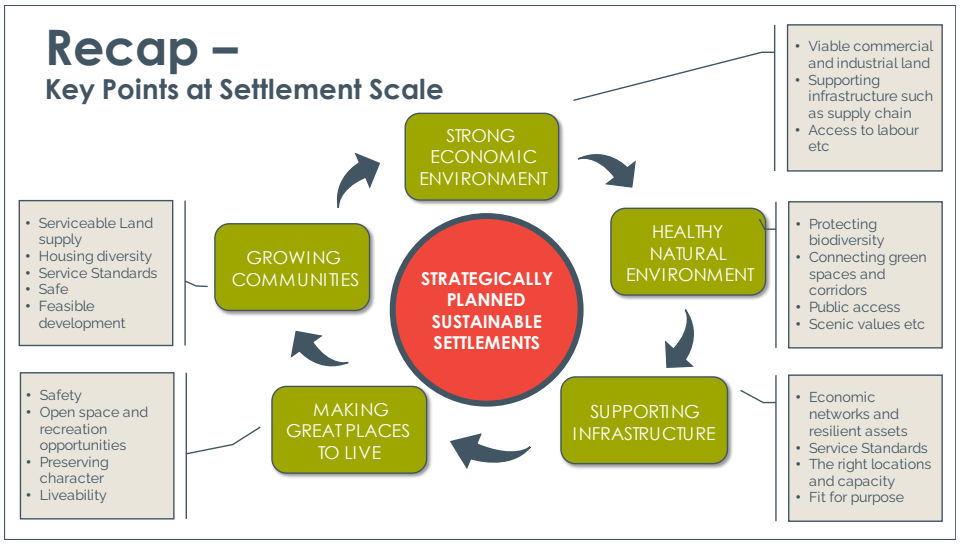

Figure A: Components of a strategically planned sustainable settlement

The extent and magnitude of the Lockyer Valley exposure to flood risk across all its land use zones is a barrier to achievement of a sustainable settlement pattern which requires a commitment to a bespoke approach for long-term land use planning.

We strongly recommend that council undertakes a **growth management study** to drive a settlement pattern that is flood resilient and ensure that growth pattern orients towards prosperity of key industry and risk minimisation. Such a growth management plan will stem from first principles of land suitability and highest and best land use (combining both opportunities and constraints) to make a step change in growth policy.

STRATEGIC RECOMMENDATIONS

- undertake a growth management study to drive a settlement pattern that is flood resilient to orients towards prosperity of key industry and risk minimisation. First principles of land suitability and highest and best land use are required to make a step change in growth policy
- strengthen the messages of primacy of agricultural land using a focussed floodplain narrative, exceptional fertility for cropping, supporting rural industry, by removing all refences to circumstances where subdivision and residential development may occur in the rural zone
- review extensive Community facilities zone at high or extreme risk
- review some zoning which follows ownership rather than land use intent
- review extensive Sport and recreation zoned land in marginal and high and extreme risk
- ensure all expansion areas or infill include appropriate redirection of localised flows through mitigation infrastructure and allocation of legal rights to Council
- all up-zoning from the Gatton or Laidley scheme in the flood zone should be removed until further planning is prepared

This project delivers to Council:

- this flood risk response report
- a draft flood hazard overlay code
- a draft table of assessment; and
- an annotated Lockyer Valley draft planning scheme highlighting recommendations and integration items across the scheme

The philosophy of the statutory approach **embraces bounded assessment** as a safer route for approvals and refusals under the *Planning Act 2016*. Code assessment confines the assessment to the benchmarks of the scheme which provides concise bounded assessment and a clear ability to refuse. Section 8 of the report provides detailed rationale and support for the drafting of the scheme along with many actions and recommendations for scheme preparation.

Section 9 of this report contains the summary of essential **actions and recommendations to realise a risk responsive planning scheme**. These should be read in association with detailed instrument information in section 8.

SCHEME DRAFTING ACTIONS

- that Council implements all changes provided in Table 8-1 (Part 3)
- that Council undertakes the reviews outlined in Table 8-2 to ensure alignment with flood policy and preparation for the Feasible Alternative Assessment Report
- that Council reviews the Tables of assessment to ensure the compliance rules are fit for purpose
- that Council reviews the policy across the planning scheme for filling and excavation in the flood hazard area
- that Council undertake a review of the terms across the planning scheme, deleting references to undefined terms, using one source of information, deleting references to sensitive uses for natural hazards, and deleting refence to vulnerable people
- that Council updates Schedule 1 with the definition for the DFE provided in Table 8-6
- that Council confirms flood immunity levels for new lots; and that Council confirms flood immunity for new roads and evacuation points
- that Council reviews section 1.6 and 1.7 of the planning scheme, to ensure integration of building matters.

SCHEME DRAFTING RECOMMENDATIONS

- that Council undertakes further reviews for zones impacted by flood to ensure alignment and note minor recommendations in the annotated LVDPS
- that Council consider further refinements as provided in the annotated LVDPS document
- that Council reviews the Tables of Assessment for consistency and clarity in expression of assessment levels
- that Council adopts the definitions, provided in Table 8.5 for Vulnerable Uses, Essential Community Infrastructure and Critical Infrastructure across the planning scheme
- that Council includes other flood related definitions such as risk levels and policy positions in a new Planning scheme policy or in Schedule 1
- that Council include a comprehensive PSP to support the flood risk policy and regulatory provisions

Finally, the Valley has significant and recent damaging flood history which has moved the community to its core. **Land use planning is only one tool**. As we have seen through this project, addressing legacy issues is difficult. Land use planning is fundamentally a forward looking action which shapes future development. Addressing flood risk must be approached through a range of actions outside development including

NON-PLANNING BASED RECOMMENDATIONS

- continued preparation of candidates and participation in any funding for voluntary house purchase
- targeted awareness for the dwellings identified as candidates for voluntary house purchase, high and extreme risk locations
- active promotion of resilient house building, house raising projects with local builders and home owners
- ongoing participation in community awareness programs through a variety of mediums including warning times and evacuation
- targeted awareness for business – rural and built, promotion of Emergency Management Plans where beneficial
- continuing to strategic upgrades of key evacuation routes
- continuing to enhance the flood warning system
- continuing to upgrade drainage networks
- ensure the Local Disaster Management Plan includes the most current information on warning times, evacuation routes and updates the risk assessment; and
- ensuring local Council owned assets are retrofitted to be resilient to flood asset management, maintenance and new projects have resilience to flood as a consideration.

Lockyer Valley Regional Council

Planning Responses for Flood Risk

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1 Introduction

Meridian Urban has been engaged by Lockyer Valley Regional Council to support the integration of work underway as part of the Lockyer Valley Local Flood Management Plan (LFMP) into the Lockyer Valley Draft Planning Scheme (LVDPS) through the provision of expert planning advice on local floodplain management planning.

The purpose of this report is to outline a policy framework for the integration of flood risk assessment outputs arising from the draft Community Precinct Risk Assessment (February 2022) prepared by WMA Water into the LVDPS, which satisfies the State interest requirements of the State Planning Policy, July 2017 (SPP) for natural hazards, risk and resilience.

This report also builds on the Background Review paper prepared in February 2020 which set the broader context for this flood risk integration work. The milestone tasks covered by this report are:

Council embarked upon the preparation of a new planning scheme to replace the current Gatton and Laidley planning schemes which were prepared under the now repealed *Integrated Planning Act 1997*.

This planning response report provides a critical linkage document between the Local Flood plain Management Plan and the new planning scheme.

1. The first principles for the project which will drive the new overlay code and scheme adjustments
2. The Land Use Policy Table that will conveys best practice policy application and a consistent approach to integration of flood considerations across risk and land uses
3. Results of testing the policy approach and risk tolerance with Council, including circumstances for back zoning and no-go areas; and
4. Results of finer analysis and implications analysis by place

The draft elements of the new Overlay code will follow immediately with some drafting instructions.

These tasks start to map the land use planning response from alternate directions: The first principles and the risk category approach in the land use tables are the start of the place-based response whereas the model code comparison and the draft elements of a new overlay code start the process from a statutory tools perspective. These tasks are followed by next steps in anticipation of the LFMP delivery and the mapping and regulatory solutions required to achieve the full extent of the outcomes in the new overlay code.

1.1 Intended outcomes

This project has been undertaken in accordance with the following phases:

- **Phase 1 and 2 – review and assess** the nature of the flood risk in land use planning terms
- **Phase 3 – translate** the flood risk assessment outcomes into risk-informed local land use policy positions, informed by Council's risk appetite and its policy platform for other socio-economic objectives
- **Phase 4 – prepare** directions and drafting instructions consistent with Queensland's statutory planning framework that builds flood resilience over time
- **Phase 5 – finalise** a Feasible Alternatives Assessment Report.

The following phases are provided for this work, shown in Error! Reference source not found.

Figure 1-1 Overarching project phases

This report comprises Phases 1 - 4. A separate report will be prepared for Phase 5 based on the final inclusions decided by Council in the LVDPS.

2 Region Overview

The Lockyer Valley region has unique topographic, environmental, hydraulic, socio-economic and cultural characteristics that should drive the principles that address flood risk through the planning response. The valley is located east of the Great Dividing Range and boundaries coincide almost perfectly with the catchment of Lockyer Creek and its tributaries of Murphy's Creek, Flagstone, Creek, Ma Ma Creek, Tenthill Creek, Sandy Creek and Laidley Creek.

The region is effectively a large riverine basin, collecting rainfall from all directions flowing into the two main tributaries of the Lockyer and Laidley Creeks. The two tributaries join, east of Gatton and support extensive alluvial plains and fertile soils, which characterises much of the economy of the Lockyer Valley.

The eastern slopes of the Great Divide in the west boundary of the Lockyer Valley comprises the escarpment of the Great Dividing Range to over 1000m and the border with Toowoomba Regional council. In the south and south east the Main Range feeds both Lockyer and Laidley Creeks with a small section of common boundary with Southern Downs Regional Council. The ridgeline of the Little Liverpool Range forms south western border with Ipswich.

In the north the peaks of the Great Divide share the boundary with Toowoomba and Somerset containing the expanse of the Lockyer National park. All the peaked and undulating country drains to the central water courses of the Laidley and Lockyer Creeks, merging at the fertile flood plains from Forest Hill and Gatton to Lake Clarendon and Glenore Grove before leaving the Valley and merging with the Brisbane River at Wivenhoe in the Somerset council area (See figure three).

It is this very basin-like collection of short run creeks and the surrounding elevated landscape which leads to the expressed local concerns of flooding especially in velocity and warning times. The topography makes the valley susceptible to flood unique behaviour which and creates difficult and complex situations for clear statutory and land use responses.

The dispersed, rural and lifestyle centred settlement pattern exacerbates the concerns, especially around risk multipliers of isolation, evacuation potential, warning times and the potential for isolated events to occur.

These local concerns are expressed through conversation, experience and examples provided over the course of the interactions with both officers and councillors and must be incorporated into the principles for the land use planning response.

Figure 2-1: The basin-like topography of the Lockyer Valley

Concerns and comments (in no particular order) which are essential components of the principles included:

- risk to life from flood velocity, time to inundation, and evacuation capability are the key drivers of risk tolerability for future development. The primarily rural nature of the region, coupled with the fast onset of fast flowing water, means adequate flood warning can be limited. This heightens risk to life considerations in the Lockyer Valley more so than other places.
- risk from riverine flooding and overland or sheet flow are of equal importance. The extent of overland flow, sheet flow and its ability to cause damage from isolated but heavy falls cascading down localised slopes prior to reaching a water course (e.g., from the very proximate Little Liverpool Range across Laidley town prior to reaching Laidley Creek).
- land zoned for a purpose should be able to be developed for that purpose. Officers have dealt with situations where – at face value – it is expected that land zoned for residential purposes can be developed, however, in some instances on close examination development for the intended purpose would pose intolerable risk to life and property.
- planning responses should be fit-for-purpose and facilitate expected development. The current arrangements are sometimes complex for simple projects. There is a desire to see simple projects have simple provisions which are understandable to the expected developer. It should be noted that regulation clarity is separate issue form the need for regulation commensurate with risk.
- the latest recommendations and leadership in flood risk management should be taken on board for the most current and robust response. The timing provides that the new overlay and land use response can already address recommendations of recent work without waiting for this to be enshrined in legislation.
- built form controls should complement the land use response, and not be used as a solution in isolation. Built form controls are a final mechanism once land use and intent are established.
- risk multipliers are transparent and addressed in the future overlay. Examples were provided of situation where again – at face value – development may be suitable of the proposed land uses but on closer examination of risk multipliers in velocity, timing, evacuation, isolation, and flood islands especially due to the topography and unique flood behaviours described above, life and property is put at intolerable risk. This is particularly evident in the ability for vulnerable people and sensitive uses to proceed in unsuitable areas.
- risk analysis will consider strategic risk in the context of the potential settlement pattern, induced demand for more infrastructure and services and the ability for localities to continue to function in an economic and prosperous manner. Issues centre on cumulative risk, and long term effects of a business as usual approach in established areas; and
- risk reduction will consider the widest possible range of tools including recommendations for change in their parts of the planning framework, policy or council programs. Greater support is needed across the range of tools to reinforce intent and to addresses the multiple behavioural facets of the unique flood.

Plate 2-1: Farming on the fertile valley plains near Grantham

These local expressions of issues have been combined with the best practice and SPP to arrive at the first principles below. In column three, specific application examples are provided.

2.1 Flood History

The LGA and Lockyer catchment has a well-known history of flooding:

- 1974 saw flood levels at Glenore Grove in the Laidley catchment peak at 14.94m
- 1996 Laidley Creek again suffered major flooding at 9m at Mulgowie and 14.3m at Glenore Grove
- 2001 experienced severe flash flooding in Laidley Creek after 600mm of rain upstream
- 2008 saw major flooding in Laidley Creek with heights not experienced since 1996
- 2011 all records were surpassed in the Lockyer catchment with some extreme recordings such as 13.8m over the record of 7m and Helidon, 4.9m at Sandy Creek and 8.85m at Laidley. The heaviest recorded rainfall associated with the flash floods in the Lockyer Creek system on 10/01/2011 was the Toowoomba AL station on the top of the range, with much lighter rain recorded to the east in the Helidon and Grantham areas. Rainfall intensities were not recorded as extreme. Much of the rainfall fell just outside the LGA boundaries in Toowoomba and Somerset.
- 2022 Flooding in the Lockyer system broke records of 1974 and 1996 for daily rainfall and was declared Australia's third most expensive natural disaster and most expensive flood. 444mm of rain fell in 7 days, however river peaks were under 2011 and 1974 levels.

3 Policy Context

The integration of flood risk into planning schemes is founded in a clear policy context set by the State Planning Policy and its subordinate guidance. In the instance of Lockyer Valley, this is further refined by the outcomes sought by the Brisbane River Strategic Floodplain Management Plan (SFMP), and its subordinate guidance.

Both the SPP and SFMP guidance provide clear parameters that need to be addressed and integrated, including:

- how the LVDPS should meet the state interest policies presented in the SPP – in particular the policy regarding how development meets an acceptable or tolerable level of risk
- key parameters for risk-based land use planning as prescribed by the SFMP-specific SPP land use planning guidance addendum.

There also exists important recommendations from the Final Report of the 2011 Floods Commission of Inquiry that need to be considered in the land use planning response.

3.1 State Planning Policy

The SPP expresses the state's interests in land use planning and development. It includes the State interest – natural hazards, risk and resilience which requires:

risks associated with natural hazards, including the projected impacts of climate change, are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards.

In particular, the SPP requires that outcome shown in Table 3-1 are achieved.

Table 3-1 - Relevant State interest policies

State interest policy (summarised)	Relevance to LVRC
1 – Natural hazard areas are identified (i.e., mapped)	✓
2 – A fit-for-purpose risk assessment is undertaken	✓
4 – Development avoids natural hazard areas or mitigates risk to an acceptable or tolerable level	✓
5 – Development incorporates a range of risk reduction and resilience measures	✓
6 – Community infrastructure is located and designed to limit risk and maintain functionality	✓

3.2 Brisbane Strategic Floodplain Management Plan

Released in 2018, the Brisbane Strategic Floodplain Management Plan (SFMP) provides a framework and shared regional vision to collectively manage current and future flood risks and deliver a regionally consistent and integrated response to flood management needed in the Brisbane River floodplain. The SFMP assesses the consequences which may occur for the full range of flood events and considers a range of flood mitigation measures to reduce risk to life and property from riverine flooding in the Brisbane River floodplain, including structural options, land use planning, building controls, landscape management, disaster management and community resilience. The land use planning component of the SFMP aspires to the following desired outcome:

- land use is planned, located and considers design elements to ensure development appropriately responds to the level of flood risk.
- there is also a clear planning and building interface with the building controls desired outcome as well:
- building design and construction improves community resilience and reduces property damage.
- furthermore, the land use planning section of the SFMP includes the following four strategies to achieve the desired outcome that need to inform Council's land use policy approach:
    - Strategy 5.1 – Planning instruments across the floodplain are informed by local flood risk assessments
    - Strategy 5.2 - Local Floodplain Management Plans, local flood risk assessments and local planning instruments consider the following:
        - potential hydraulic risk and hazard classification
        - regional evacuation capability
        - 'no worsening' of flood risk from new development
        - regional assessment of cumulative land form changes across the floodplain
        - regional climate change adaptation
    - Strategy 5.3 - Local planning instruments incorporate consistent approaches that protect vulnerable people from increased flood risk
    - Strategy 5.4 - Local Floodplain Management Plans, flood risk assessments and the review of local planning instruments consider implications for regional planning assumptions.

3.3 Recommendations from the Floods Commission of Inquiry

Most of the recommendations in the Queensland Floods Commission of Inquiry (QFCOI) have already been implemented in the 2017 version of the SPP. There are a few recommendations which have not been included which can be considered for incorporation into the new overlay code. Elements of the QFCOI to consider (with the relevant recommendation number) are incorporated into the overlay as shown in Table 3-2 below.

Table 3-2: Incorporation of QFCOI recommendations

7.13 Hazardous materials dealings to be conditioned	Included as a Performance Outcome (PO) and Acceptable outcome (AO) for all risk levels - no manufacture in the flood hazard area and storage must be above the defined flood level.
7.16 Floodplain storage is not to be altered through filling and excavation	Filling is limited to that permitted under the Building Act for lower risk and high risk flood areas. In moderate risk areas compensatory fill is permitted only on demonstration of no alteration to the flood plain. In the extreme risk area fill is not permitted.
7.24 The impacts of isolation are to be considered	Access to individual properties to the defined flood level is required, however the Valley is constrained and characterised by acute isolation from local roads
8.7 Evacuation plans are not an acceptable solution	Noted. Evacuation plans have not been provided as an acceptable solution in ay cases
10.9 Overland flow should be mapped and included	Council will continue to work towards mapping this element.
10.10 Basements should have special conditions for flood resilience	No provision of this nature has been specifically included as basement development is not anticipated in Lockyer Valley.

These have been incorporated into the new draft code and notes made where relevant

3.4 Brisbane Strategic Floodplain Management Plan Guidance –

A Brisbane River catchment-specific addendum to the SPP State interest guidelines for flood hazard was provided as a deliverable through the SFMP. The addendum is intended to be read in conjunction with the SFMP, the SPP, and the SPP flood hazard guideline, as well as the SEQ Regional Plan. This guideline addendum provides specific guidance on how to apply the technical outputs of the SFMP into the land use planning context of the councils in the Brisbane River catchment.

While non-statutory in nature, the guidance provides very clear expectations regarding how local governments utilise the planning system to achieve the outcomes intended by the SFMP – and is in alignment with the expectations of the state interest guideline for flood hazard. Key parameters are outlined in the tables below.

The SFMP Technical Evidence Report (SFMP TER) also provides parameters regarding recommended freeboard, filling sensitivity and evacuation requirements that are relevant for land use planning. These parameters have been reflected and locally refined where necessary based on Council input to provide the basis for the Land Use Policy Table provided in Section 6.4.

Table 3-3: Summary of LUP risk-based planning parameters from SFMP LUP Guidance Addendum (2018)

Planning Parameter	SFMP LUP Guidance
Residential uses	For expansion (or greenfield) areas, the establishment of new residential and accommodation uses **should not occur in the HR1 or HR2 Potential Hydraulic Risk categories**. The intensification or expansion of existing residential and accommodation uses **should not occur in the HR1 and HR2 Potential Hydraulic Risk categories** or where the relative time to inundation is **less than 12 hours** and development does not support preservation of life on-site. The establishment of new residential and accommodation uses or expansion of existing development in the HR3 or HR4 Potential Hydraulic Risk categories **may be tolerable subject to certain requirements**, including mitigation to an extent where development achieves an acceptable level of risk and is higher than or outside the 1 in 100 AEP + freeboard.
Commercial uses	For expansion (or greenfield) areas, the establishment of new commercial and industrial development **should not occur in the HR1 and HR2 Potential Hydraulic Risk categories** The intensification or material expansion of existing commercial and industrial uses should not occur in the HR1 and HR2 Potential Hydraulic Risk categories or where Relative Time to Inundation is less than **12 hours**. The establishment of new commercial or industrial uses or expansion of existing development in the HR3 or HR4 Potential Hydraulic Risk categories may be potentially tolerable subject to certain requirements, including mitigation to an extent where development achieves an acceptable level of risk and is located above the 1 in 100 AEP. Ancillary activities associated with commercial and industrial uses which are more resilient to flooding impacts such as carparking, buffer areas etc. may be located in areas with a lower flood immunity than the primary uses. Hazardous uses or the storage of hazardous materials occur in areas outside the floodplain (defined by the extent of the 1 in 100,000 AEP) or occur within facilities that should be designed to ensure hazardous materials are not released to flood waters during any flood event and where relative time to inundation is greater than 24 hours
Filling sensitivity	HR 1 & 2 risk categories are particularly sensitive to filling – resulting in flood impacts elsewhere in the floodplain, and implications for cumulative impact downstream.
Freeboard	The SFMP TER provides an options framework to determine an appropriate freeboard for use in setting defined flood levels and finished floor levels. The most significant factors that contribute to variable flood levels across the floodplain include:

	(1) the sensitivity or uncertainty of changes in flood behaviour because of increased catchment inflows, rainfall and sea level rise. This factor also considers how significantly the depth changes between similar AEP events (e.g., between 1 in 50 and 1 in 100 AEPs), with a greater differential (e.g., >1m) indicating higher flood sensitivity; and (2) the sensitivity of the proposed development to flooding and the impact of property damage. This can be expressed for each land use activity group (e.g., residential, commercial, industrial etc.), or for specific uses (e.g., community use, health care service, relocatable home park etc). The appropriate freeboard applied depends on the combination of development sensitivity and flood behaviour sensitivity and uncertainty in the floodplain. This aligns with a more risk-based approach in recognising that different areas of the floodplain will have higher or lower levels of uncertainty. **Table 9-1 Freeboard options assessment framework** Development sensitivity / Flood behaviour sensitivity / uncertainty Low / Low: Minimal (minimum 300mm) Low / High: Moderate (300 – 500mm) High / Low: Moderate (300 – 500mm) High / High: Maximal (at least 500mm)
Evacuation / Access	The guidance includes a Flood risk factors decision support tool with a focus on relative time to inundation as a key factor in determining land use suitability for certain uses. The core issue is addressing whether all occupants can be evacuated to a safe location within the available warning time (including along the evacuation route). This will require both consideration at strategic land use planning stage (for allocation of zones) and at site-based development assessment stage.

Further, the guidance provides a summary of indicative land use compatibility in terms of risk tolerance, per the below table, that needs to inform the land use policy approach adopted by Council.

Table 3-4: Summary of Indicative Land Use Suitability Against Hydraulic Risk Categories

Land Use Activity Group	Potential Hydraulic Risk Category				
	HR1	HR2	HR3	HR4	HR5
Community infrastructure and critical services	Intolerable	Intolerable	Intolerable	Tolerable*	Acceptable
Vulnerable uses	Intolerable	Intolerable	Intolerable	Tolerable*	Acceptable

Land Use Activity Group	Potential Hydraulic Risk Category				
	HR1	HR2	HR3	HR4	HR5
Filling	Intolerable	Intolerable	Tolerable*	Tolerable*	Acceptable
Residential and accommodation	Intolerable	Intolerable	Tolerable*	Tolerable*	Acceptable
Commercial and industrial	Intolerable	Intolerable	Tolerable*	Acceptable	Acceptable
Non-urban and recreation uses	Tolerable*	Tolerable*	Tolerable*	Acceptable	Acceptable

*** Subject to requirements to treat and manage risk to an acceptable level (informed by local floodplain management plans and risk assessment process).**

3.5 Best Practice

Given recent events in Queensland and nationally, Australia now has considerable brains trust of knowledge and best practice to inform and influence land use planning instruments and support decision making.

3.5.1 The Queensland Floods Commission of Inquiry

The QFCOI established a definition of best practice principles for flood plain management at the outset, relying upon Floodplain Management Australia's determination of an appropriate mix of four different kinds of floodplain management measures:

i. land use planning controls (for example, zoning requirements to ensure compatibility between land use and flood risk)

ii. building controls (for example, minimum flood levels and flood-proofing)

iii. structural measures (for example, flood mitigation works such as the construction of levees); and

iv. flood emergency measures (for example, flood warning, evacuation and recovery plans).

The SFMP responds to the recommendations of the QFCOI taking a step further with an integrated approach. This approach advocates for seven components working together as shown in figure one. The land use planning component of the SFMP aspires to nine strategic outcomes:

- floodplain management initiatives are delivered using a holistic, integrated and collaborative approach;
- floodplain management initiatives are informed by a regional understanding of current flood risks;
- future climate change impacts are recognised and planned for through adaptation and resilience building;
- community awareness, understanding and response is the foundation for community resilience;

- **land use is planned, located and considers design elements to ensure development appropriately responds to the level of flood risk;**
- building design and construction improves community resilience and reduces property damage;
- infrastructure is used to reduce flood risks where appropriate;
- landscape management across the catchment contributes to flood risk reduction; and
- disaster management planning and response applies a regionally consistent approach whilst recognising local flood risks (p.2)

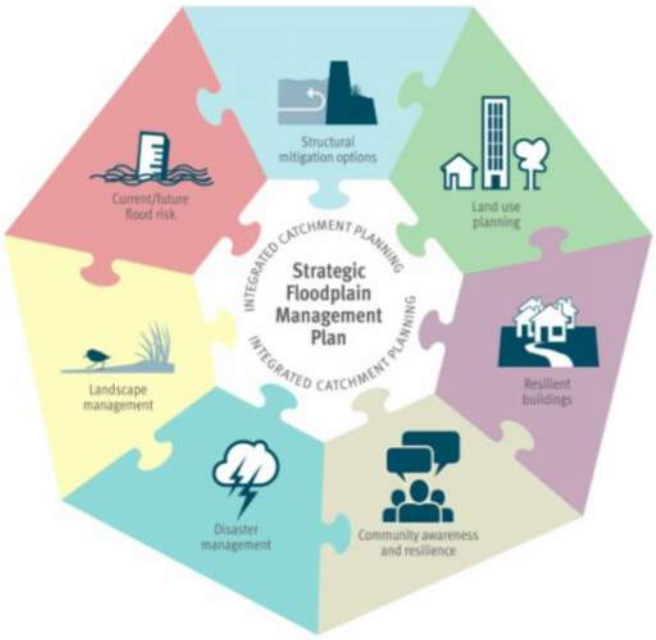

Figure 3-1: SFMP Integrated Planning Approach (p.12)

3.5.2 The Australian Institute of Disaster Resilience - Knowledge Hub

The AIDR produces a raft of information across natural hazards and across the scope of tasks from consultation to technical assessment to implementation. A primary reference manual for practitioners is the handbook series and especially AIDR Handbook 7 "*Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia*". The guide works toward a vision of:

> ***Floodplains are strategically managed for the sustainable long-term benefit of the community and the environment, and to improve community resilience to floods.***
>
> *AIDR Handbook 7 p.2*

The guide outlines best practice which involves a more holistic approach and consideration and management of flood impacts to existing and future development within the community.

The guide aims to improve community flood resilience using a broad risk management hierarchy of avoidance, minimisation and mitigation to:

- limit the health, social and financial costs of occupying the floodplain
- increase the sustainable benefits of using the floodplain; and
- improve or maintain floodplain ecosystems dependent on flood inundation.

This focus asks us to recognise that living in the floodplain has an inherent risk, and a residual risk will always exist even after management measures, including mitigation and land-use planning measures, are implemented.

The success of risk management depends on '*…the effectiveness of the management framework providing the foundations and arrangements that will embed it throughout the organisation at all levels*'

The guide was being drafted at the time of the QFCOI. Relevant chapters of this comprehensive edition include:

- Chapter 7: Treating flood risk; managing the risk to life and property and maintaining function of the floodplain
- Chapter 8: Treating flood risk to future development; and
- Chapter 9: Treating Flood risk to existing development

The summary of chapter seven provides a succinct direction on overall intent and outcomes which should be achieved through any flood risk review and conversion to a regulatory response.

It says that an effective response is informed by a detailed understanding of the local flood situation and its impacts on the community, and an understanding of the treatment options available and their limitations. Handbook 7 confirms that there is no single, uniformly applicable treatment to manage flood risk, its multipliers or range of behaviours. Importantly, the dynamics of flood risk should be considered over time and unless effectively managed, flood risk can change significantly with alterations to catchment and floodplain development in all forms and physical land characteristics. Risk can also vary with a changing climate. Risk increase can be managed by limiting risk to new development. The chapter provides guidance on tools to manage existing, residual and future risk. Planning, zoning and development responses dominate the future risk category.

Chapter 8 deals specifically with future development risk and guidance and confirms that limiting exposure to risk in the first place, where possible will always be the best options. There are areas of the floodplain that may be either too hazardous to develop or where development may have a significant impact on existing flood function that can result in adverse impacts on the existing community or environment.

Managing risk to new development is essential to limiting future risk. This can be achieved most effectively by strategic and development-scale land-use planning cognisant of the need to maintain flood function. Best practice in Handbook 7 advocates setting of 'flood risk' informed strategic land-use planning directions, and supporting zonings and land uses responses which

- limit the impacts of new development and the intensification of development on the flood risk of the existing community;
- limit the exposure of the new community to flood hazard;
- limit damage to new property and infrastructure to acceptable levels; and
- consider public safety and the associated needs of emergency response management.

Chapter 9 looks at regulatory and management responses for existing settlement patterns, which as for all components of the best practice manual requires a complete and thorough understanding of the flood risk and behaviours. The manual recommends prioritisation for reducing intolerable risks where practical and feasible. Consequences of flooding to existing buildings and infrastructure are a tough call to reduce in the short term through land-use planning responses. Options to reduce risk to the existing community aim to reduce vulnerability or exposure

of the community to flood impacts or improve the community's resilience to respond to floods and are generally focussed on built form and structural interventions. Relocation and buy back are also discussed in this chapter. The AIDR Handbook 7 is an extensive guidance document across the entire scope of flood management and responses.

3.5.3 Queensland State Planning Policy 2017

The final source of first principles for a planning response is the State Planning Policy (SPP). Figure two shows that planning response must address state policy matters four to six:

> ***Policy 4.*** *Development in bushfire, flood, landslide, storm tide inundation or erosion prone natural hazard areas:*
>
> *(a) avoids the natural hazard area; or*
> *(b) where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.*

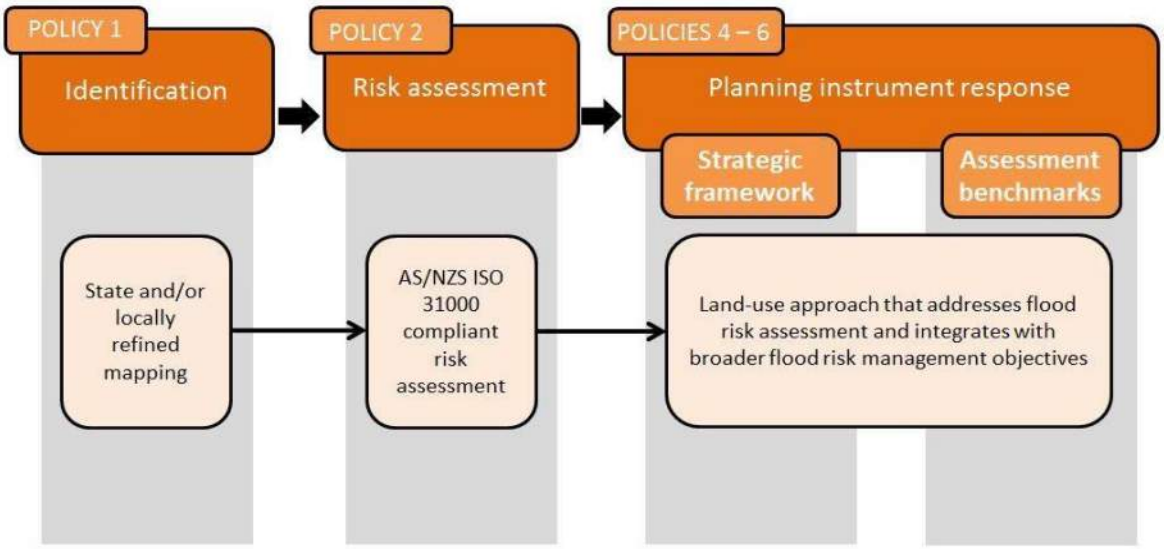

Figure 3-2: State Planning Policy Response

> ***Policy 5.*** *Development in natural hazard areas:*
>
> *(a) supports, and does not hinder disaster management capacity and capabilities*
> *(b) directly, indirectly and cumulatively avoids an increase in the exposure of severity of the natural hazard and the potential for damage on the site or to other properties*
> *(c) avoids risks to public safety and the environment from the location of the storage of hazardous materials and the release of these materials as a result of a natural hazard*
> *(d) maintains or enhances the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard.*
>
> ***Policy 6.*** *Community infrastructure is located and designed to maintain the required level of functionality during and immediately after a natural hazard event.*

Local planning instruments must achieve compliance with the state level policies.

3.6 South East Queensland Regional Plan

The South East Queensland Regional Plan (SEQRP) guides development across 12 LGAs including the entirety of the Lockyer Valley. The Lockyer Valley is in the Western Sub-region of the SEQRP. The Western Sub-region includes Ipswich and Toowoomba as the major growth centres. This peri-urban area provides the contrast to the urban and coastal areas and supports its reputation as one of the most fertile farmland areas in the world, and its role as Australia's food bowl, growing the most diverse range of commercial fruit and vegetables in Australia.

The region is noted as an emerging national- and global-oriented economy leveraging investments in airport, logistics and freight infrastructure an integrated transport network across and within the sub-region, connecting with the Metro subregion, including critical freight connections with the Port of Brisbane.

The SEQRP acknowledges expansive water catchments and groundwater systems that supply the region's water for drinking, farming and industry through a network of waterways, lakes and wetlands.

The SEQRP sets growth targets for Lockyer Valley at 21,500 in the 25 years from 2016 to 2041, or an additional 9,600 dwellings achieved 100% through expansion. However, the only area mentioned by the SEQRP for expansion is Plainlands. Gatton and Laidley are noted at Principal and Major rural centres respectively.

In the outcomes for the ***Grow*** theme the SEQRP is very clear the growth will occur in Toowoomba and Ipswich and Plainlands and that other centres should support new and emerging freight and logistics while preserving the primacy of the food bowl. To achieve the outcomes of the plan, the SEQRP divides broad land uses into Land Use Categories with three options:

- Urban Footprint; or
- Rural Living Area (RLA); or
- Rural Landscape and Rural Production Area (RLRPA)

RURAL PROSPERITY

10 The sub-region's principal rural production lands (for horticulture, forestry and grazing) in the Lockyer Valley, Scenic Rim, Somerset and Ipswich areas support one of the nation's most important food bowls; they are extremely important for long-term food security and export opportunities. This land resource and the supporting processing infrastructure will be protected, including preventing further land fragmentation and protecting rural industries and activities from encroachment by incompatible uses.

Alternative rural futures will be explored to diversify and increase the productivity of rural activities and strengthen the area's resilience to market cycles and climate change. Maintaining the productive capacity

of this land resource will become increasingly

important to the region in the face of climate

change.

11 The Queensland Government will partner with Ipswich, Scenic Rim, Somerset, and Lockyer Valley councils, the private sector, and key stakeholders to identify opportunities to ensure a sustainable future

for the sub-region's rural production land resources, including a secure and sustainable water supply.

12 The sub-region's hinterland areas support the growth of creative and boutique industries, and nature-, rural- and adventure-based tourism and recreation activities that add to its visitor appeal and economic diversity. These activities will be encouraged where impacts on the environment and scenic amenity can be successfully managed.

SEQRP, Sub-regional outcomes – next 25yeras, p.132

The intent of the RLRPA is to protect rural and landscape values and support associated rural economic activities. The RLA serves and contains the need for rural living. In the box at right the

Rural prosperity outcomes for the Western Sub- region are provided with a focus on rural production.

The Urban footprint designation is slightly more complex and is intended as a management tool. However, the Urban Footprint is not an urban zone and does not imply that all land can be developed for urban purposes. Land in the Urban Footprint may be unsuitable for urban purposes for other reasons including constraints such as flooding, land slope and scenic amenity. ShapingSEQ relies on local government planning schemes to determine the most suitable zone for each land parcel within the Urban Footprint. (Shaping SEQ p.101). For a region which is not designated to grow considerably the urban footprints attributed to through the Regulatory Maps are extensive. This will require further scrutiny when the place-based analysis is completed.

In the 'Live' theme outcomes section of the SEQRP, Laidley is the only centre to be mentioned:

"Laidley, one of the region's largely intact rural town main streets with potential to increase the appeal of the town centre".

Overall, the SEQRP supports continuation and primacy of rural-based industry and economy with specific growth only occurring at Plainlands.

4 Flood Risk Assessment Outputs

The risk matrix was informed by a detailed examination to understand the flood risk for Lockyer Valley and included a consideration of the **Hydraulic risk (HR)** which maps flood likelihood by Annual Exceedance Probability (AEP) and flood hazard category based on depths and velocities of floodwaters.

Consistent with the SFMP, hydraulic risk has been mapped using the methodology provided in the Australian Institute of Disaster Resilience (AIDR) Guideline. The WMA hazard risk assessment adopts the five hydraulic risk categories (HR1 to HR5) shown in Figure 4-1 below, with minor variations for local context (such as the addition of the 2011 flood event).

AEP	H1	H2	H3	H4	H5	H6
PMF	HR5	HR5	HR5	HR5	HR5	HR5
1 in 500	HR4	HR4	HR4	HR4	HR4	HR4
1 in 200	HR4	HR4	HR4	HR3	HR3	HR3
2011	HR4	HR3	HR3	HR2	HR2	HR2
1 in 100	HR4	HR3	HR3	HR2	HR2	HR2
1 in 50	HR4	HR3	HR3	HR2	HR2	HR1
1 in 20	HR3	HR2	HR2	HR1	HR1	HR1
1 in 10	HR3	HR2	HR2	HR1	HR1	HR1

Figure 4-1: Hydraulic Risk Matrix

Source: WMA Water Community Precinct Risk Assessment 2022, p.101

The raw hydraulic risk categories are then refined through the application of flood risk multipliers of velocity, isolation, warning time and others as mapped out in Table 4-1 using the colours of the internal Flood information portal. This allows allocation of a final risk level for the purposes of planning scheme integration. Four risk categories are shown which will form the foundation of the new planning scheme overlay from high to very low.

An initial categorisation of low to very high was presented to council to test tolerability levels and application to planning scheme regulation (see also section 4.3 above). The flood risk categories outlined below were formulated through discussion with Council and were originally four categories with high and extreme as one. However, the spatial extent of a merged category was not aligned with Council's risk tolerance therefore the extreme risk was identified to enable clarity in potential back zoning. The extreme risk category includes H5 and 6 upstream of Grantham from the 2011 event and downstream from the 1 per cent event.

Table 4-1: Flood Risk Categories

Risk Category	Criteria
Extreme	Upstream of Grantham - Hazard Category 5 or 6 from 2011 Flood event Downstream of Grantham – Hazard Category 5 or 6 from 1% AEP event
High	HR 2 Low flood islands Category A Floodway (1% AEP) Any moderate areas with warning time of less than 6 hours

Moderate	**HR3** **Low Flood Island Category B** **High Flood Island** **Flood Storage areas (1% AEP)** **Any low areas with warning time of less than 6 hours**
Low	**HR4** **Flood fringe areas (1% AEP)**
Very low	**HR 5**

4.1 Locality-Specific Risk Assessment

The region has been presented as 10 local areas for the purpose of preparing a place-based risk profile. Figure 4-2 below shows the ten precincts. The WMA Community Precinct Risk Assessment report outlines the hydraulic risk and other flood behaviours for each of the ten localities, and includes four vulnerabilities:

- physical vulnerability using demographic data
- mobility vulnerability using household and motor vehicle ownership data
- awareness vulnerability using transience data; and
- social and economic vulnerability using household, employment and financial data.

Each locality features a flood behaviour narrative, and greater detail on specific settlements and townships of hydraulic risk. Future scenarios and consequences are outlined along with a profile of population in relation to flood events. Each section is provided with statistical evidence of property by land uses and by potential hydraulic risk category. Access to and from the locality is summarised along with critical assets at risk.

4.2 Risk Multipliers

In the discussion for each section and the WMA Community Precinct Risk Assessment report, distinct risk multipliers are provided with exacerbate risk to life and property, add burden to emergency services, create isolation and further risky situations and assist in telling the story about flood behaviours unique to the Lockyer Valley.

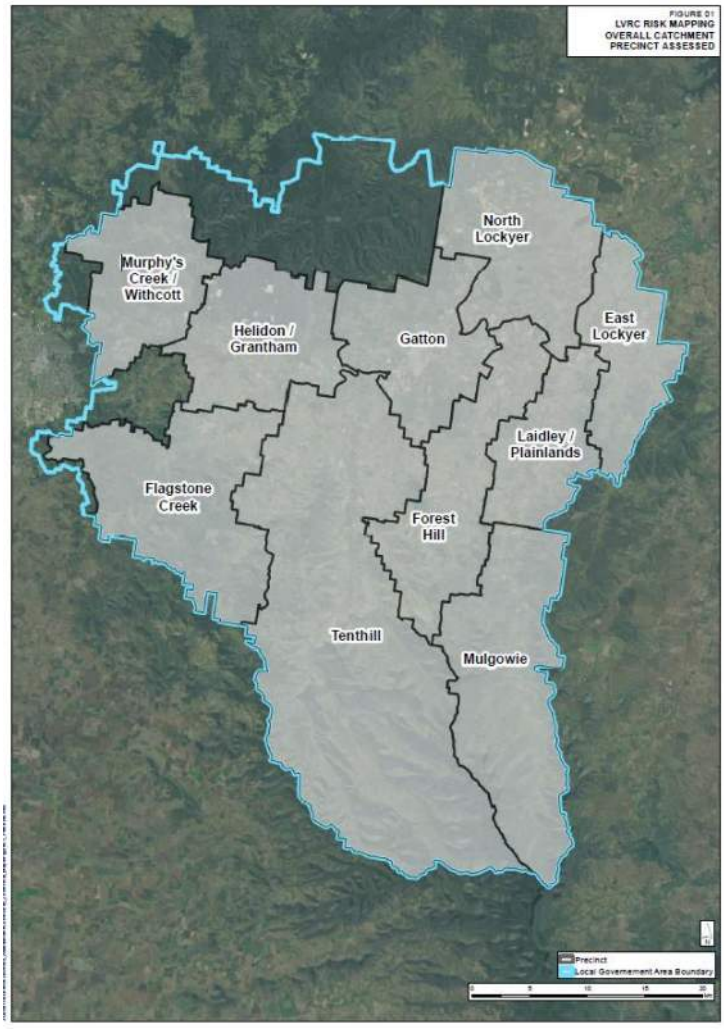

Figure 4-2: Local Community Precincts Map

For each locality, WMA has prepared figures which show:

- potential hydraulic risk over five categories
- flood behaviour (floodway, flood storage and flood fringe)
- limited warning time < 6 hours; and
- isolation maps of cut roads and flood islands

All figures and scenarios are prepared using the 1% Annual exceedance Probability (AEP) or in any given year the event has a 1% chance of occurring.

4.2.1 Limited Warning time

A fundamental driver of risk for Lockyer Valley is its overall topographical character and function as a valley surrounded by slopes and peaks. Settled areas are located in the lowest points of the valley and isolated settlements in high locations with fast running waters. The topography drives high velocities and low warning time. Figure 4-3 (right) shows (in pink) areas which have a warning time less than six hours.

The extent of the flood events with limited warning time impacts the entire valley and the extent of the probable maximum flood in grey does not have a vastly larger footprint.

This means that for a 1% AEP event, limited warning time is a feature for all communities and its spatial impact can be extensive.

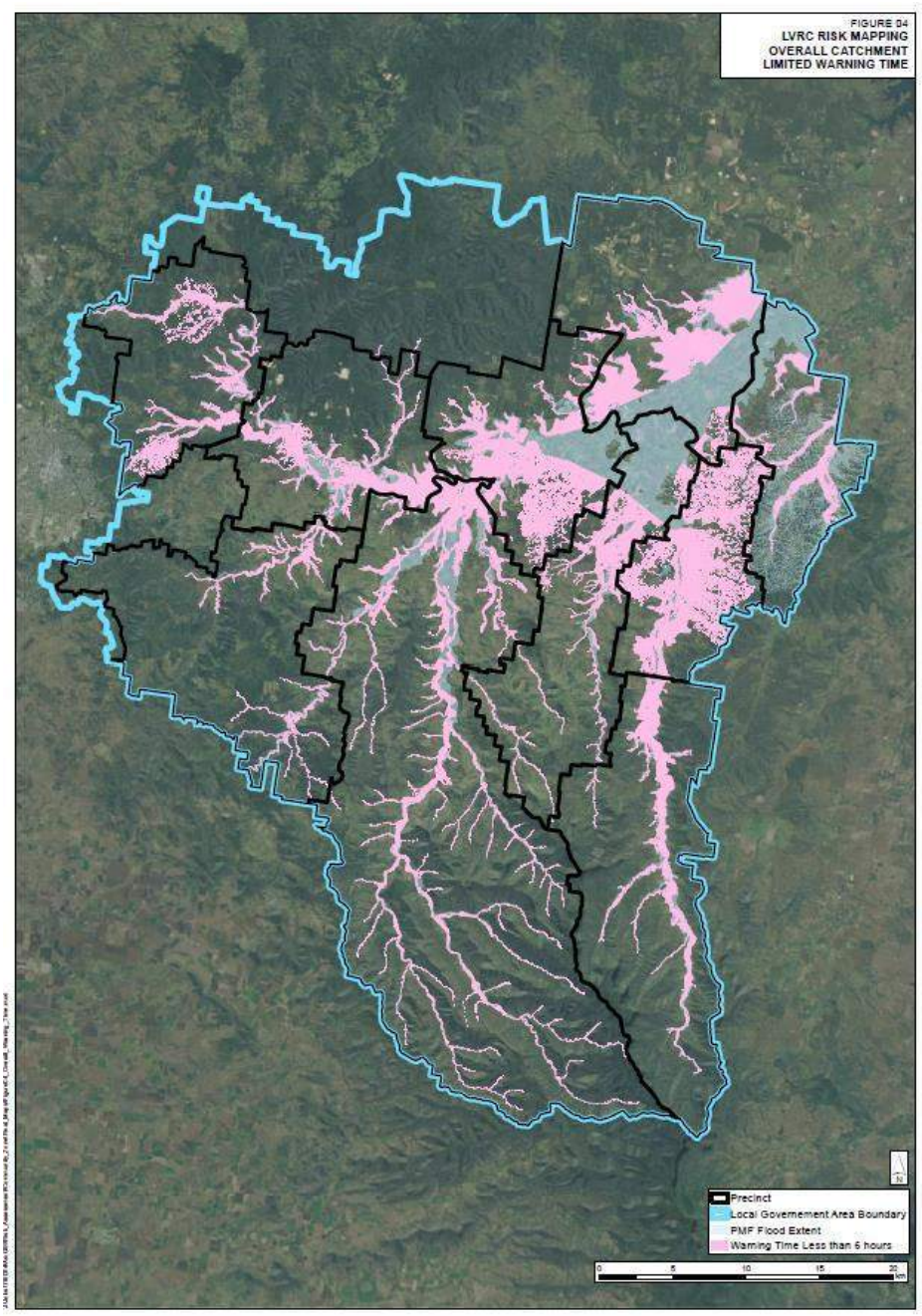

Figure 4-3: Warning time less than six hours

4.2.2 Catchment isolation

The catchment isolation map shows three features of importance:

- roads cut in the 1% AEP and rarer events
- properties effected above floor and above ground for 1% AEP and rarer events; and
- flood islands which are overtopped in a 1%AEP event, the PMF and high flood islands.

Each of these features is discussed by local area. From a regional perspective it is evident from Figure 4-4 below that these features manifest across the region and play a role in the efficacy of disaster management.

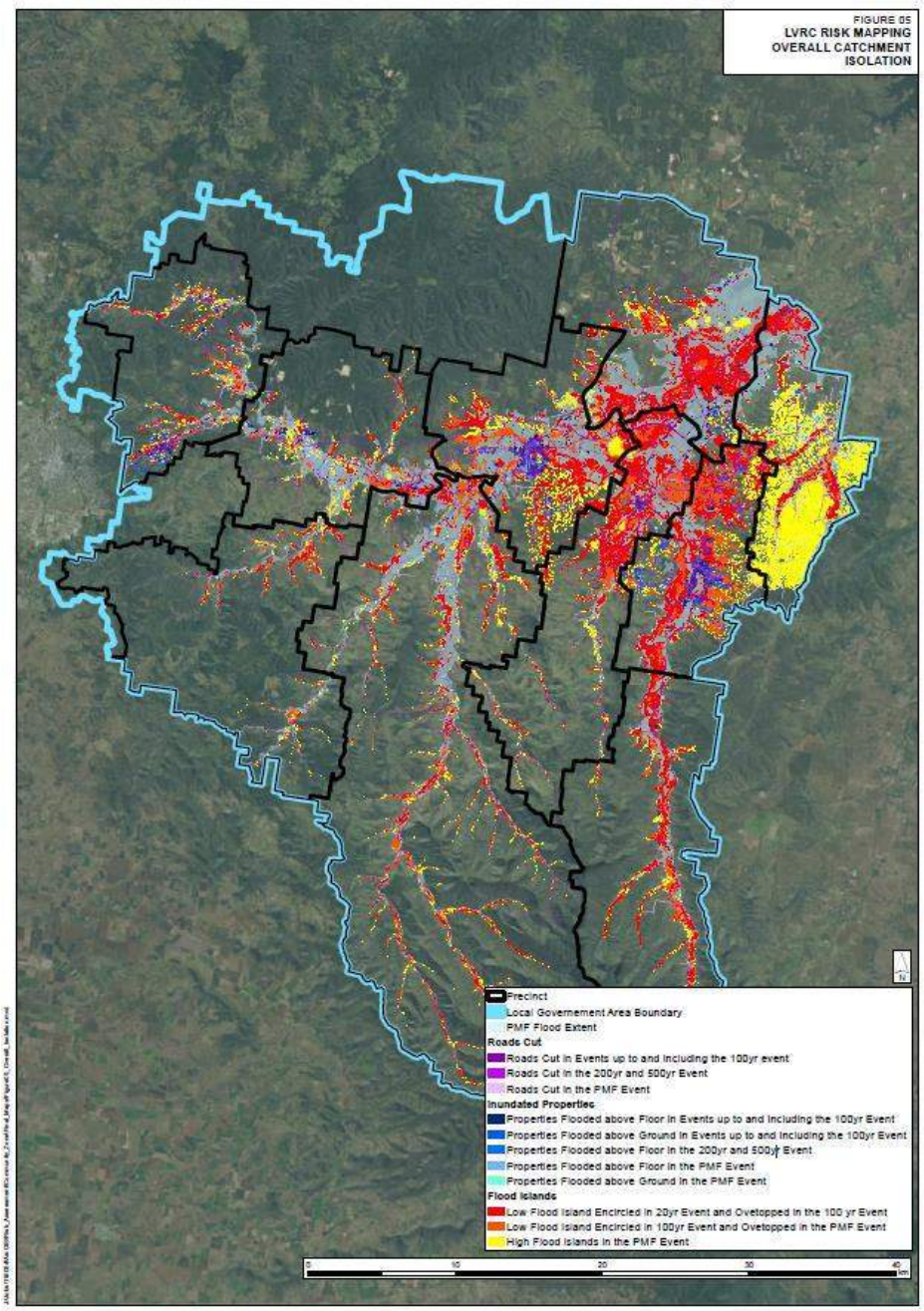

Figure 4-4: Catchment Isolation Map

4.3 Region-wide Land Use Zone Analysis

At an LGA scale, the impact of flood risk on existing urban-zoned land is profound. The region is highly exposed to high flood risk across most urban zones. Of key concern are the levels of flood risk exposure in urban zones against:

- HR 1 & 2 hydraulic risk (refer to the risk matrix in section 4.1) – given the significant flood depths and velocities associated with this hydraulic risk level, in relatively frequent events (i.e., generally below 1% AEP); and
- HR 3 hydraulic risk, given the majority of the region is also subject to less than 6 hours' warning time, these areas are subject to lower hydraulic risk but also (like HR 1 & 2) very limited time to evacuate or prepare. HR 3 also involves less than the 1:200 / 0.5% AEP event (i.e., similar to or less than the 2011 flood)

As per section 4.1 all the above risk categories are included within the extreme and high risk flood category for the purposes of land use planning. Therefore, the table below demonstrates the following flood exposure issues within urban zoned land in the region (whether with existing development or greenfield):

- 30% of Low density residential land is exposed to HR 1–3 hydraulic risk
- 36% of Low-medium residential land is exposed to HR 1-3 hydraulic risk
- 37.5% of Township land is exposed to HR 1-3 hydraulic risk – with 21% (which represents 56% of the total) affected at HR 1/2
- 56% of Major centre land is exposed to HR 1-3 hydraulic risk
- 63% of Local centre land is exposed to HR 1–3 hydraulic risk – with 42% (which represents 66% of the total) affected at HR 1/2
- 43% of Industry land is exposed to HR 1-3 hydraulic risk – with 27% (which represents 63% of the total) affected at HR 1/2

Rural residential land appears less constrained by direct impact from hydraulic risk, with approximately 20% of zoned land within HR 1-3. However, by land area, this represents 1,743 hectares of land that is severely constrained by flood risk – and exceeds the total hectares of urban zoned land otherwise flood impacted by HR1-3 (approximately 1,250 hectares).

In our professional experience, these values are substantially in excess of other local governments of similar type or location. See also section 7 for further discussion on the impacts of these risk exposure levels.

4.4 Local Area Risk Profile Summary

After examination of risk multipliers, vulnerabilities, flood behaviour, access, assets, future scenarios, people and property, each local area is provided is a summary risk level within the WMA report. These findings are presented in Table 4-2. Of the ten local areas only one is considered low risk which is Flagstone Creek.

Four local areas, Murphy's Creek and Withcott, Helidon and Grantham, Mulgowie, and Laidley and Plainlands all have high risk overall categorisations, which is due to both their locations high in their respective catchments, while also having substantial existing and possible future development at risk. The remaining five areas are considered at a moderate level of risk. Notably, Gatton is considered one of those moderate risk locations – primarily because of its situation generally above the floodplain. The dominance of high flood risk throughout the majority of the

region's existing growth centres highlights flood as a dominant and salient factor in developing a flood-resilient settlement pattern for the Valley.

Table 4-2: Local Areas Risk Profile Summary

Local Area	Locality	WMA Risk Classification
1. **Murphy's Creek and Withcott**	Murphy's Creek	
	Withcott	
	Lockyer and Upper Lockyer	
	Postman's Ridge	
2. **Helidon and Grantham**	Helidon Spa	
	Helidon	
	Iredale	
	Carpendale	
	Grantham	
3. **Flagstone Creek**	Flagstone Creek and Lilydale	
	Fordsdale	
4. **Tenthill**	Upper Tenthill Creek – Mount Sylvia, Mount Whitestone and Ropeley	
	Ma Ma Creek, Winwill	
	Upper Tenthill	
	Lower Tenthill	
5. **Gatton**	East – Placid Hills, Ringwood	
	Gatton	
	Woodlands	
	Lawes	
	Adare	
6. **North Lockyer**	Glenore Grove	
	Lake Clarendon	

Local Area	Locality	WMA Risk Classification
	Lockyer Waters, Morton Vale and Kentville	
7. **Forest Hill**	Blenheim and Glen Cairn	
	Forest Hill	
	Crowley Vale	
8. **Laidley**	Laidley Heights	
	Laidley	
	Laidley North	
	Plainland	
9. **East Lockyer**	Upper Woolshed Creek – Summerholm and Hatton Vale	
	Regency Downs and Brightview	
	Lynford and Luckrose	
10. **Mulgowie**	Thornton	
	Mulgowie	

5 Risk Based Policy Approach

As agreed with Council, the planning response for flood risk should be grounded in a methodology that focusses on places and people rather than a 'one size fits all' approach to flood regulation throughout the Council area. The figure below, developed as part of the Background Review paper, shows the steps in the approach presented to Council as the basis for moving forward with the expert advisory work. This represents a place-specific approach to policy and controls, based on identified risks.

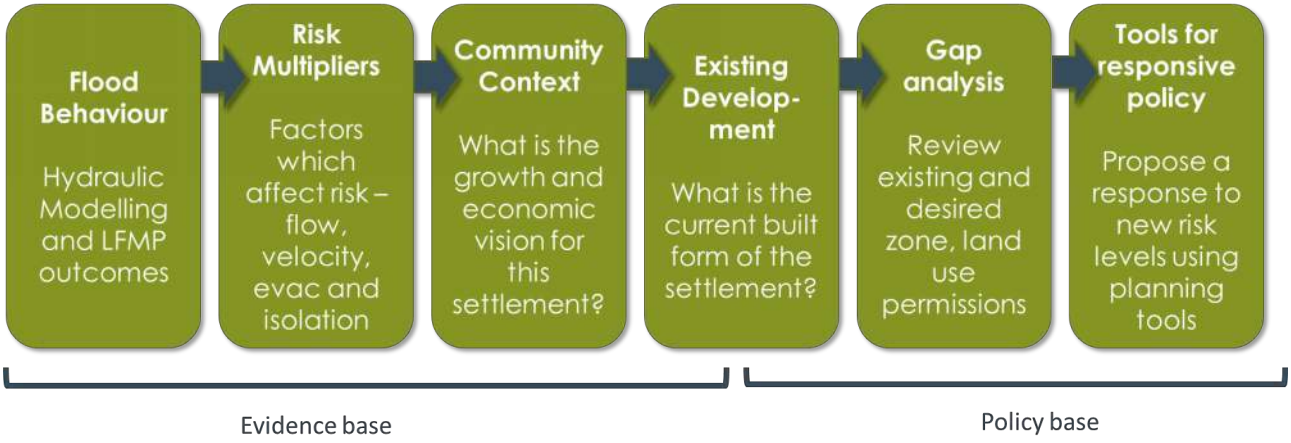

Figure 5-1: Project methodology using a place-based approach

Planning for natural hazards is fundamentally about risk to life and property but is also about taking steps to limit future impositions on other government functions (like disaster management) and expenditure on recovery and reconstruction, while also supporting communities to strive for sustainable development and community wellbeing even when stresses and shocks might occur. This requires a multi-faceted view of the dimensions of risk, to ensure that future development in the LGA occurs in a way that is tolerable or acceptable.

Through the planning scheme, and therefore compliance with the SPP, Council is determining those risk levels for all parties involved in future development undertaken in accordance with the planning scheme. Reaching that decision regarding risk acceptability and tolerability also requires Council to balance other state interests under the SPP and locally relevant values and context as discussed dint he policy implementation section above. Therefore, a place-based approach is needed in addressing risk.

A risk-based planning framework is highly valuable as a tool to 'translate' the often highly technical outputs from hazard-specific risk assessments into land use policy positions for broader strategic and land use planning application.

This section sets out the risk-based planning framework which is used as a start point for testing local policy implementation and tolerability, providing a 'first pass' or strategic assessment of land use appropriateness relative to risk and considers a wide range of place-based and contextual elements critical for the proper integration of risk into the land use planning context.

5.1 Flood Risk Category and Land Use Planning Risk

To advance the concept of the land use policy table below while awaiting key inputs from the LFMP process (including localities for review, community profiles, locality-based flood risk

behaviour, and the like), a purely hydraulic risk-driven land use policy table (i.e., without the place-based context) has been developed to describe both the:

1. flood risk circumstances that the planning scheme should seek to address through land use policy and development control (including risk multipliers like velocity and time to inundation); and
2. possible land use policy responses to the combined circumstances of hydraulic risk and likely risk multipliers.

Consistent language is important as we move from hydraulic risk and the risk assessment to a planning context. Planning instruments and the SPP use language shown in the right column to convey risk implications, however overlays will still show an intensification of risk using qualitative language of low to extreme.

Table 5-1: Land Use Planning Risk Categorisation

Flood Risk Categorisation	Description of flood and likelihood and consequences	Initial Planning Risk Categorisation (SPP) before mitigation / regulation
High (or greater)	• Likely and frequent flooding • Combination of depth and velocity issues • Buildings vulnerable to failure and unsafe for vehicles and people • Isolated flood islands with potential to be submerged and limit evacuation options and opportunity • Buildings vulnerable to failure • Limited or insufficient warning time • Immediate risk to life	**Intolerable** **individuals and society will not accept this risk and measures should be put in place to reduce risks to at least a tolerable level**
Moderate	• Likely and regular flooding • Buildings vulnerable to damage, some structures may fail • Generally unsafe for vehicles and people • Some isolation and flood islands which impact ability to evacuate	**Tolerable** **society can live with this risk but expect that as much as is reasonably practical should be done to reduce the risks further. Individuals may find this risk intolerable and choose to take their own steps, within reason, to make this risk acceptable.**
Low	• Likely but infrequent flood events • Buildings should sustain • No velocity or depth extremes • Adequate warning time allowing preparedness • Unlikely loss of life or significant property	

Flood Risk Categorisation	Description of flood and likelihood and consequences	Initial Planning Risk Categorisation (SPP) before mitigation / regulation
Very low	• Balance of floodplain • Unlikely and rear flooding events • Area potentially affected by extremely rare flooding that may not require mitigation	**Acceptable** **Individuals and society can live with this risk without further action and accept any residual risk.**

5.2 Land Use Policy Principles

The following policy principles will be used to guide the land use policy response for flood risk:

Principles for land use policy response to flood risk	
	**Risk from riverine flooding and overland or sheet flow are of equal importance**
	**Land zoned for a purpose should be able to be developed for that purpose**
	**The latest recommendations and leadership in flood risk management should be taken on board for the most current and robust response, especially the Brisbane SFMP and the QFCOI**
	**Local context, land use and natural hazard history shapes the local flood hazard response.**
	**Risk analysis will consider strategic risk in the context of the potential settlement pattern and demand for more infrastructure and services in locations – with a core focus on risk to life and minimising future impact**
	**Risk reduction will consider the widest possible range of tools including recommendations for change across the planning framework, policy or council programs**

Figure 5-2: Policy principles for Lockyer Valley flood risk

5.3 Planning Pathways

In order to translate the risk assessment outcomes and recommendations into risk-informed local land use policy positions, there are five planning pathway options which can be considered in the context of the:

- flood risk of an area, and
- intended settlement and growth outcomes for that area.

These are *accept/transfer*, *avoid*, *arrest*, *mitigate* or *transition away* from the risk as shown in Table 5-2 This then provides a pathway to develop an appropriate land use planning response relative to the risk for the new planning scheme. The table below provides the land use policy response context for applying planning pathways that will be used to guide the land use policy responses in the new planning scheme.

Table 5-2 - Planning pathways to guide land use policy responses

ACCEPT / TRANSFER THE RISK Relevant to low-level / acceptable risk situations and recognises that other mitigation measures exist outside planning processes
• The risk is sufficiently low (acceptable) to negate the need for a strong planning response • The risk level is accepted as is, or can be transferred beyond the planning process with disaster management arrangements or public assets
MITIGATE THE RISK Enable the achievement of growth intent for the area
• Mitigate the risk to protect economic primacy of urban centres where appropriate • Consider the use of flood resilient precincts which provide specific built form mitigation responses • Mitigate the risk if it can reduce risk to life and improve the safety of people
AVOID THE RISK Undeveloped areas or areas with limited built form
• Prioritise the safety of people and avoid the risk where there is a risk to life • Avoid zoning land in flood risk areas for urban purposes • Consider policies that promote development in places outside the risk areas • Maximise the environmental values of natural areas
ARREST / AVOID FUTURE RISK INCREASES A no-worsening approach, no further intensification, 'holding pattern'
• Stop risk from increasing by limiting the future intensification of use • Consider the use of flood resilient precincts which provide specific use or density reductions to maintain compatibility of use with the risk • Enable built form mitigation / drainage responses over time through development controls • Allow rural uses relative to the flood risk in rural areas • Avoid any intensification of development in high-risk areas
TRANSITION AWAY FROM THE RISK Deliberate density reductions or planned retreat of most at-risk existing urban areas
• Active use / intensity reduction over time where the risk is intolerable – use in line with direct interventions such as buy-back or land swap • Downsize key centres where it is aligned with the realistic economic viability of the centre • Consider a reduction in the intensity of the land use or a change in the land use to maximise community and economic resilience so that it can sustain and prosper

5.4 Land Use Policy Tables

The table provides a general description of, and reasons for, the level of risk prescribed by the combination of the hydraulic risk categorisation and the risk multipliers, consistent with the first principles identified above. It also utilises the terminology of the SPP in framing the levels of risk into acceptable, tolerable, and intolerable as per the figure below.

Figure 5-3: Land Use Risk and Response Continuum

The table articulates a broad description of the land use policy position that responds to the identified level of risk, and a more detailed set of land use and statutory planning responses for integration with the broader settlement policy parameters within the LVDPS. This involves describing zoning changes, precinct additions, use restrictions, and the like against common zone types in the LVDPS.

Key development control parameters related to some specific risk circumstances that should drive overlay code development are also provided. Note this list is not exhaustive – the full suite of matters to be addressed by the revised draft flood hazard overlay code are provided in section five.

A list of non-planning risk treatments & supporting governance measures that would support the implementation of the planning response is also provided, given that the SPP requires the level of connection between the planning provisions proposed and the broader suite of risk management measures used to treat the flood risk to be clearly demonstrated.

In short, the land use policy tables attempt to show the complete pathway from hydraulic risk, risk assessment, planning risk categorisation, policy application and regulatory implementation options.

Table 5-3: Hydraulic Risk-Driven Land Use Policy Table

Flood Risk Categories inc. multipliers		General Level of Risk	Reason for Level of Risk	Policy Pathway Options	Broad Land Use Policy Position	Integration with Settlement Policy							
						Natural Places	Rural Productive Land	Rural Places Townships and Hamlets	Rural Residential	Existing Urban Areas	Greenfield Urban Areas	Commercial Centres	Special Use Places
Flood Risk Category (WMA)	Extreme	Intolerable Risk	HR1&2 within H5&6 2011 DFE upstream of Grantham 1% AEP downstream		Strategic intent should highlight areas not suitable for development and targeted for transition and limited land use permissibility. Support **TRANSITION** or maintenance of land for non-urban use due to intolerable existing and future risk. Identify on a lot basis, parcels which should have Limited Development Zone applied or a limiting precinct approach. Rationale to be clearly articulated in the strategic intent. - Ensure risk to life is not increased (even indirectly via adjacent development) - Strict Land Use Permissibility - No development (residential, commercial, industrial, community facilities) - No intensification of existing use - No hazardous chemicals - Suitable for cropping, open space, parks etc only	No zoning change - no infrastructure in extreme risk area	No zoning change - potentially apply a rural precinct to limit built form and capital investment - No other development in extreme risk area	Apply back zone (LDZ) on urban sized allotments or the valley Rural floodplain precinct due to intolerable risk to life and property on urban sized lots. No other development in extreme risk area	Apply back-zone (LDZ) due to intolerable risk and severe development limitations - no dwellings of any kind located on a lot within the extreme risk area - no secondary dwellings of any kind on the lot - no home-based business - protect flow paths and require demonstration of access - consider split zone for undeveloped parcels	**Apply LDZ on lots in resdiential, commercial, industrial and lots where impacted by 75% or greater,** due to intolerable risk & severe development limitations - No dwellings of any kind located on a lot within the extreme risk area - No urban uses or reconfigurations to increase intensity -No other development in the extreme risk area - Apply split zone for undeveloped parcels	Split zone all extreme risk areas from development footprint using a non-urban zone (e.g. Open Space where public benefit, LDZ or Environmental Management) and not retain in private ownership post development Ensure future development is appropriate for broader settlement pattern	Maintain lower order commercial zones e.g. Local centre zone - no intensification - limit built form (height and footprint) - no people intensive uses e.g. gyms - promote less intense commercial uses e.g. outdoor sales - promote inherent strengths, e.g. heritage values - assist transition to less intensive uses through assessment levels	No zoning change - Promote structures outside of high risk and limit built form - no uses with dangerous chemicals
	High	Intolerable Risk	HR 2 Low flood islands Category A Floodway (1% AEP) Any moderate areas with warning time of less than 6 hours		Strategic intent should highlight specific places and townships not suitable for certain development with particular flood needs in place-based precincts. First position for urban uses is **AVOID**. Support **ARREST** of urban uses and maintenance of land for non-urban use due to intolerable existing & future risk. Some areas may still need a **TRANSITION** approach for particular land uses Ensure risk to life is not increased (even indirectly via adjacent development) - Strict Land Use Permissibility, potentially with identified precincts - No vulnerable uses - Arrest urban development (residential, commercial, industrial, community facilities) by limiting development types to flood compatible uses - No intensification of existing use or expansion of urban uses - Suitable for open space, parks and low intensity development with low built form needs, sacrificial built form, or rural land uses - no hazardous chemicals - strict fill policy	No zoning change - Promote structures outside of high risk are (even for park equipment etc - due to DRFA Cat B not covering this anymore)	No zoning change - Promote development outside of high risk area - no dwellings in high risk area - no intensive rural industry in high risk area	Apply a flood resilient precinct approach which uses place and context specific performance outcomes - **ARREST** and limit density and use types due to intolerable risk to life and property but enable flood compatible uses - promote development outside of high risk area - dwellings permissible on existing Township lots where complying with floor levels, MP3.5, and flood free access - no rural industry, local centres or employment nodes in high risk area	Apply a flood resilient precinct approach which uses place and context specific performance outcomes where appropriate - apply stringent built form requirements - dwellings permissible on existing developed Rural residential lots where complying with floor levels, MP3.5, and flood free access - **AVOID** structures located on a lot within the high risk area - **AVOID** intensification - no secondary dwellings of any kind on the lot - no home-based business - protect overland flow paths and require demonstration of safety from flow paths and is protected via covenants, easements or split zones - apply largest lot size precinct due to intolerable risk to life and property.	Apply a flood resilient precinct approach which uses place and context specific performance outcomes where appropriate - local and specific actions such as stringent built form requirements, emergency and evacuation plans - dwellings permissible on existing developed Low density residential lots where complying with floor levels, MP3.5, and flood free access - no intensification / density increase - **AVOID** structures located on a lot within the high risk area where possible - **AVOID** intensification - no secondary dwellings of any kind on the lot - no home based business - protect flow paths and require demonstration	**AVOID** new growth per SPP - Split zone known corridors - Review settlement pattern new development must demonstrate immunity from flood events.	Apply a flood resilient precinct approach which uses place and context specific performance outcomes where appropriate - local and precinct specific actions such as footprints, uses, setbacks, emergency response, evacuation or similar - maintain lower order commercial zones e.g. Local centre zone - **AVOID** intensification and increased capital investment - promote less intense commercial uses e.g. outdoor sales - promote inherent strengths, e.g. heritage values - assist transition to less intensive uses through assessment levels	No zoning change - Promote structures outside of high risk and limit built form - no uses with dangerous chemicals
	Moderate	Tolerable Risk	HR3 Low flood islands Category B Flood storage areas (1% AEP) Any moderate areas with warning time of less than 6 hours High flood islands		Strategic intent should highlight that development should not occur in many instances with limited suitability and the need for mitigation to acceptable risk. **ARREST** future increase in risk by limiting future urban use Retain undeveloped or rural areas in current state Encourage reduction in existing risk by adapting existing development over time on a case by case basis. Strict Land Use Permissibility - **AVOID** first due to multiplying risk factors of warning time and depth - mitigation may be possible in some places / uses - No vulnerable uses - No intensification or up zoning - Limit new urban development unless **MITIGATION** to acceptable level can be demonstrated (residential, commercial, industrial, community facilities) - rural industry only where no other reasonable alternative site - building improvements (including new dwellings) only where property and risk to life can be mitigated - no greenfield expansion without demonstration of mitigation - strict fill and overland flow controls	No zoning change - promote structures outside of risk (even for park equipment etc - due to DRFA Cat B not covering this anymore)	No zoning change - promote development outside of risk - dwellings not located within risk area - no rural industry unless mitigation can be demonstrated	No zoning change Strategic intent should maintain or decrease settlement intensity and require development **MITIGATE** to performance outcome of acceptable risk. - promote development on lowest risk parts of lot compliance with overlay code	No zoning change Proposals must **MITIGATE** risk and demonstrate all aspects of development can proceed in accordance with overlay code - built form outside risk area where possible - secondary dwellings or dual occupancy outside risk area - dwelling only via code assessment which also demonstrates safety from overland flow and is protected via covenants, easements or split zones	Strategic intent should maintain settlement pattern or decrease intensity and require new development to **MITIGATE** to acceptable levels - infill proposals must **MITIGATE** risk and demonstrate all aspects of development can proceed outside the risk area - maintain low density - dwelling only via code assessment	New growth per SPP unless demonstration of mitigation and future development is at acceptable risk - Split zone known corridors - Review settlement pattern new development must demonstrate immunity from flood events.	No zoning change Strategic intent should maintain settlement pattern and not intensify commercial development - proposals must mitigate risk and demonstrate all aspects of development can proceed outside the risk area including risk to patrons - built form solutions - monitor accepted change in use for vulnerable uses - limit built form in risk areas - promote low intensity commercial and industry supporting land uses	Proposals must **MITIGATE** risk and demonstrate all aspects of development can proceed outside the risk area - limit built form in risk areas - no uses with dangerous chemicals
	Low	Tolerable Risk	HR4 Flood Fringe Area at 1% Flood Fringe		Strategic intent should have dealt with risk at higher levels. These areas should be suitable of redevelopment . Reconsider greenfield expansion in the context of wider risk multipliers and disaster management All proposals must **MITIGATE** to acceptable levels Support built form change in existing areas over time Address isolation and time to inundation issues through design where possible Support flood resilient land uses in non-urban areas Responsive Land Use Permissibility - strong focus on built form controls - no adverse impacts on flood behaviours - strict filling controls	No zoning change, land uses compatible with natural areas can proceed on a flood aware basis	No zoning change, land uses compatible with rural production areas can proceed on a flood aware basis. - minimum floor levels	No zoning change, land uses compatible with the zone - apply minimum floor levels and resilient built form	No zoning change Proposals must MITIGATE risk and demonstrate all aspects of development can proceed in accordance with overlay code - built form located outside risk areas with consideration of evacuation and surrounding flood risk - strong stormwater and drainage policies to support - maintain flow paths - encourage resilient home construction and apply resilient built form requirements.	No zoning change Strategic intent should confirm suitability of land for development. Consider long term effects on location. - proposals must **MITIGATE** risk and demonstrate all aspects of development can proceed with an acceptable risk level -built form responses and resilient home construction and apply built form resilient built form requirements -strong code responses to allow development to proceed where risk can be mitigated - strong stormwater and drainage policies to support	No zoning change - MITIGATE any risk to acceptable.	No zoning change Strategic intent should promote principal and elevated commercial centres and intensive investment in other areas. Consider long term effects of higher order commercial centres - proposals must mitigate risk and demonstrate all aspects of development can proceed with an acceptable risk level -built form responses -strong code responses to allow development to proceed where risk can be mitigated - strong stormwater and drainage policies to support	Proposals must mitigate risk and demonstrate all aspects of development can proceed with an acceptable risk level
	Very Low	Acceptable Risk	HR5		Development is generally acceptable subject to any applicable development controls. Vulnerable uses require site-based consideration for access / isolation / disaster management burden in particular.	No zoning change, land uses compatible with natural areas can proceed on a flood aware basis	No zoning change, land uses compatible with rural production areas can proceed on a flood aware basis.	No zoning change, land uses compatible with the zone - apply minimum floor levels and resilient built form	No zoning change Proposals must have a built form response and ensure development can proceed in accordance with overlay code - consideration of evacuation and surrounding flood risk - strong stormwater and drainage policies to support - maintain flow paths - support resilient homes	No zoning change Proposals are consistent with he urban zone and must have a built form response and ensure development can proceed in accordance with overlay code - consideration of evacuation and surrounding flood risk - strong stormwater and drainage policies to support - maintain flow paths - support resilient homes	No zoning change	No zoning change Use is consistent with the zone - proposals must mitigate any risk a -built form responses -strong code responses to allow development - strong stormwater and drainage policies to support	Proposals must mitigate risk and demonstrate all aspects of development can proceed with an acceptable risk level

6 Place-based Flood Risk Profiles

The region has 10 precincts for the purpose of preparing a place-based risk profile. WMA Community Precinct Risk Assessment report outlines the hydraulic risk for each of the ten precincts and includes four vulnerabilities:

- physical vulnerability using demographic data
- mobility vulnerability using household and motor vehicle ownership data
- awareness vulnerability using transience data; and
- social and economic vulnerability using household, employment and financial data.

Each precinct features a flood behaviour narrative, and greater detail on specific settlements and townships of hydraulic risk. Future scenarios and consequences are outlined along with a profile of population in relation to flood events. Each section is provided with statistical evidence of property by land uses and by potential hydraulic risk category. Access to and from townships is summarised along with critical assets at risk. This section will detail each of the ten precincts and discuss the settlement context, strategic vision role for the community. The WMA flood narrative is combined with other local features and risk is considered in a land use planning context with draft zones and strategic intent.

- risk categories
- land use transects
- policy tables; and
- policy pathways

Finally, each section is provided with a recommended policy pathway and actions for the new planning scheme.

6.1 Murphy's Creek and Withcott

The precinct of Murphy's Creek and Withcott is at the western edge of the LGA and dominated by road infrastructure connecting to Toowoomba and the Toowoomba Escarpment. The LGA boundary is about half way up the Toowoomba Range Road (A21).

The area is characterised by steep slope, remnant vegetation, isolated settlements dominated by lifestyle living, and the townships of Withcott, Murphy's Creek, Upper Lockyer, Lockyer and Postman's Ridge. Table 6-1 provides a glimpse of hydraulic risk across the local area.

There is a convergence of water course streaming down the range to Withcott such as Monkey Water Holes Creek on the south, Gatton Creek which runs parallel to the A21, Oakey, Little Oakey and Rocky Creek to the north of Withcott, and Murphy's Creek north of the Toowoomba Bypass.

Murphy's joins Alice and Fifteen Mile Creeks coming from the north which merge into Locker Creek in the vicinity of Lockyer Siding Road at Upper Lockyer. The Six Mile Creek joins just below Withcott before all streams from north or south join at various intervals in the vicinity of Helidon.

Murphy's Creek commences its watershed at about 500 metres. Gatton Creek watershed commences at about 550 metres and Monkey Water Holes Creek at about 450 metres. Murphy's Creek township and Withcott are located at approximately 250 metres, Lockyer at 170 metres and Postman's ridge at an elevation of approximately 180 metres. Figure 6-2 shows a hill shade image of the topography and the convergence of water courses into the Lockyer Creek at the Helidon area.

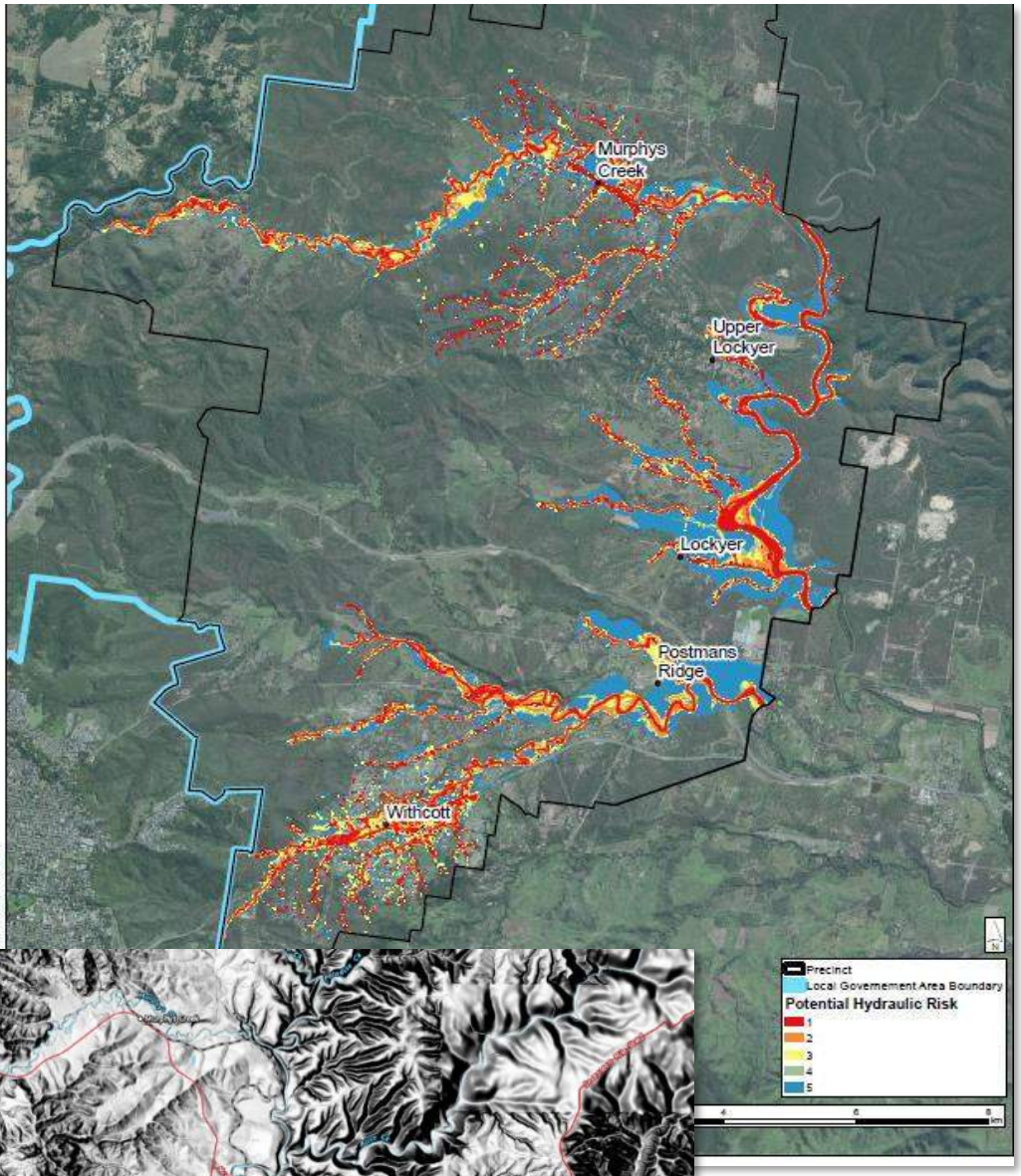

Figure 6-1: Potential Hydraulic Risk - Murphy's Creek and Withcott

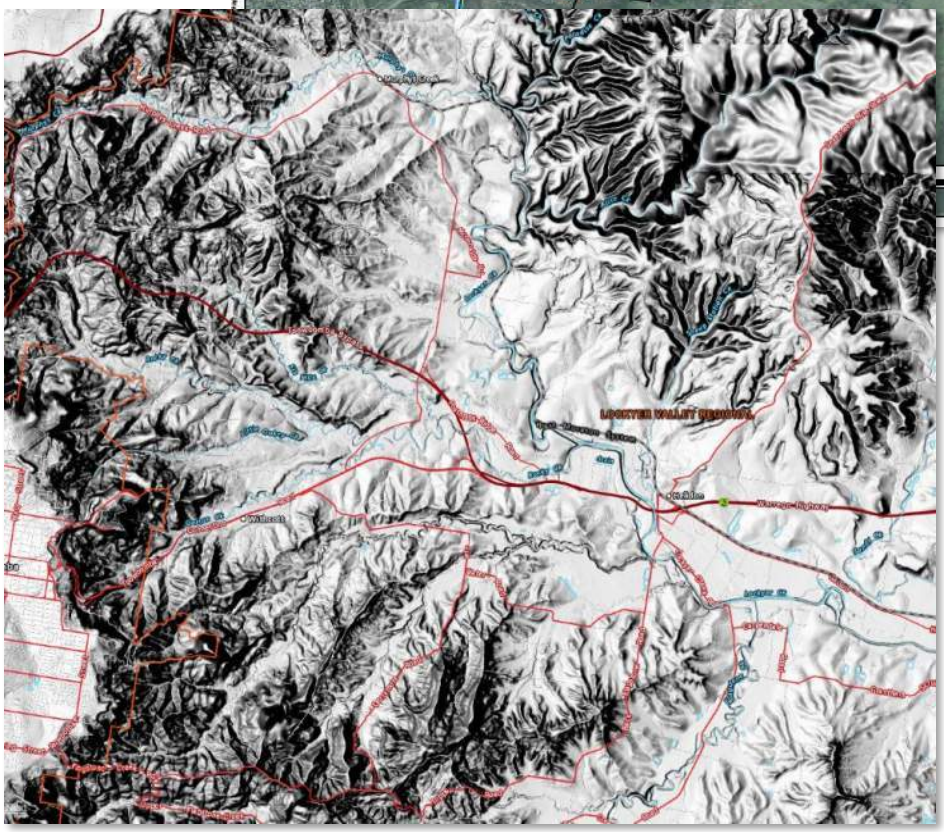

Figure 6-2: Multidirectional Hill shade image of watercourses converging at Helidon.

6.1.1 Flood risk narrative

From the risk assessment and local area profiles prepared by WMA, Table 6-1 synthesises the local area details which form the basis of an overall risk profile of 'high'.

Table 6-1: Murphy's Creek and Withcott Flood Particulars

Element	Comments
Overall Risk (from WMA report)	HIGH
Vulnerability	Vulnerability is generally higher but vulnerability due to awareness is slightly lower. Physical and mobility vulnerabilities are higher than average.
Flood Behaviour and Multipliers	Due to steep terrain, flash flooding within deeper floodways is expected and flood storage is limited. This is valid for both Withcott and Murphy's Creek. Withcott warning time is less than 2 hours. The A21 is a floodway and water flows rapidly along the main street. Potential Hydraulic Risk is classified as HR1 and HR2. Surrounding Rural residential development at Postman's Ridge flood behaviour is characterised by numerous flow paths and overland flows which impact across residential allotments. Further south, flows star to breakout of the channel at Lockyer where tributaries converge
Future Outlook	Depths will increase by .5m in the Lockyer area under climate change scenarios, but given flows are mostly contained within floodways and water courses, impacts are expected to be limited, apart from the areas already known to break out such as Withcott main street.
Consequences	• residential properties on the north side are trapped in flood events as exit for the area is not possible. • high velocity has resulted in loss of life through vehicle and people being swept away. • low warning times add to this high risk • high isolation issues prevent fulsome emergency response
Mitigation Options	• recent buy back schemes • minor structural recommendations by Jacobs and others on drainage and road infrastructure • improve flood intelligence systems (cameras) • ensure no worsening through land use planning • community awareness

6.1.2 Property and Land Use Impact Summary

For the purposes of detailed analysis, for each locality several metrics are prepared

- 71 residential* allotments are impacted by >50% of the lot area in HR1&2; of which
- 29 are impacted >75% of the lot area
- there is no Emerging community zoned land in the location

**Residential is LDR, LMDR, RRES and does not include Township or Emerging community Zones*

Table 6-2 below provides an analysis by zone. The Withcott and Murphy's Creek precinct has significant percentages across many zones. Murphy's Creek entirely within the Township zone and almost 80 per cent of the township is at risk. Lockyer, Upper Lockyer and Postman's Ridge and entirely within the Rural Residential zone, and both townships have minor Community facilities and Sport and Recreation zoned land.

Table 6-2 shows that 99.4 per cent of the commercially zoned land in Withcott has some flood risk. More than half is at high risk, another third and moderate risk and the balance at low risk. Almost three quarters of the industrial zoned land is at risk. Significant areas in all residential zones show risk across the spectrum. As is expected, significant areas of Open Space, Conservation and Sport and Recreation zoned land is affected by flood.

6.1.3 Draft Planning Scheme zones and intent

The Strategic Framework provides for Urban Centres, Urban Towns, townships and Rural Hamlets. Murphy's Creek is noted as Township while Withcott is an Urban Town.

Zones within the local area are dominated by Rural and Rural Residential zones. Withcott has several zones expected in a community including Low Density Residential, Open Space, Sport and Recreation, Industry zone and Local centre zone.

Withcott is designated as an urban locality in the strategic framework and is expected to grow to the limits of the existing urban area (excluding Rural residential). The draft Strategic Framework 3.2.3 notes urban towns as having the following growth characteristics (emphasis added):

Urban towns *Urban towns offer a range of lifestyles with moderate levels of access to employment, infrastructure and services and a strong affinity with community and rural areas. These towns also often have medium to high tourism visitation values.* ***Most Urban towns are intended to expand*** *to accommodate future growth.* ***Consolidation of established areas is expected.***	*Forest Hill, Grantham, Helidon, Withcott*

The strategic framework highlights the constraints to Withcott due to flooding and the Gatton Creek flood way. However, it maintains Withcott's position as an Urban Town. The above narrative does not commit growth to every Urban town; however, it does commit each Urban town to intensification through infill and consolidation.

Murphy's Creek is a Rural township. The Strategic Framework 3.2.3 notes Rural townships as having the following growth characteristics:

Table 6-2: Murphy's Creek & Withcott - Hydraulic Risk and Zone Area Analysis

Current Scheme Hydraulic Risk Overlay		*Murphy's Creek / Withcott*										*Total*
		Zoned area		HR1-2 *Overlay area*		HR-3 *Overlay area*		HR4 *Overlay area*		HR5 *Overlay area*		
Zones	**Total LVRC zone (ha)**	(ha)	(%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected zone (%)
Community Facilities Zone	3,657.86	642.15	17.56%	21.67	3.38%	12.78	1.99%	7.18	1.12%	25.19	3.92%	10.41%
Conservation Zone	23,083.17	17.97	0.08%	6.17	34.33%	0.47	2.62%	0.35	1.94%	0.77	4.29%	43.18%
Emerging Community Zone	1,299.38	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Industry Zone	363.47	32.92	9.06%	7.31	22.20%	5.26	15.97%	7.35	22.33%	4.02	12.23%	72.73%
Limited Development Zone	44.54	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Local Centre Zone	22.17	10.89	49.10%	6.71	61.68%	3.24	29.73%	0.80	7.35%	0.07	0.66%	99.42%
Low Density Residential Zone	1,135.77	361.70	31.85%	33.58	9.28%	31.63	8.74%	27.26	7.54%	13.61	3.76%	29.33%
Low-Medium Density Residential Zone	90.57	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Major Centre Zone	43.96	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Mixed Use Zone	7.26	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Open Space Zone	565.28	9.04	1.60%	5.39	59.60%	0.57	6.27%	0.49	5.41%	0.48	5.33%	76.61%
Principal Centre Zone	24.65	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Rural Residential Zone	8,927.59	1,415.95	15.86%	173.25	12.24%	46.66	3.30%	31.64	2.23%	60.15	4.25%	22.01%
Rural Zone	149,962.71	9,682.89	6.46%	432.46	4.47%	144.44	1.49%	124.22	1.28%	387.98	4.01%	11.25%
Special Industry Zone	845.30	0.08	0.01%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Sport and Recreation Zone	387.90	16.07	4.14%	5.24	32.59%	1.65	10.29%	4.15	25.85%	2.31	14.39%	83.12%
Township Zone	48.07	41.70	86.75%	9.99	23.95%	7.69	18.45%	9.67	23.20%	5.61	13.45%	79.04%
Total Area	190,509.64	12,231.36	6.42%	701.78	5.74%	254.38	2.08%	213.11	1.74%	500.20	4.09%	

Rural townships *Rural townships that offer a range of lifestyles with moderate to very low levels of access to employment, infrastructure and services and a strong affinity with the rural areas and natural environment. These towns have unique tourism and visitation values. Townships are the higher hubs in the order of rural centres but are supported by higher urban hubs. Rural townships are not expected to expand beyond their current boundaries.* ***Any growth is expected to be consolidated within Rural townships.***	*Glenore Grove, Ma Ma Creek, Murphy's Creek*

The strategic narrative does not allow expansion of the township but does allow development through infill and renewal. The places of Postman's Ridge, Lockyer or Upper Lockyer are not mentioned in the description of localities.

Growth in the Withcott area will consist of further subdivision capacity in the Rural Residential (RRes) and Low Density Residential (LDR) zone. There is considerable capacity at Withcott for growth with 361 hectares of already zoned Low density residential land. The legacy settlement pattern promotes very large allotments and recent development has produce large allotments up to 7,800m^2 which remain zoned low density residential. Lots along the highway are approximately 5,000m^2 and some of the smallest lots are still above 2,000m^2.

There are currently approximately 560 lots in the LDR zone. The available land and the minimum lot size of 3,000m^2, provides a maximum density of 1260 lots. This Is unlikely but it is certainly possible that Withcott has the capacity to almost double the number of lots in the LDR zone to 1,000 lots. Should Council decide to invest in infrastructure capacity this potential will need to significantly increase to account for the investment.

The draft planning scheme provides for various allotment sizes for Rural residential development. The area in the red circle has development potential but is permitted to be a smaller lot size than the existing development where precinct D is permitted 2.5 hectare sites, but precinct E requires 4 hectares.

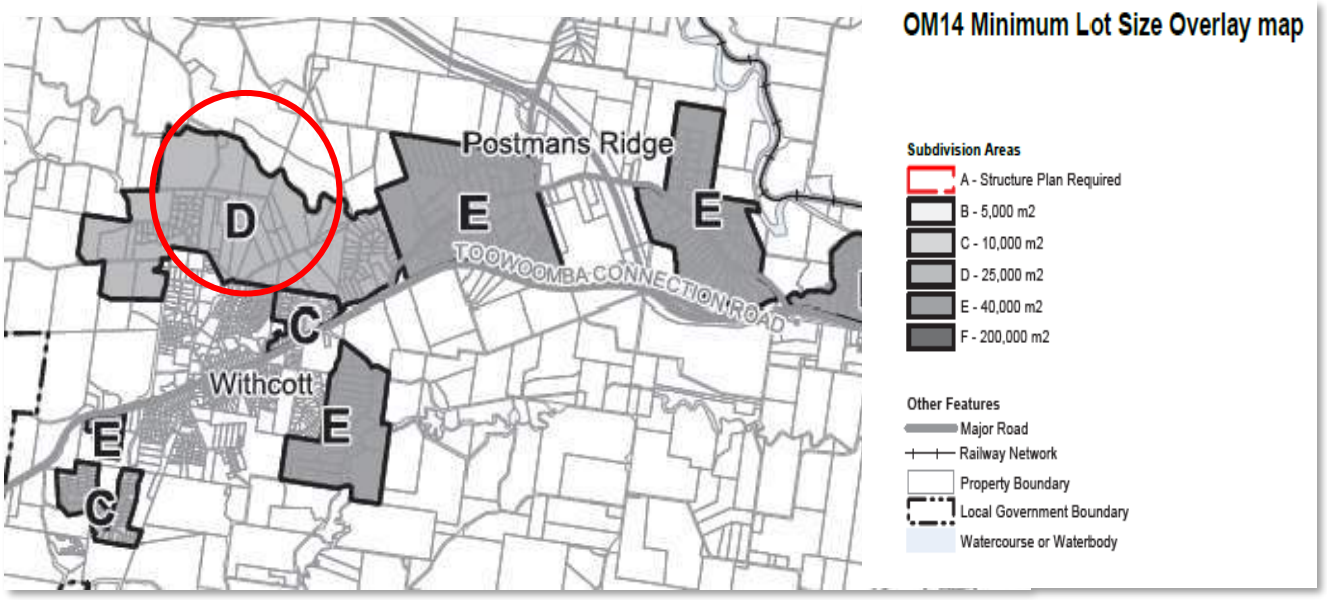

Figure 6-3: Withcott Rural Residential Lot Sizes

The zoning has not changed considerably between existing and proposed save for a few minor amendments.

1. There is a large area of land zoned emerging community at Withcott under the Gatton Shire Planning scheme, north of the existing urban edge (in grey). The first SIR allocated the Rural Residential Zone to that land which was questioned by the state. The land is located at the convergence of Little Oakey Creek and Rocky Creek in the PHR1 area
2. Five larger lots (Lots 20-5 on SP184595 and Lot 10 on SP276318) which were previously Rural and proposed Rural Residential each of just under 4 hectares in size.
3. Lot 5 on SP295715 with an area of approximately 58 hectares was previously in the Industrial Zone and is now split with approximately 20 hectares in the Industry zone and the balance in the Rural zone.
4. A small parcel fronting the highway A21 which is currently developed as a service station and the zone has been changed from Local centre to Industry.

The figures below provide the transition between previous Gatton Shire zoning to the draft Lockyer valley zoning.

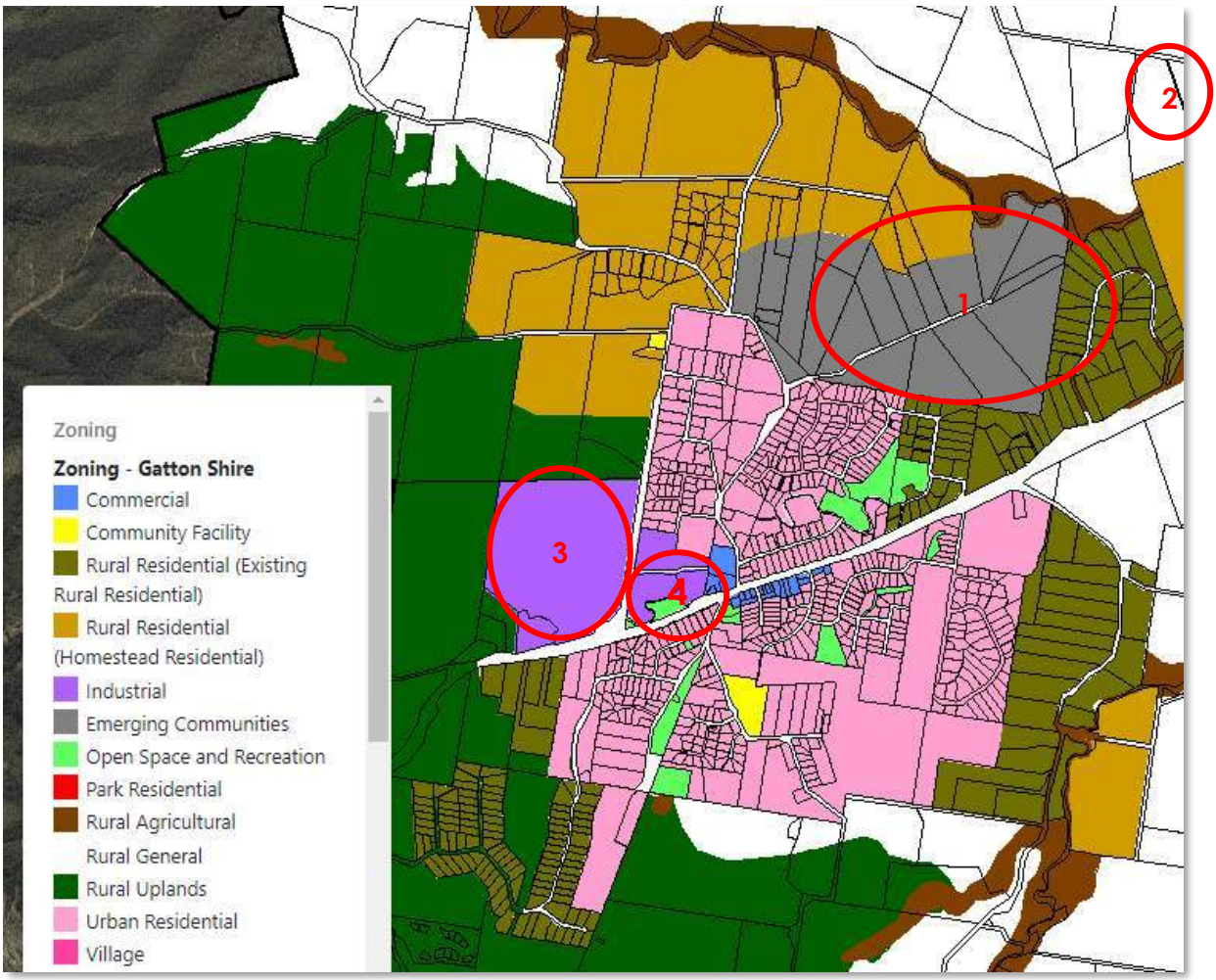

Figure 6-4: Withcott - Gatton Shire Zoning

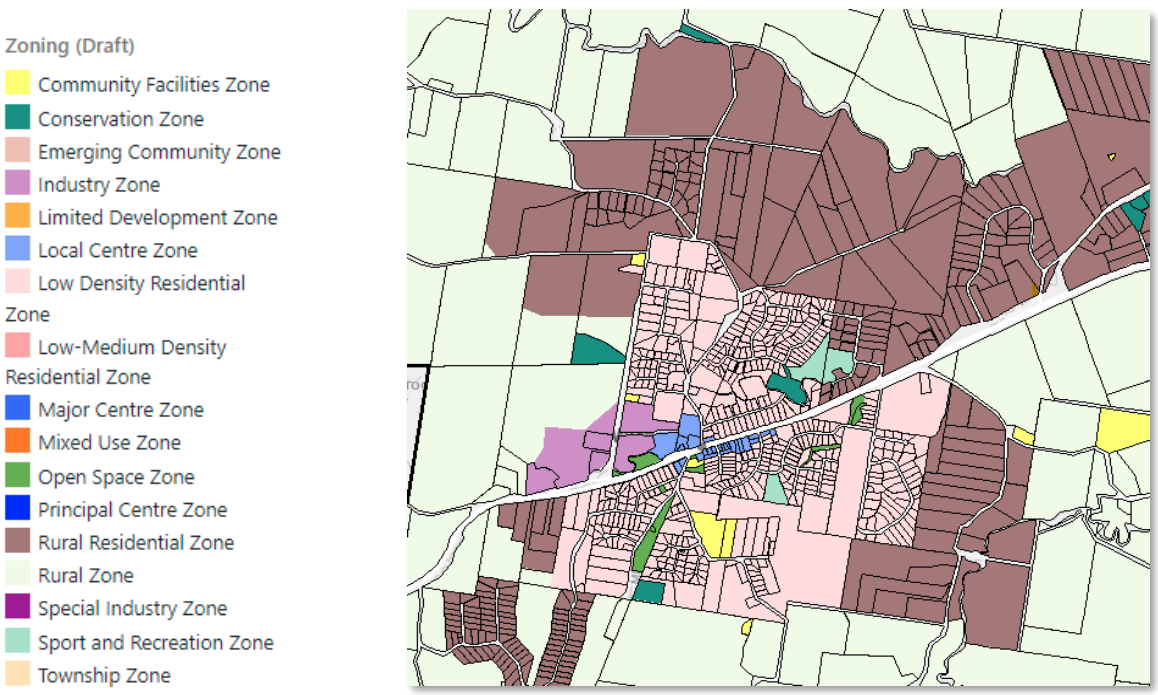

Figure 6-5: Withcott - Draft Zoning and Hydraulic Risk

6.1.3.1 Zone Changes

There are a number of zone changes from the Gatton scheme to the LVDPS as noted above. It is recommended that the changes to the industry and Local Centre zone (items 3 and 4) proceed but that:

- Item 1 – land previously in the emerging community zone is reverted to Rural
- Item 2 that the land already in the rural zone is maintained in the Rural zone.

There are 15 candidates for the Limited development zone where greater than 75% of the lot is impacted by the extreme risk category as shown in Figure 6-6 below.

- o two in the Murphy's Creek Township zone
- o one Sport and Recreation at Withcott
- o eleven in the rural residential zone; and
- o one tiny lot in the Low density Residential zone

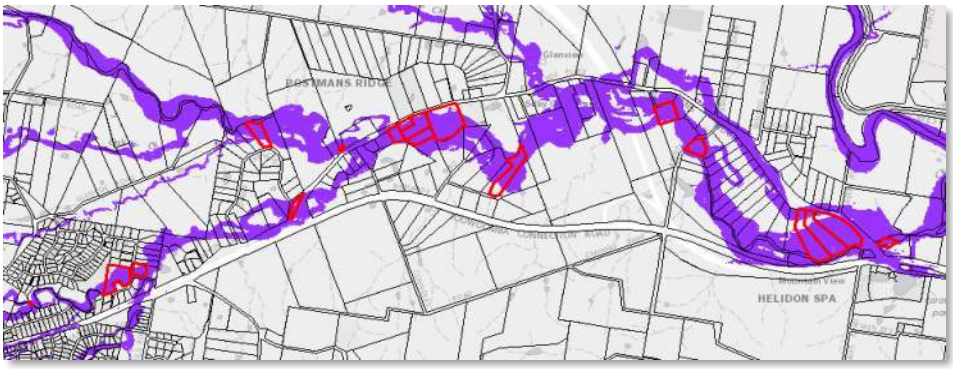

Figure 6-6 Limited development zone lots - Withcott

6.1.4 Planning Scheme Integration Recommendations

The planning policy applied in the Murphy's Creek and Withcott precinct is focussed on arrest and avoid pathways. The strategic intent for the area is recommended to change due to the high and extreme risk across the settlements and the inability for essential commercial and employment generating land uses to support any further growth.

Future development will be regulated through strategic intent modifications, zone changes, and site based and construction provisions. Integration of flood risk is achieved by the actions provided in Table 6-3 across strategic and growth intent, specific statutory provisions and non-planning actions. The table is indicative of primary integration actions based on the site analysis above. See also Section 9 for Scheme-wide integration recommendations.

6.1.4.1 Withcott Flood Resilient precinct

To maintain economic function but apply risk appropriate constraints on future development in the high and extreme risk area of Laidley township, a flood resilient precinct is required with a boundary shown in Figure 6-7 below. The precinct effectively applies the same rules as the high risk area but further constrains land use types, maintaining and promoting land uses that are less capital intense.

The precinct boundary includes all the local centre and industry zoned land. It is noted that the entirety of the industrial land is not impacted by extreme and high risk flood hazard, however this will ensure new development is located outside the areas of higher risk.

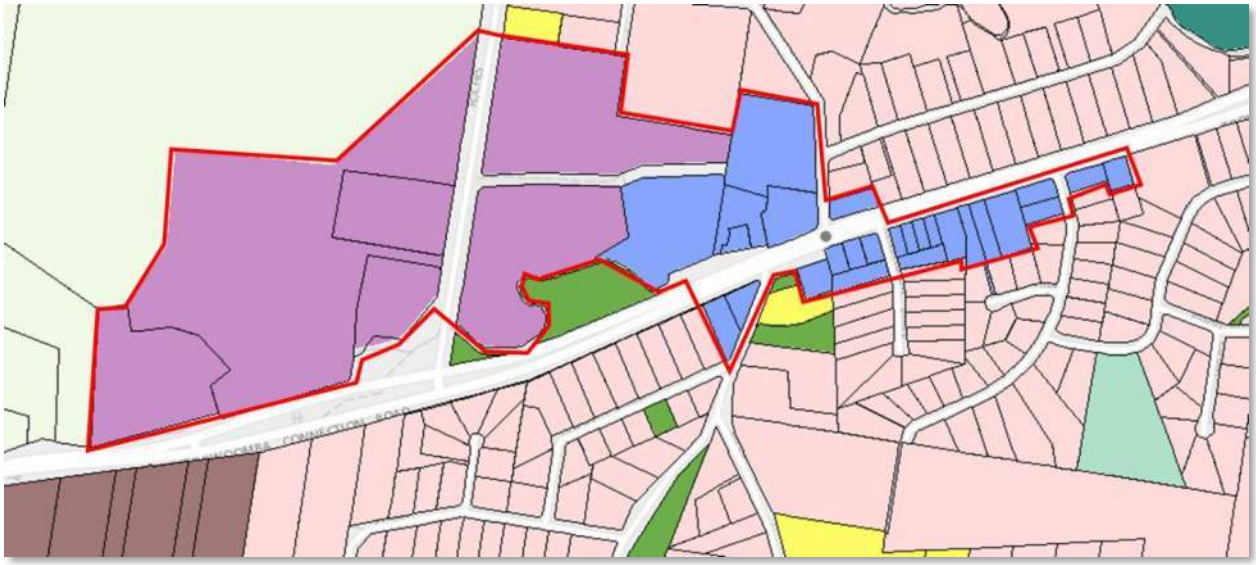

Figure 6-7: Withcott flood resilient precinct

Table 6-3 Murphy's Creek and Withcott - Planning Scheme Integration Recommendations

	Urban Growth Recommendations
1.	Either: • re-examine extent/quantum of greenfield rural residential land in Withcott; or • apply Rural Residential Precinct E to all Rural Residential allotments in the Withcott area and the Rocky, Little Oakey and Gatton Creek areas and update the OM14 – Minimum Lot Size Overlay Map
2.	remove reference in the strategic framework to further work on infrastructure due to risk-based requirement to maintain very low densities and dispersed settlement pattern; and
3.	retain Withcott as an urban centre but redraft the growth narrative to recognise the severe limitations borne by flood risk. Helidon and Toowoomba are likely capable of fulfilling this urban centre need and maintaining the growth potential of Withcott in the urban localities section presents conflict between expectations of growth, infrastructure availability and natural hazards.
	Statutory Planning Recommendations
4.	remove high and extreme risk areas from greenfield footprint via split zoning to create riparian corridors (Rural residential zone and Low density residential zone)
5.	maintain a minimum Low density residential lot size of 3,000m^2, applying this stringently
6.	limit intensification in the town centre through application of the Withcott flood resilient precinct which should encompass all land in the industry and local centre zones
7.	back-zone the lots with greater than 75% extreme risk as shown in Figure 6-3 and any further allotments across the commercial, industrial or residential zones which fit the criteria of 75% lot coverage of extreme risk as outlined in section 6.1.3.1
8.	applying strict avoidance and arrest policy positions for existing development such as no secondary dwellings and development must demonstrate tolerable risk dwelling locations
9.	applying strict reconfiguration regulatory controls including Council legal control over flow paths, location of outbuildings and services; and
10.	apply strict flood levels for fill and built form controls
11.	apply strict stormwater and localised flooding controls
	Non-scheme Supporting Recommendations
12.	non-planning responses such as:

	o additional awareness for all community members on warning times and evacuation o targeted awareness for the dwellings identified as candidates for voluntary house purchase; and o participation in a voluntary house purchase program o ensures the Local Disaster Management Plan risk assessment include the most current information

6.2 Helidon and Grantham

The precinct of Helidon and Grantham includes five communities of Helidon, Helidon Spa, Iredale, Carpendale and Grantham. It lies directly east of Withcott further downstream on Lockyer Creek. Figure 6-8, provides a locality scale picture of risk across the locality. Generally, the precinct remains characterised by surrounding steep slopes but has a central wide and flat floodplain where settlement and agriculture occurs.

Lockyer Creek is joined by Rocky Creek just east of Helidon Spa. From the northern slopes of the catchment there are several small creeks converging directly on Helidon township: Sheep Station and Wrights Creeks. On the south side of the township, Monkey Water Holes, Soda Spring and Flagstone Creeks meet the Lockyer east of Helidon.

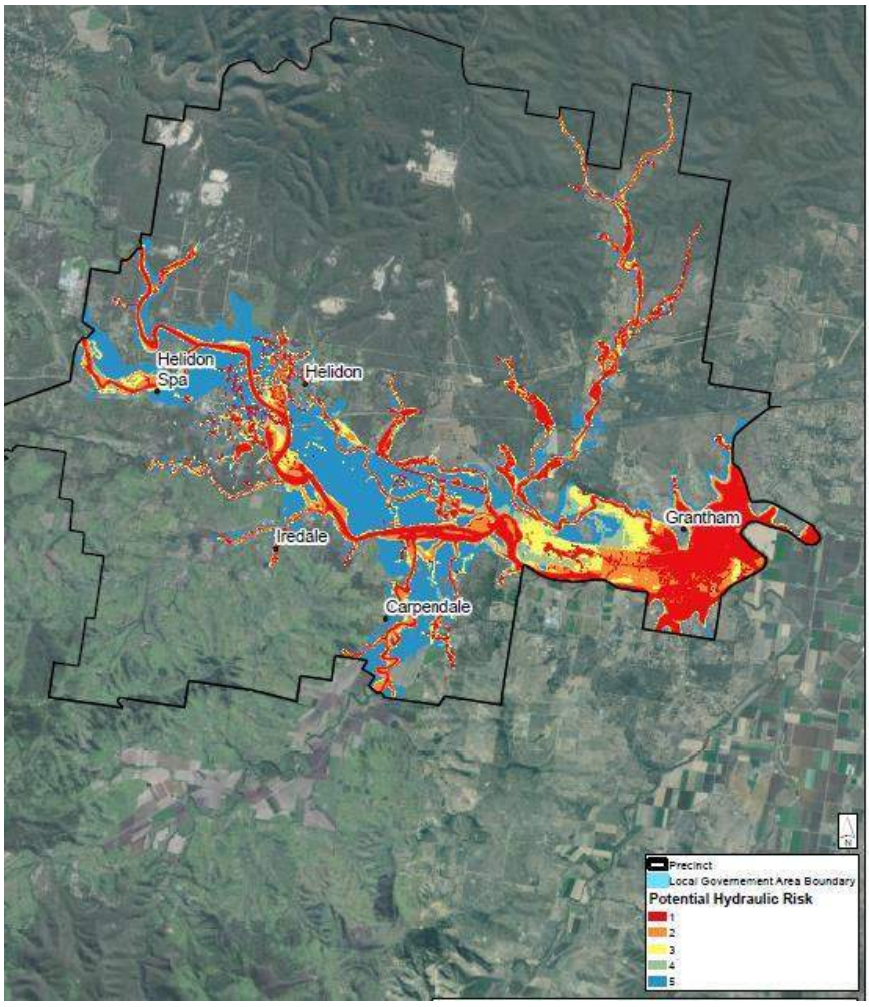

Figure 6-8: Potential Hydraulic Risk - Helidon and Grantham

Helidon Spa is a concentration of Rural residential allotments with no discernible centre, hugging the edge of Rocky and Lockyer creeks. There isa large area of High impact industry zone to the north of Lockyer Creek principally for quarrying activities.

Helidon township is on the north side of Lockyer Creek. It features expected zone diversity of a small township with Local centre, Industry and Community facilities. All residential land uses are in the LDR and RRes zones. There is a small amount of Limited Development zone (LDZ) on the banks of Lockyer Creek. The west Moreton Rail line runs along the valley floor through

Helidon. There is significant development potential in the LDR zone on the south side of the township.

Iredale and Carpendale are entirely within the Rural zone. Iredale is at the junction of Spa Water and Back Flagstone Roads at the convergence of a number of flow paths which join as Soda Spring Creek. Carpendale is further east on the flat floodplains of Flagstone Creek.

Grantham is located further east along Lockyer Creek. It is joined from the north by Sandy Creek. The wide expanse of the plain is used for agricultural purposes with a collection of allotments between the highway and the rail line for residential uses. These allotments are principally in the LDZ having experienced extreme flooding events in 2011. The township has moved up the hill through the well documented Grantham Development Scheme which has been in place since that time. Remaining in the valley floor are a handful of local centre zone allotments, open space and Sport and recreation zone.

6.2.1 Flood risk narrative

One of the poignant characteristics of the Helidon and Grantham locality is the manner in which the floodway occupies such a large extent of the plain. Figure 6-8 shows the wide expanse of high and extreme risk areas spreading across the low lying and flat areas around Grantham. Figure 6-9: Extent of Floodways, PMF and Warning Times - Helidon and Grantham(right) shows the vast area of floodway breaking out at Grantham, and (left) the Probable Maximum Flood (PMF) for the valley floor between Helidon and Grantham which spreads across the flat floodplain. The low warnings times of less than 6 hours affect the entire area. The entire locality features warning times of less than 6 hours.

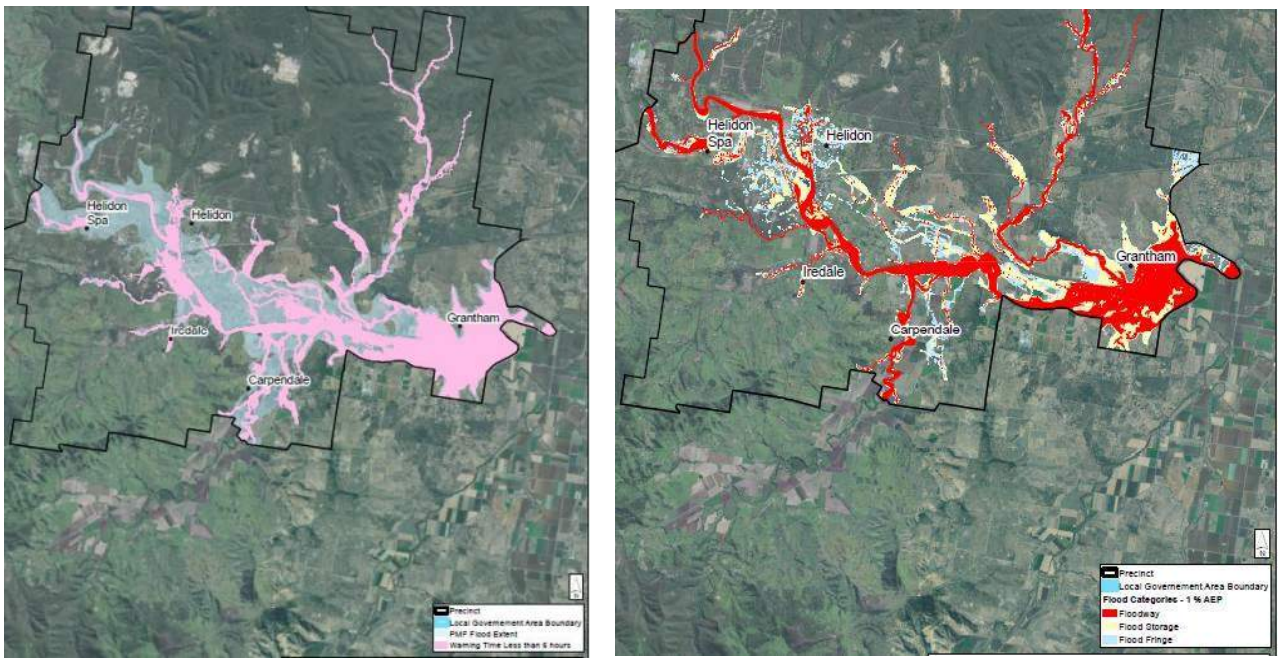

Figure 6-9: Extent of Floodways, PMF and Warning Times - Helidon and Grantham

Another notable risk multiplier, especially for Grantham are the Low flood islands. Figure 6-10 (right) shows in red and orange respectively, low flood islands:

- which are encircled in a relatively frequent event of 5 percent AEP and overtopped in the 1 per cent AEP event; and

- which are encircled in a 1 percent AEP event and overtopped in the PMF.

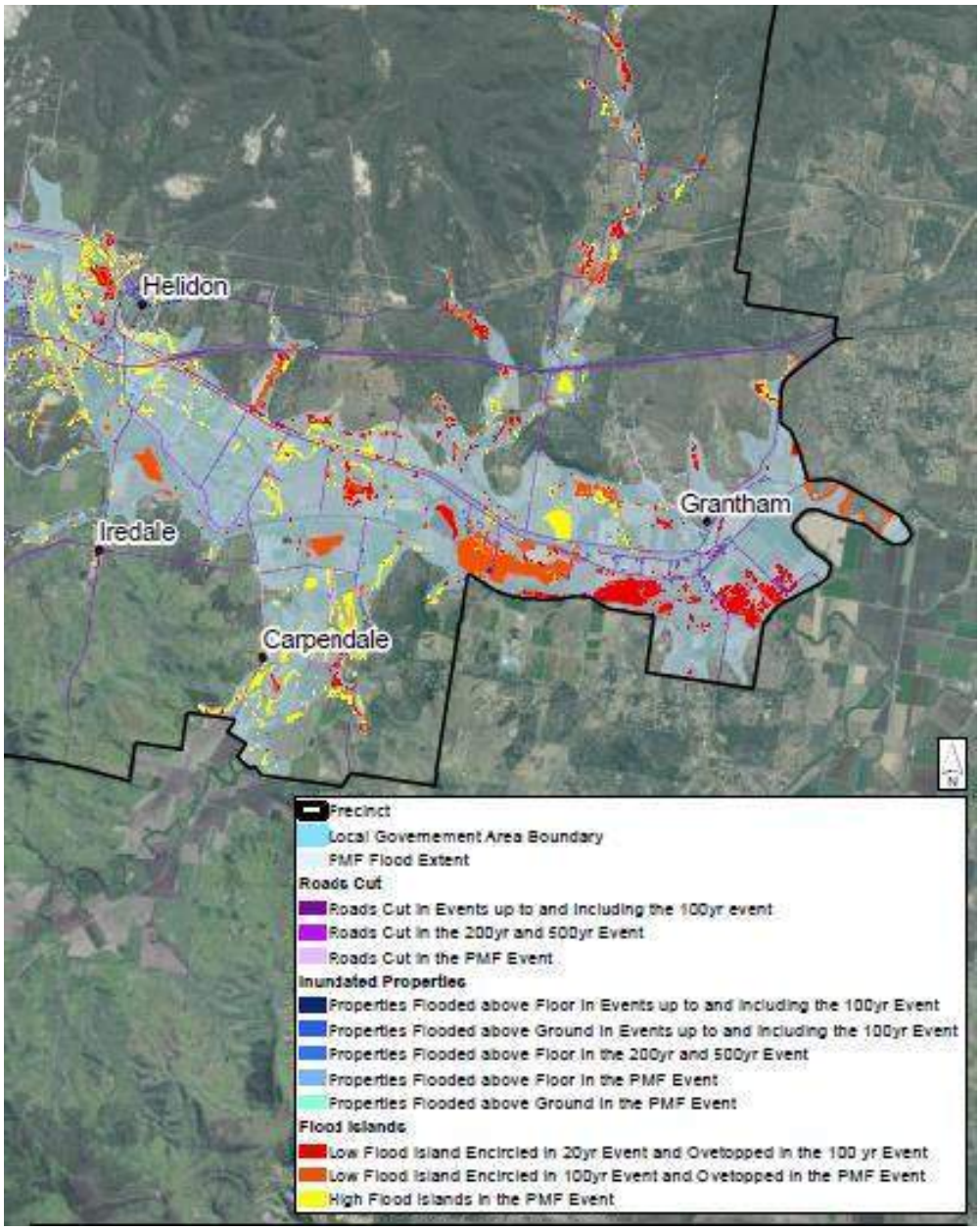

Figure 6-10: Flood Islands - Helidon and Grantham

From the risk assessment and local area profiles prepared by WMA, Table 6-4 synthesises the local area details which form the basis of an overall risk profile of 'high'.

Table 6-4: Helidon and Grantham Flood Particulars

Element	Comments
Overall Risk (from WMA report)	HIGH
Vulnerability	Vulnerability from age and mobility is generally consistent with the Queensland profile. Income profiles indicate lower incomes in Helidon and Grantham increasing vulnerability in those locations.
Flood Behaviour and Multipliers	Due to steep terrain, flash flooding within deeper floodways is expected and warning time remains less than 6 hours. Highly channelised and deep floodways dominate. Flood storage starts to back up at creek convergences in Helidon Iredale and Carpendale are characterised by HR1 and HR2 fast flowing and deep channels. Grantham is highly flood prone with flooding occurring in both Sandy and Lockyer Creeks. Heavy falls in the Lockyer catchment can break the banks and block flows from Sandy Creek Large expanses of Grantham outside channels is classed as floodway. Storage expands across the floodplain.
Future Outlook	Climate change is predicted to increase flooding with depths up to .8m higher south of the existing rail line in Grantham with diverse depth increases across the locality.
Consequences	• Significant isolation and risk across the region in several zones and legacy areas. • The rail line and roads are cut, and people are trapped in flood events as exit for the area is not possible. • Significant recent history of disastrous events and loss of life, especially in Grantham • High velocity has resulted in loss of life through vehicle and people being swept away. • Low warning times add to this high risk • High isolation issues prevent fulsome emergency response
Mitigation Options	• recent buy back schemes • improve flood intelligence systems (cameras) • ensure no worsening through land use planning • community awareness

6.2.2 Property and Use Impact Summary

For the purposes of detailed analysis, for each locality a number of metrics are prepared

- 34 residential* allotments are impacted by >50% of the lot area in HR1&2; of which
- 17 are impacted >75% of the lot area
- there is no Emerging community zoned land in the location
- there are approximately 91 allotments already in the LDZ as a consequence of the Grantham Development Scheme post 2011;
- of those allotments a significant number are now vacant and were not rebuilt post 2011 and participated in the land swap to the new Grantham area on higher ground.
- there remain nine Local centre zone allotments on the historic Grantham town centre, all of which are in the HR1 and HR2 area.

**Residential is LDR, LMDR, RRES and does not include Township or Emerging community Zones*

Table 6-5 below provides an analysis by zone. The Helidon and Grantham locality is of particular note, with high values across many zones.

More than a third of the Community facilities zone is impacted by flood with areas across all hazard risk categories. More than a quarter of Industry zone is affected, all of which is at Helidon. Of concern is that 100 per cent of the Local centre zone land is impacted by flood including more than a third in the HR1 and HR2 category and more than half in the low risk area.

This is consistent with more than half of the LDR zone. Small areas are impacted across the higher risk categories with the bulk of 39 per cent in the HR5 area. High percentages of RRes lots are affected as are Sport and Recreation. This is particularly of concern as vulnerable community sporting groups and not for profits may seek to locate assets in this zone which attracts large numbers of people and enable. Where Sport and Recreation is permitted, there will be an expectation that club facilities can also occur.

6.2.3 Draft Planning Scheme zones and intent

The Strategic Framework provides for Urban Centres, Urban Towns, townships and Rural Hamlets. Both Grantham and Helidon are noted as Urban Towns. Neither Helidon Spa, Iredale nor Carpendale are mentioned in the Strategic Framework.

There is a full suite of zones in Helidon with ample development potential in residential and industrial zoned land. There are several existing LDZ allotments along Lockyer Creek. Grantham is dominated by LDZ and RRes allotments with significant areas of Community facilities zone designated by the Grantham Development Scheme for future expansion and showgrounds precinct.

The Strategic Framework 3.2.3 notes urban towns as having the following growth characteristics (emphasis added):

Urban towns Urban towns offer a range of lifestyles with moderate levels of access to employment, infrastructure and services and a strong affinity with community and rural areas. These towns also often have medium to high tourism visitation values. Most Urban towns are intended to expand to accommodate future growth. Consolidation of established areas is expected.	**Forest Hill, Grantham, Helidon, Withcott**

Table 6-5: Helidon and Grantham - Hydraulic Risk and Lot Area Analysis

Current Scheme Hydraulic Risk Overlay			*Helidon / Grantham*										*Total*
			Zoned area		*HR1-2*		*HR-3*		HR4		HR5		
					Overlay area		*Overlay area*		*Overlay area*		*Overlay area*		
Zones	**Total LVRC zone (ha)**	**Total precinct zone (ha)**	(ha)	(%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected zone (%)
Community Facilities Zone	3,921.66	3,657.86	312.57	7.97%	39.07	12.50%	18.29	5.85%	7.67	2.45%	48.87	15.64%	36.44%
Conservation Zone	33,693.22	23,083.17	1,532.54	4.55%	1.22	0.08%	0.40	0.03%	0.65	0.04%	1.38	0.09%	0.24%
Emerging Community Zone	1,299.38	1,299.38	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Industry Zone	363.47	363.47	58.94	16.21%	8.60	14.59%	4.03	6.84%	1.51	2.57%	2.48	4.21%	28.21%
Limited Development Zone	44.54	44.54	32.54	73.05%	32.02	98.42%	0.08	0.25%	0.06	0.18%	0.38	1.15%	100.00%
Local Centre Zone	22.17	22.17	6.05	27.27%	2.10	34.71%	0.34	5.62%	0.20	3.28%	3.41	56.39%	100.00%
Low Density Residential Zone	1,135.77	1,135.77	103.06	9.07%	2.96	2.87%	4.03	3.91%	3.88	3.76%	41.10	39.88%	50.42%
Low-Medium Density Residential Zone	90.57	90.57	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Major Centre zone	43.96	43.96	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Mixed Use Zone	7.26	7.26	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Open Space Zone	565.28	565.28	59.77	10.57%	15.77	26.38%	4.83	8.08%	2.90	4.84%	13.26	22.19%	61.49%
Principal Centre Zone	24.65	24.65	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Rural Residential Zone	9,063.98	8,927.59	542.42	5.98%	100.00	18.44%	49.30	9.09%	26.07	4.81%	154.53	28.49%	60.82%
Rural Zone	167,203.52	149,962.71	10,292.60	6.16%	1,055.55	10.26%	236.91	2.30%	198.18	1.93%	798.70	7.76%	22.24%
Special Industry Zone	845.30	845.30	845.22	99.99%	4.48	0.53%	5.25	0.62%	1.87	0.22%	47.75	5.65%	7.02%
Sport and Recreation Zone	391.58	387.90	30.01	7.66%	10.85	36.17%	0.11	0.36%	0.10	0.34%	4.76	15.86%	52.73%
Township Zone	48.07	48.07	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Total Area	218,764.38	190,509.64	13,815.71	6.32%	1,272.63	9.21%	323.57	2.34%	243.08	1.76%	1,116.61	8.08%	

The strategic framework also notes at 1.2.3.3.2 (Page 8) that towns should avoid areas of natural hazards. In the case of Grantham, the continued positioning of the township location on Anzac Avenue is contrary to this provision and the statement that "*growth does not occur south of the existing railway line*".

6.2.3.1 Grantham Development Scheme

The Grantham Development Scheme (GDS) came into force after the 2011 event to facilitate land swaps and relocation of the Grantham Township to a safe location. The structure plan provided ample land for further expansion north and north east including a large swathe of land for a future showground precinct. There are a number of zone refinements proposed for the draft planning scheme. Of note are:

- 16 allotments in the LDZ under the GDS which have been amended to Sport and Recreation between the rail line and the Gatton-Helidon Road;
- low impact industry reverting to Rural zone between the rail line and Gatton – Helidon Road;
- numerous Local centre zone lots reverting to open space on Anzac Avenue; and
- numerous Local centre and Open Space lots reverting to LDZ along Harris Street

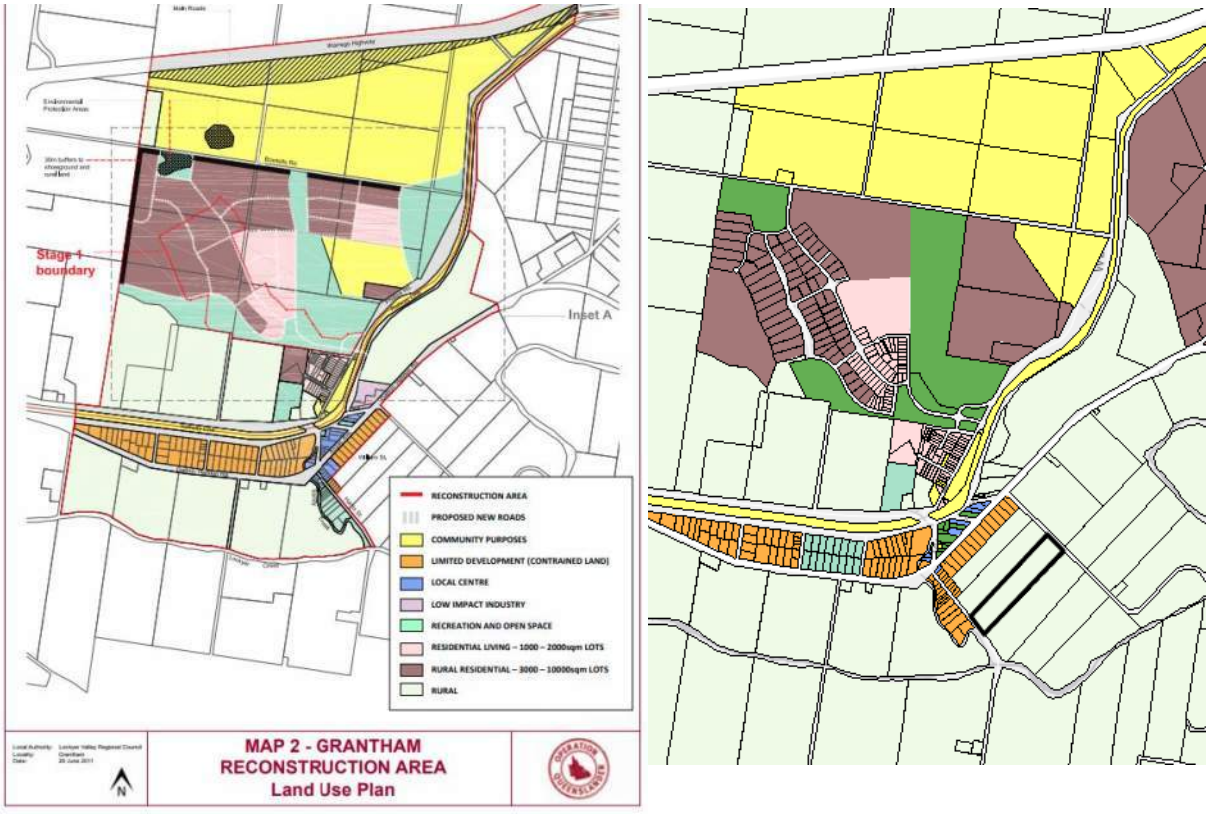

Figure 6-11: Grantham Development Scheme (left) and Draft Planning Scheme (right)

The intention of the GDS is that the township should slowly migrate to the areas north which have been zoned Community facilities for the interim period and designated (among other things) as the location for a future showground. Figure 6-12 below is an extract of the vision in the GDS for the expansion of the town further north.

Major new facilities have started to emerge as well. There are plans to expand the town further north and east, and introduce more community facilities and parks in the new part of town. Whilst not developed yet, the new showgrounds which are planned adjacent to the Warrego Highway will be a great addition to our town when they are built.

There are noticeably more jobs in town now, with some new rural businesses that have been built to the east of the main street supporting the farming and rural activities which are the foundation of our town.

Grantham is an amazing place – we have endured tragedy and emerged stronger and prouder, with a wonderful mix of history and character and strong and vibrant new areas that are helping us achieve a safe and bright new future.

Figure 6-12: Extract from the Grantham Development Scheme Vision

6.2.4 Zone Changes

There are 126 candidates for Limited development zone, noting that this number includes the 90 allotments already in the Limited development zone. The recommendation for further zone changes includes:

- two in the Helidon and two in the Grantham Community facilities zone
- seven in the Grantham Local centre zone
- nine in the rural residential zone; and
- the 16 Sport and Rec Lots on Nicholls Street

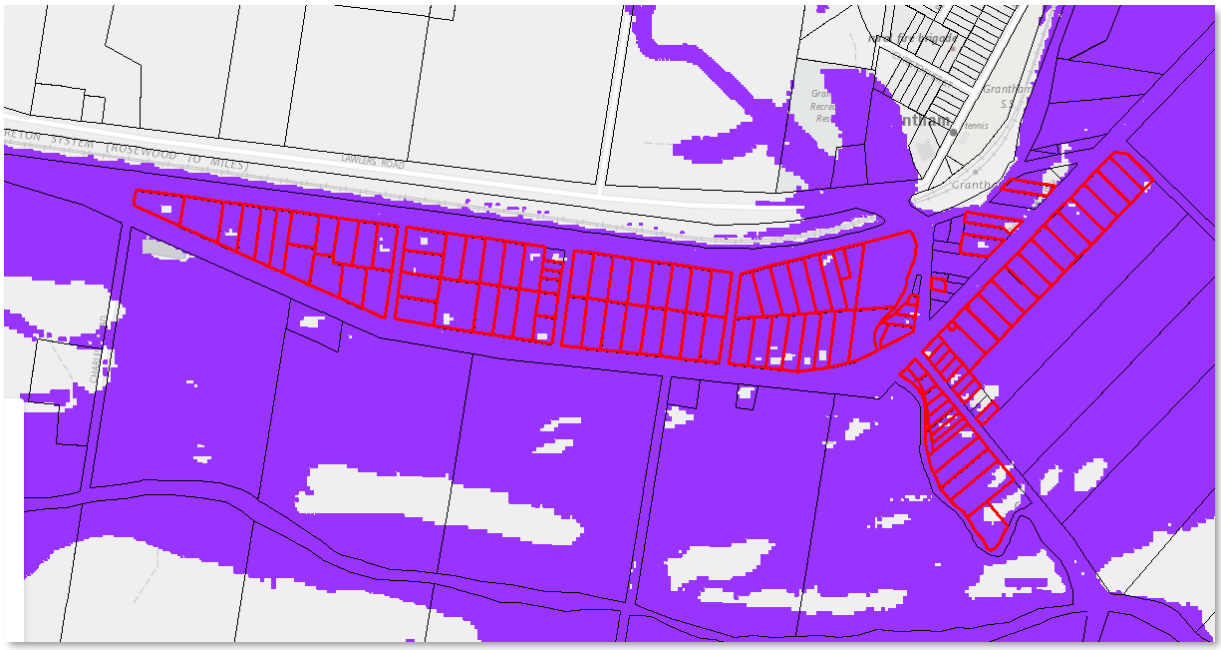

Figure 6-13 Limited Development zone lots - Grantham

6.2.5 Planning Scheme Integration Recommendations

The planning policy applied in the Helidon – Grantham area will take in all options of avoid, arrest, mitigate, accept and transition. Future development will be regulated through strategic intent modifications, zone changes, and site based and construction provisions. For Grantham, with recent lived experience the policy focus is on continuing the transition laid out in the GDS and avoiding further very high risk to life. Helidon can maintain its growth intent but should be mindful of the impacts of the infrastructure convergence and worsening to the north from climate change. Rural residential development is a particular risk area for Helidon.

Integration of flood risk is achieved by the actions provided in Table 6-6 across strategic and growth intent, specific statutory provisions and non-planning actions. The table is indicative of primary integration actions based on the site analysis above. See also Section 9 Scheme-wide integration recommendations.

Table 6-6: Helidon and Grantham – Planning Scheme Integration Recommendations

	Urban Growth Recommendations
1.	removing the 'urban centre' dot on the Strategic Framework maps from the "old" Grantham and placing it in the northern area as intended by the GDS
2.	reinforce the narrative of the GDS in the Strategic Framework to continue the vision of an expanded Grantham to the north
3.	include mention of future structure planning to realise the vision of the GDS for Grantham to grow to the north
4.	deleting the refence to "community purposes" in the LDZ at section 1.2.3.1 (8) page 5;
	Statutory Planning Recommendations
5.	maintain the LDZ for all existing lots
6.	extend the LDZ to all allotments in the "old" Grantham town (including centre zoned land) in accordance with the analysis where 75% of a lot is impacted by extreme flood risk as shown in Figure 6-13
7.	elevate dwelling house and all other built forms (save agricultural purposes) in the rural zone through a Valley rural floodplain precinct (see section 8.11) category to impact assessment or potentially include in a rural floodplain precinct
8.	remove the provision in the RoL Code which permits Rural lots to be subdivided to 2.5 hectares
9.	apply strict flood levels for fill and built form controls
10.	apply strict stormwater and localised flooding controls

	Non-scheme Supporting Recommendations
11.	continue the voluntary house purchase program for areas between the rail line and Gatton Helidon Road in Grantham
12.	focus on Gatton centre drainage to determine if there are economic solution for some localised flooding issues.
13.	other non-planning responses such as: o additional awareness for all community members on warning times and evacuation o targeted awareness for the dwellings identified as candidates for voluntary house purchase; and o ensures the Local Disaster Management Plan risk assessment include the most current information

6.3 Flagstone Creek

This region is an elevated and heavily vegetated area in the far western reaches of the valley. It includes the small hamlets of Egypt, Fordsdale, Rockmount and Stockyard. These are all very small hamlets almost entirely within the Rural zone. There are some isolated allotments in the Community facilities zone or Environmental protection zone and a handful to Township zone allotments at Ma Ma Creek.

The area is dominated by many unnamed water courses and overland flow areas and two primary creeks: Flagstone Creek and the upper area of Ma Ma Creek. The two catchments start at The Big Hill and Mount Campbell on the boundary with Toowoomba at Upper Flagstone.

Flagstone Creek is joined by Stockyard Creek and Millard Creek and follows the alignment of the Flagstone – Clifton road down the valley to join Lockyer Creek just east of Helidon. Ma Ma Creek similarly is a convergence of smaller watercourse, starting with Heifer, Silky Oak and Boundary Creeks, joining near Fordsdale.

6.3.1 Flood risk narrative

The risk here seems to be somewhat contained within the channels. Due to the topography, fast flowing and fast receding waters move swiftly down the valley. The extent of the floodway is shown on Figure 6-14. The PMF and flood storage does break out east of flagstone.

6.3.2 Property and Land Use Impact Summary

The region is sparsely populated with a small cluster of dwelling at Flagstone Creek which are directly on the creek.

The zone analysis returns zero results in all zones except Rural. Cumulatively about 5 per cent of the Rural Zone in the precinct is impacted by flood with 290 hectares or 1.46 per cent in the HR1-2 zone.

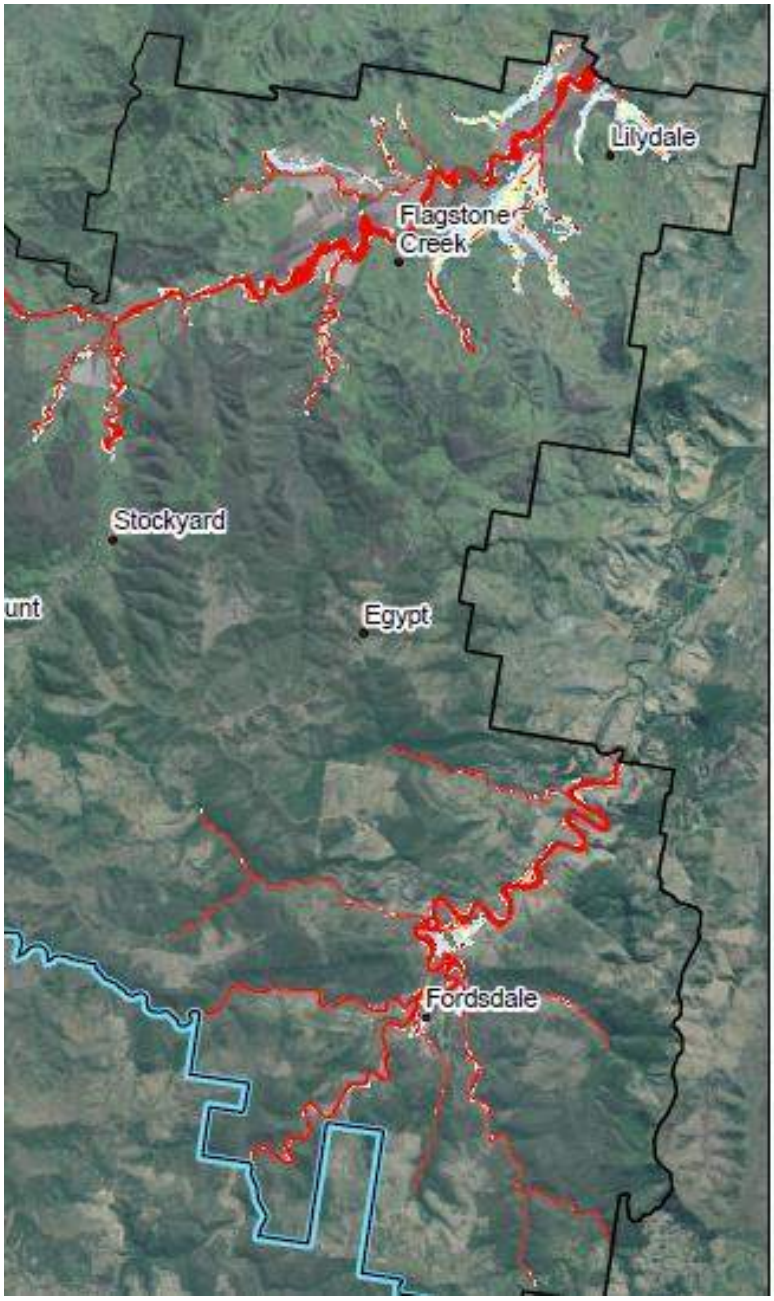

Figure 6-14: Flagstone Creek floodway extent

6.3.3 Draft Planning Scheme zones and intent

The draft planning scheme does not alter the zones from the current Gatton Planning scheme. Flagstone Creek township is not specifically mentioned in the planning scheme as a hamlet.

6.3.4 Policy pathways and recommendations

Policy pathways will be consistent with those applied across the region for the purposes of mitigating risk and compliance with the SPP as shown in the Land Use Policy tables for the Rural zone. There are no specific recommendations for this precinct.

6.4 Tenthill

The Tenthill precinct includes the small hamlets of Black Duck Creek, Caffey, East Haldon, Junction View, Lefthand Branch, Lower Tenthill, Ma Creek, Mount Sylvia, Mount Whitestone, Ropeley, Upper Tenthill, Veradilla, West Haldon, Winwill and Woodbine. The region is similar to Flagstone and has a heavily vegetated and steep topography to the south at the top of the catchment flowing north to end up on the flood plain and flow into the Lockyer Creek.

There are two primary creeks. The downstream section of Ma Ma Creek and Tenthill Creek. Ma Ma creek is on the west, starting in the Flagstone precinct at Mount Campbell.

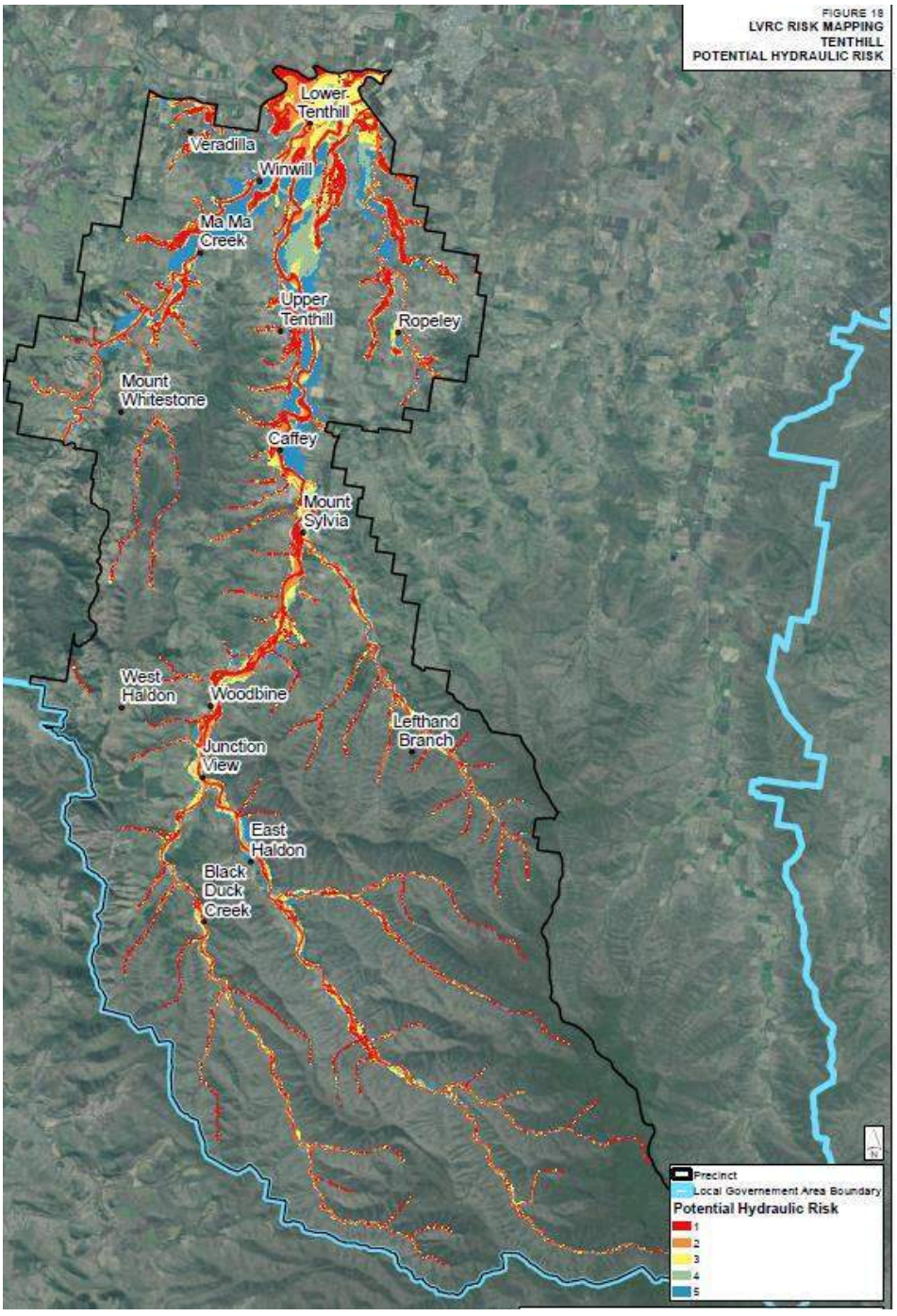

Figure 6-15: Potential Hydraulic Risk - Tenthill

Tenthill Creek starts in the furthest southern area of the region in the Main Range as a variety of gullies and creeks including Blackfellow, Black Duck, Bullock and Straight Forward creeks. These converge at about Junction View and continue as Blackfellow Creek, generally along the Mount Sylvia Road alignment. The Creek meets Tenthill Creek Lefthand Branch at Mount Sylvia and continues as Tenthill Creek from there before joining Lockyer Creek just west of Gatton.

Ma Ma Creek follows a similar pattern with the Gatton – Clifton Road adjacent. It is joined by Paradise Creek and Dry Creek before reaching the small hamlet of Ma Ma Creek before joining Lockyer Creek east of Grantham and Lower Tenthill.

Further west is the smaller waterway of Deep Gully commencing at about Ropeley. This is a shorter catchment, and the Ropeley Rockside Road follows the creek alignment. Deep Gully flows into Tenthill Creek on the outskirts of Gatton at the Gatton Helidon Road.

6.4.1 Flood Risk Narrative

The upper reaches of the catchment are very similar to flagstone with flows predominantly classed as floodway. The risk here is somewhat contained within the channels. Due to the topography, fast flowing and fast receding waters move swiftly down the valley. The extent of the floodway is shown on Figure 6-15 The PMF and flood storage does break out north of the townships of Caffey and Mount Whitestone. These areas pose a greater risk that the waters within the channel.

6.4.2 Property and Land Use Impact Summary

The precinct is predominantly Rural zone and sparsely populated. There is a scattering of other zones as described below but as expected in the precinct, of the 190,000 hectares, 150,000 hectares is in the Rural zone and a further 25,000 in the conservation zone, about 30% of the Rural zone is impacted by flood. There are a number of community facilities lots also impacted. This is due to historic settlement on the creeks.

6.4.3 Draft Planning Scheme zones and intent

The area was in the Rural general and the rural agricultural zones in the Gatton Shire Plan. There are some minor clarifications of zone for Community facilities and open space, however the Rural focus remains. The hamlet of Ma Ma Creek is proposed to be changed from rural to township for six allotments. There is a cluster of LDZ parcels due to historic soldiers' subdivision on Tenthill Creek Road. The LVDPS mentions a number of the locations as "hamlets" with the following narrative:

Hamlets Hamlets provide two or three activities. They consist of low scale and low impact activities. Hamlets do not form a part of the activity centres network within the Lockyer Valley. Growth of hamlets is not expected as they are to be supported by Major or Principal activity centres in urban growth areas.	Blenheim, Caffey, Kentville, Lake Clarendon, Lockrose, Mount Sylvia, Mount Whitestone, Mulgowie, Thornton, Upper Tenthill, Veradilla

6.4.4 Policy pathways and recommendations

Policy pathways will be consistent with those applied across the region for the purposes of mitigating risk and compliance with the SPP as shown in the Land Use Policy tables for the Rural zone. There are no specific recommendations for this precinct.

6.5 Gatton

The Gatton locality includes the Principal centre of Gatton, Placid Hills and Adare Rural residential areas, rural areas of Ringwood and Woodlands and the University of Queensland campus at Lawes.

Overland flow in unnamed channels flows through the elevated areas of Placid Hills into the Lockyer west of Gatton. Gatton Township is on a bend in Lockyer Creek on the floodplain. It is the largest urban centre for the region. Watercourses on the northern slopes collect from Ringwood in a chain of ponds (likely constructed) on the north side of the rail line, joining the Lockyer east of Gatton.

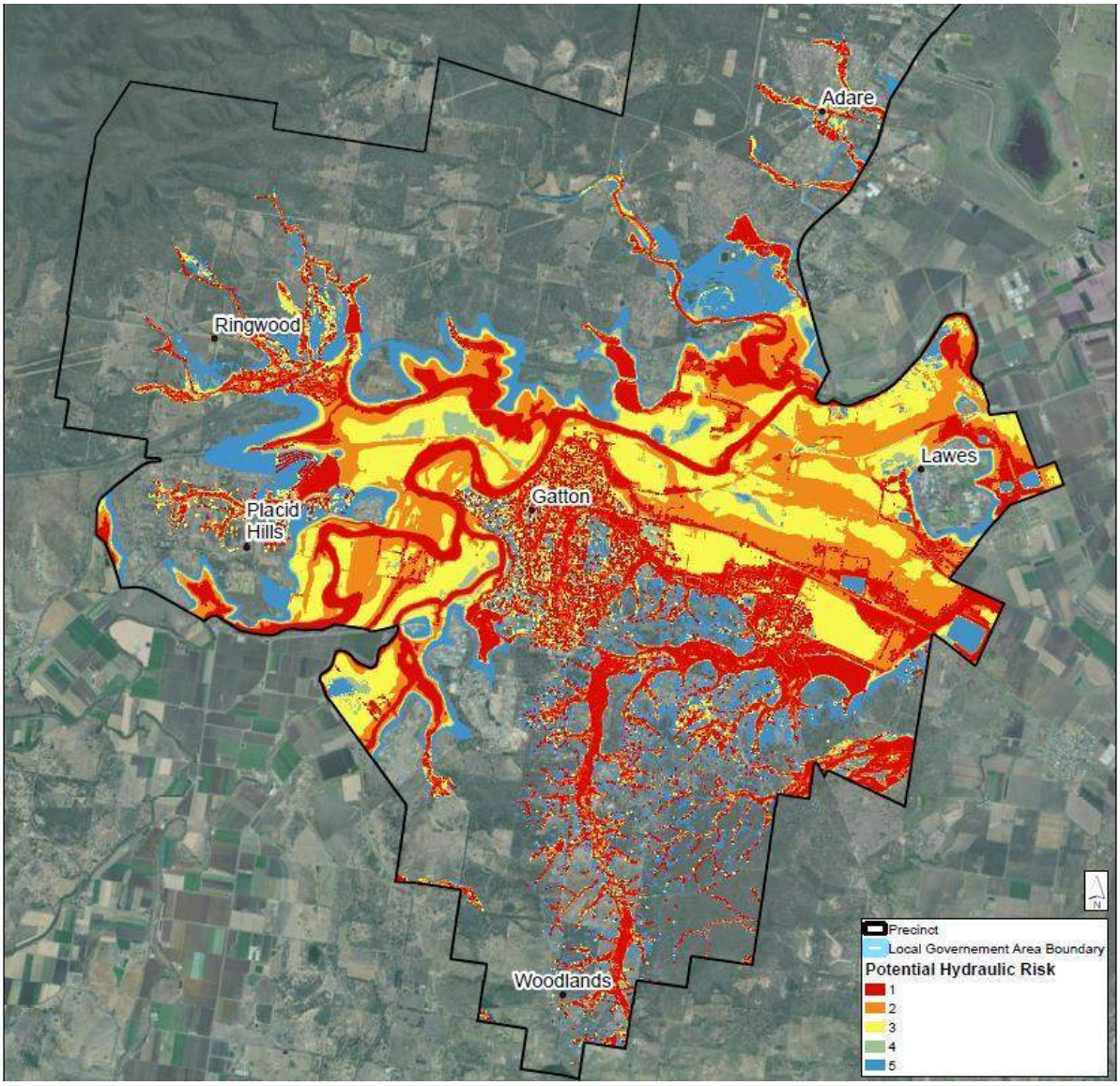

Figure 6-16: Potential Hydraulic Risk – Gatton

From the south, Ma Ma Creek joins at Placid Hills and Tenthill Creek joins the Lockyer on the western edge of town. Woodlands does not have a named watercourse and is characterised by a number of converging localised channels and flow paths Lawes sits in the centre of the valley on the floodplain also with localised flooding and water storage features. Adare is just

west of Lake Clarendon where several channels flow downhill from the northwest across the residential area to the lake. Redbank Creek at Hidden Valley joins Lockyer Creek between Gatton and Adare. Figure 6-16 below shows the hydraulic risk across this locality. Generally, there is significant of floodway and flood storage areas which expand out onto the surrounding floodplain as the landscape becomes particularly flat.

6.5.1 Flood Risk Narrative

The flood risk at Gatton displays some similar characteristics to other localities in maintaining a less than six hours warning time across the entirety of the locality. Of particular note is the risk of flood waters extending across the flood plain once the floodway is at capacity. Figure 6-17 below shows the warning time (left) across the locality and on the right the PMF extents and the mass of purple road ways in Gatton is the extent of roads cut up to and including the 1 per cent AEP. Table 6-7 below provides a snapshot of the Gatton flood particulars.

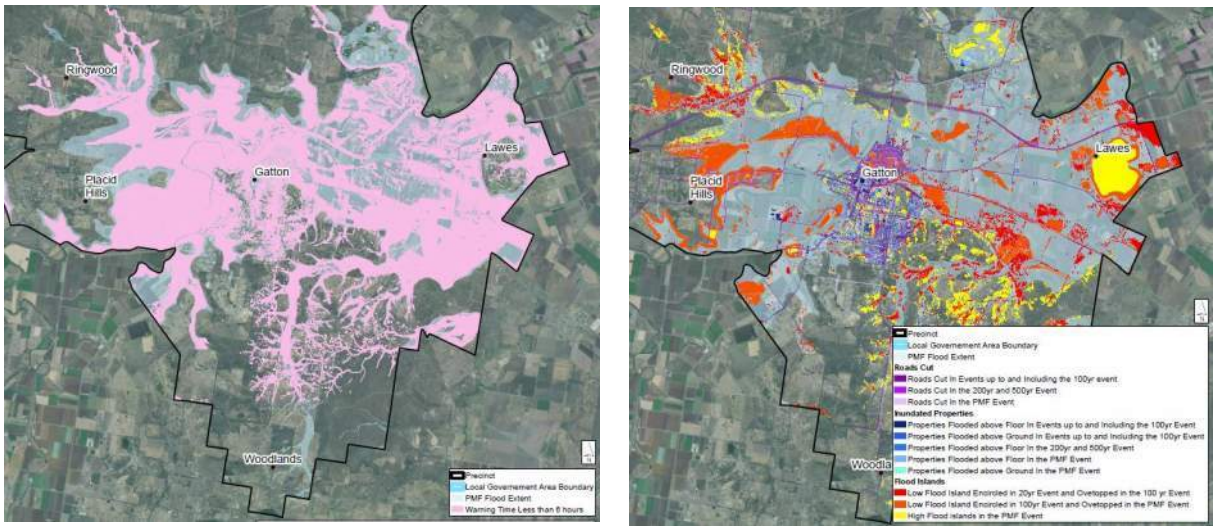

Figure 6-17: Warning, Flood Island, Evacuation routes and PMF - Gatton

Table 6-7: Gatton Flood Particulars

Element	Comments
Overall Risk (from the WMA Report)	MODERATE
Vulnerability	The Gatton area shows a slightly higher vulnerability than the Queensland average with a slightly higher proportion of lower income earners, non-English speakers, some transience and a slightly lower incidence of vehicle ownership.
Flood Behaviour and Multipliers	Flood behaviours vary across this locality where outer small hamlets of Ringwood, Woodlands and Adare feature localised channel and flooding off undulating country. There are a few smaller creeks feeding into the Lockyer: Redbank, Tenthill and Ma Ma. The dominant hazard is Lockyer Creek flowing through the centre of the locality. There are significant areas of floodway, flood storage and flood fringe impacting Gatton township.

Element	Comments
Future Outlook	Depths will increase by .6m in the channels area under climate change scenarios. Depths on the north side of the towns ship between the rail line and the Highway are expected increase by 2m due to flood storage and pooling.
Consequences	• ponding already occurs to constraints by built infrastructure; • extensive isolation from north to south and also within the township and surrounding creeks. • low warning times add to this high risk • many low flood islands across the locality; and • high isolation issues prevent fulsome emergency response
Mitigation Options	• minor structural recommendations and drainage and road infrastructure • working with DTMR for bridge raising • the 2014 Sinclair Knight Merz report identified various projects for local improvement • ensure no worsening through land use planning • community awareness

6.5.2 Property and Land Use Impact Summary

For the purposes of detailed analysis, for each locality a number of metrics are prepared

- 117 residential* allotments are impacted by >50% of the lot area in HR1&2; of which
- 83 are impacted >75% of the lot area
- there are significant areas of Emerging community zoned land which are impacted by HR1 and HR 2 areas to a degree
- there are no allotments in Gatton or surrounds in the LDZ
- there remain nine Local centre zone allotments on the historic Grantham town centre, all of which are in the HR1 and HR2 area.

**Residential is LDR, LMDR, RRES and does not include Township or Emerging community Zones*

Table 6-8 below provides a breakdown of flood impacts by zone area and percentage. Gatton has significant areas of urban zones impacted by flood. In the HR1 and HR2 area more than a third of the Community facilities zone and the Industry zone is impacted along with almost half the Local centre zone and the Sport and recreation zone. In the moderate HR3 category the balance 50 percent of the Local Centre zone is affected, more than one third of the Principal centre and the LMDR areas, along with a further 15 per cent of industry and another quarter each of Community facilities and Sport and recreation. Overall, 70 per cent of industry is affected, 100 percent of local centre, 90 per cent of MDR and 80 per cent of the Principal centre.

Table 6-8 Gatton - Hydraulic Risk and Lot Area Analysis

Current Scheme Hydraulic Risk Overlay			*Gatton*										*Total*
			Zoned area		*HR1-2* *Overlay area*		*HR-3* *Overlay area*		HR4 *Overlay area*		HR5 *Overlay area*		
Zones	**Total LVRC zone (ha)**	**Total precinct zone (ha)**	(ha)	(%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected zone (%)
Community Facilities Zone	3,921.66	3,657.86	1,013.51	25.84%	340.14	33.56%	252.44	24.91%	116.11	11.46%	83.64	8.25%	78.18%
Conservation Zone	33,693.22	23,083.17	693.34	2.06%	12.60	1.82%	11.82	1.71%	19.66	2.84%	30.62	4.42%	10.77%
Emerging Community Zone	1,299.38	1,299.38	1,113.36	85.68%	80.37	7.22%	118.23	10.62%	166.83	14.98%	137.98	12.39%	45.21%
Industry Zone	363.47	363.47	222.88	61.32%	73.57	33.01%	35.33	15.85%	18.25	8.19%	29.57	13.27%	70.32%
Limited Development Zone	44.54	44.54	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Local Centre Zone	22.17	22.17	0.59	2.65%	0.29	49.75%	0.30	50.25%	0.00	0.00%	0.00	0.00%	100.00%
Low Density Residential Zone	1,135.77	1,135.77	385.55	33.95%	22.10	5.73%	79.67	20.66%	64.87	16.82%	76.61	19.87%	63.09%
Low-Medium Density Residential Zone	90.57	90.57	32.84	36.26%	2.96	9.01%	11.95	36.38%	8.79	26.76%	6.04	18.38%	90.52%
Major Centre zone	43.96	43.96	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Mixed Use Zone	7.26	7.26	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Open Space Zone	565.28	565.28	95.02	16.81%	51.09	53.76%	10.47	11.02%	7.63	8.03%	9.37	9.86%	82.67%
Principal Centre Zone	24.65	24.65	24.65	100.00%	2.09	8.47%	8.85	35.89%	5.15	20.90%	3.81	15.44%	80.70%
Rural Residential Zone	9,063.98	8,927.59	1,374.05	15.16%	124.76	9.08%	150.38	10.94%	197.09	14.34%	145.12	10.56%	44.93%
Rural Zone	167,203.52	149,962.71	7,939.85	4.75%	1,268.94	15.98%	1,208.79	15.22%	378.54	4.77%	537.49	6.77%	42.74%
Special Industry Zone	845.30	845.30	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Sport and Recreation Zone	391.58	387.90	127.62	32.59%	61.04	47.83%	28.22	22.11%	9.75	7.64%	10.54	8.26%	85.84%
Township Zone	48.07	48.07	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Total Area	218,764.38	190,509.64	13,023.27	5.95%	2,039.93	15.66%	1,916.42	14.72%	992.66	7.62%	1,070.79	8.22%	

6.5.3 Draft Planning Scheme Zones and Intent

The Strategic Framework nominates Urban Centres, Urban Towns and Urban localities. Gatton township is an urban locality and an Urban Centre. As an Urban Centre, Gatton has a full range of zones and is intended to cater for growth into the future. Gatton is the highest order centre in Lockyer Valley.

Urban centres Urban areas offer a range of lifestyles with higher order levels of access to employment, infrastructure and services with a strong affinity with community and high tourism visitation. These areas form the Principal and Major growth centres of the Lockyer Valley and are intended for expansion and consolidation. The Principal centre of Gatton forms the highest order centre.	Gatton, Laidley, Plainland

The localities of Woodlands, Placid Hills, Lawes and Adare are not mentioned.

A key feature of Gatton is the extensive Emerging community zoned land and the capacity for the township to expand. Council has the opportunity in the new scheme to ensure that development:

- properly considers internal and external impacts of localised flooding
- takes the opportunity with Council to improve outcomes on surrounding land (e.g., Rogers Drive and Golf Links Drive); and
- creates new opportunity for evacuation

Improvements to outcomes can be achieved with minor amendments across arrange of provisions in the planning scheme.

6.5.3.1 Zoning Changes

There are11 properties which are candidates for Limited development zone:

- two in the Industry Zone (however this need checking from a modelling perspective)
- one Sport and recreation which is the Gatton race track; and
- eight in the LDR zone spread across the town

Figure 6-18 shows the spread of the allotments

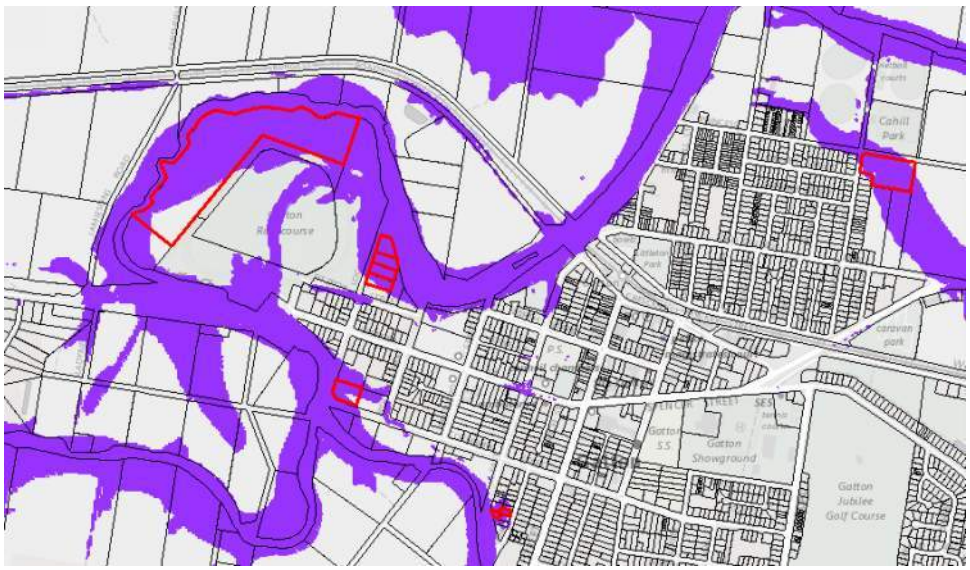

Figure 6-18 Limited development zone lots - Gatton

6.5.4 Planning Scheme Integration Recommendations

The planning policy applied in the Gatton area will take in all options of avoid, arrest, mitigate, accept and transition. Gatton is the principal growth area for the region, which, while the Emerging community land is outside areas of high and extreme risk, there will be opportunities for improvement through this development.

Future development will be regulated through strategic intent modifications, zone changes, and site based and construction provisions. Integration of Flood Risk is achieved by the actions provided in Table 6-9 across strategic and growth intent, specific statutory provisions and non-planning actions. The table is indicative of primary integration actions based on the site analysis above. See also section 9 for Scheme-wide integration recommendations.

Table 6-9: Gatton - Planning Scheme Integration Recommendations

	Urban Growth Recommendations
1.	delete references to growth to the north due to climate change impacts
2.	delete refences to industrial growth until structure planning is complete or consider other areas for industrial expansion
3.	re-examine the extent of Emerging community zoned land east of Woodlands Road
4.	include a split zone with open space in the Emerging community zone and undeveloped Industry zone across areas of HR1 and HR2
5.	restore the rural zone to areas outside the low flood islands and the existing University footprint
6.	investigate the viability and plan for trunk evacuation routes to the south of the Emerging community areas in Part 4 – local Government Infrastructure Plans using Woodlands Road
	Statutory Planning Recommendations
7.	back-zone the lots with greater than 75% extreme risk as shown in Figure 6-18 and any further allotments across the commercial, industrial or residential zones which fit the criteria of 75% lot coverage of extreme risk
8.	include Open space zone drainage corridors on the interfacing boundary of Lot 1 on SP163523 and the existing LDR on Rogers Drive to alleviate HR1 and HR2 flood issues
9.	apply Split zones and Rural Residential Precinct E to all Rural Residential allotments on the south side of Gatton-Esk Road at Adare and updating the OM14 – Minimum Lot Size Overlay Map
10.	ensure all expansion areas or infill include appropriate redirection of localised flows or allocation of drainage corridors with legal rights to Council
11.	remove the provision in the RoL code which permits rural lots to be subdivided into 2.5 hectares

12.	elevate the assessment levels of dwelling houses and any other built form (save agricultural purposes) in the Rural zone, through a Valley rural floodplain precinct (see section 8.11).
13.	apply strict flood levels for fill and built form controls
14.	apply strict stormwater and localised flooding controls
	Non-scheme Supporting Recommendations
15.	continue the voluntary house purchase program for areas of HR1 and HR2
16.	focus on Gatton centre drainage to determine if there are economic solution for some localised flooding issues.
17.	other non-planning responses such as: o additional awareness for all community members on warning times and evacuation o explore interim evacuation routes to the south o targeted awareness for the dwellings identified as candidates for voluntary house purchase; and o ensure the Local Disaster Management Plan includes the most current information

6.6 North Lockyer

This precinct is in the northern reaches of the Lockyer catchment on the Somerset Regional Council and Ipswich border. The precinct is bounded roughly by Gatton-Esk Road to the west, Lockyer Creek to the south and the LGA boundary to the east. It includes the convergence of the Lockyer and Laidley Creeks between Glenore Grove and Lake Clarendon. The precinct covers the localities and townships of Lake Clarendon, Spring Creek, Glenore Grove, Kentville, Morton Vale and Lockyer Waters. The potential hydraulic risk is shown below in Figure 6-19.

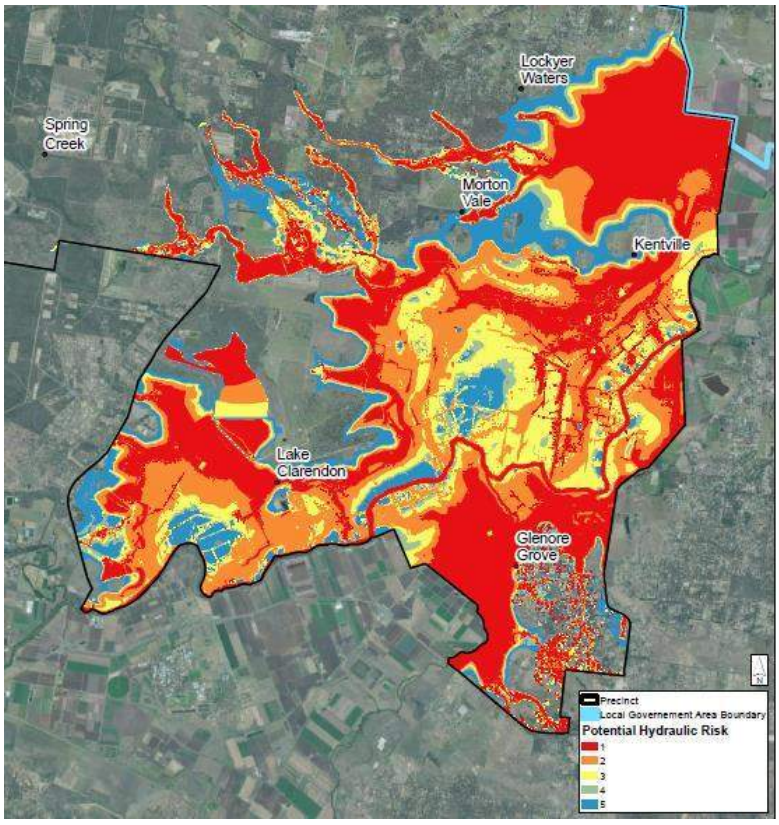

Figure 6-19: Potential Hydraulic Risk - North Lockyer

The precinct is relatively undulating and features extents of vegetated areas and a number of larger water bodies such as Lake Clarendon, Seven Mile and One Mile lagoons. The primary watercourse is Spring Creek which terminates at One Mile Lagoon across the northern area. In the south of the precinct Redbank Creek winds its way through Adare, joining the Lockyer at Lake Clarendon. Laidley Creek also joins the Lockyer a little further downstream.

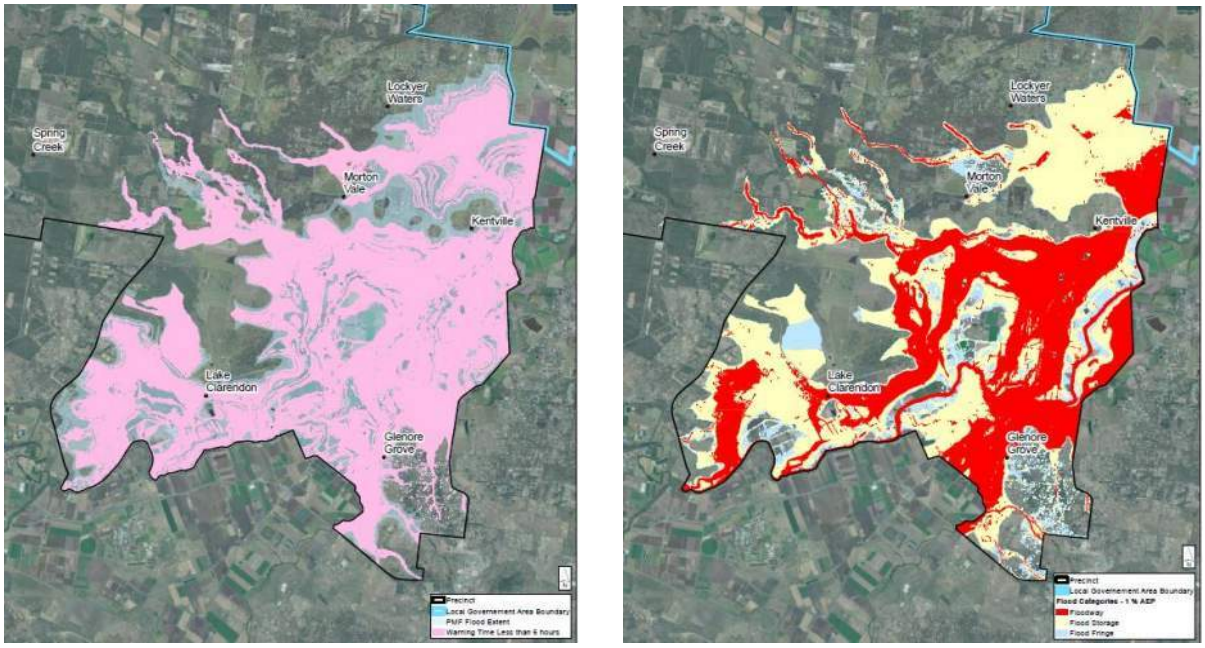

Figure 6-20: Extent of Floodways, PMF and Warning Times - North Lockyer

The precinct is considered more vulnerable than the Queensland average due to the age profile which likely stems from the high number of lifestyle allotments in the precinct.

6.6.1 Flood Risk Narrative

From the figures above, the extent of floodwaters is significant and does not differentiate considerably from the PMF. Water spreads across the floodplain without clear channels and has limited warning time and high velocities. Vast areas of the region are identified as flood way or flood storage. The Lockyer Creek becomes increasingly flat and winding as it makes its way to the Brisbane River in Somerset Council area.

Future scenarios indicate a significant increase in depths in this locality from .2 to 1 metre by 2090. The precinct has many flood islands and is isolated from the highway or from Somerset by inundation of local roads.

6.6.2 Property and Land Use Impact Summary

This precinct is predominantly in the Rural zone with a high number of Rural residential allotments. There are a small number of community facility zoned lots and many in green zones. Of the Rural residential zoned allotments:

- 25 Rural residential allotments are impacted by >50% of the lot area in HR1&2; of which
- 18 are impacted >75% of the lot area

The impacts across Rural and Rural residential are shown below. There are 10 Rural residential allotments recommended for the Limited development zone.

Table 6-10 North Lockyer - Hydraulic Risk and Lot Area Analysis

Current Scheme Hydraulic Risk Overlay			*North Lockyer*									
			Zoned area		*HR1-2*		*HR-3*		HR4		HR5	
					Overlay area		*Overlay area*		*Overlay area*		*Overlay area*	
Zones	**Total LVRC zone (ha)**	**Total precinct zone area (ha)**	Precinct zone area (ha)	Precinct zone area (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)
Community Facilities Zone	3,921.66	3,657.86	1,158.93	29.55%	52.67	4.54%	149.65	12.91%	7.86	0.68%	33.82	2.92%
Conservation Zone	33,693.22	23,083.17	280.67	0.83%	240.23	85.59%	5.77	2.06%	1.98	0.71%	5.36	1.91%
Emerging Community Zone	1,299.38	1,299.38	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Industry Zone	363.47	363.47	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Limited Development Zone	44.54	44.54	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Local Centre Zone	22.17	22.17	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Low Density Residential Zone	1,135.77	1,135.77	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Low-Medium Density Residential Zone	90.57	90.57	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Major Centre zone	43.96	43.96	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Mixed Use Zone	7.26	7.26	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Open Space Zone	565.28	565.28	217.60	38.49%	124.42	57.18%	12.66	5.82%	4.02	1.85%	11.71	5.38%
Principal Centre Zone	24.65	24.65	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Rural Residential Zone	9,063.98	8,927.59	724.85	8.00%	211.87	29.23%	86.08	11.88%	93.89	12.95%	110.45	15.24%
Rural Zone	167,203.52	149,962.71	14,162.04	8.47%	3,173.61	22.41%	1,454.44	10.27%	734.09	5.18%	779.78	5.51%
Special Industry Zone	845.30	845.30	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Sport and Recreation Zone	391.58	387.90	6.04	1.54%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.76	12.61%
Township Zone	48.07	48.07	3.10	6.45%	0.00	0.00%	0.27	8.85%	1.00	32.29%	0.28	9.13%
Total Area	218,764.38	190,509.64	16,553.22	7.57%	3,802.82	22.97%	1,708.86	10.32%	842.83	5.09%	942.16	5.69%

6.6.3 Draft Planning Scheme Zones and Intent

A number of lots have been up-zoned to Rural residential from the Gatton Planning scheme Rural Agricultural and Rural General zones. These lots along the Gatton-Esk Road have extreme and very high flood hazard risk and are recommended to be maintained as Rural:

- Lots 75 and 76 on CA311429, Lot 100 and 900 on SP321209, and Lot 34 on SP310939 which have various depths greater than 2m and up to 3.1 metres.
- Lot 10 on RP206332 should also be maintained in the rural zone with depths of over 1.5 metres and velocity of 2.57 metres per second.

Council is commended for containing other Gatton Shire Park residential and Rural residential options within the Rural Zone in this precinct.

6.6.3.1 Zone Changes

There are 10 lots recommended for back zoning to Limited Development zone as part of the analysis of lots impact by extreme risk for greater than 75% of the allotment.

In discussion with Council, these examples are in the Rural Residential zone and approximately five hectares in size. It is possible (and is evident) that these lots are able to cater for expected built form entirely outside the extreme risk area. This is a good example of a single metric not being suitable for all zones.

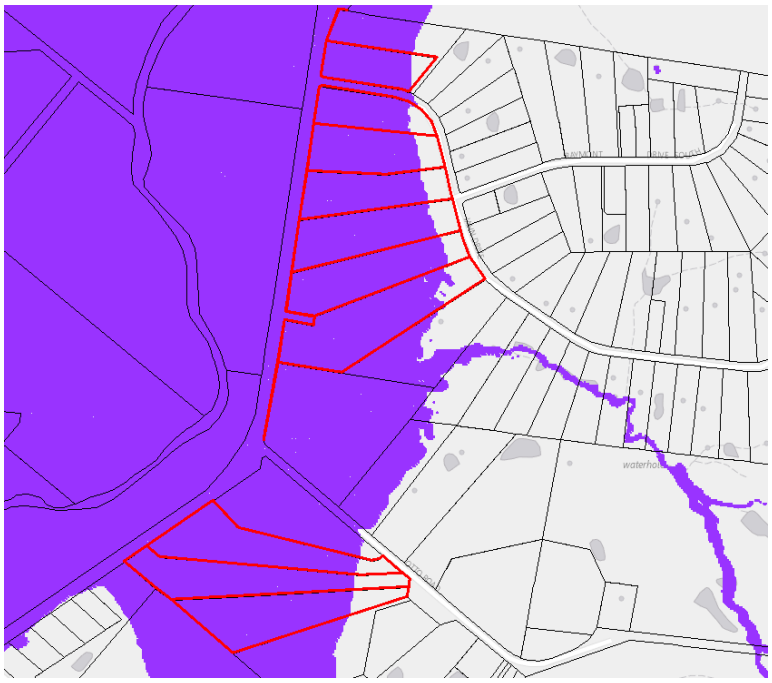

Figure 6-21 Limited development zone lots - Glenore Grove

6.6.4 Planning Scheme Integration Recommendations

The planning policy applied in the North Lockyer area will be an avoid, position. There is no demonstrated need for expansion of the Rural residential footprint and this area of the floodplain should be maintained for agriculture.

Future development will be regulated through strategic intent modifications for the primacy of agriculture, the creation of a rural precinct and avoidance of any intensification or residential uses. Integration of Flood Risk is achieved by the actions provided in Table 6-11 across strategic and growth intent, specific statutory provisions and non-planning actions. The table is indicative of primary integration actions based on the site analysis above. See also section 9 for Scheme-wide integration recommendations.

Table 6-11 North Lockyer - Planning Scheme Integration Recommendations

	Urban Growth Recommendations
1.	ensure that the message of no further reconfigurations in the rural zone and the primacy of the agricultural industry is reinforced.
2.	Glenore Grove is noted as a Rural Township. It is important that this township does not grow north or west into the very high and extreme flood risk areas.
	Statutory Planning Recommendations
3.	include the rural zone in the high and extreme risk in a Valley rural floodplain precinct (see section 8.11).
4.	consider zoning changes to the lots with extreme risk for greater than 75% of the allotments and whether this is an appropriate measure in the Rural Residential zone. Continue to refine metrics for back zoning in the rural residential and rural zones.
5.	remove the provision in the RoL code which permits rural lots to be subdivided into 2.5 hectares
6.	elevate the assessment levels of dwelling houses and any other built form (save agricultural purposes) in the Rural zone, through a Rural floodplain precinct.
7.	apply strict flood levels for fill and built form controls
8.	apply strict stormwater and localised flooding controls
9.	continue to refine the criteria for the Limited development zone candidature outside the urban area on urban sized allotments in the Rural zone.
	Non-scheme Supporting Recommendations
10.	promote resilient building design and materials
11.	other non-planning responses such as: o additional awareness for all community members on warning times and evacuation o explore interim evacuation routes to the south o targeted awareness for the dwellings identified as candidates for voluntary house purchase; and o ensure the Local Disaster Management Plan includes the most current information

6.7 Forest Hill

The precinct of Forest Hill is long, in a north south direction and sits between Tenthill and Laidley. It includes the townships of Forest Hill and is predominantly in the Rural Zone. The precinct is dominated by the central feature of the precinct is Sandy Creek. The creek commences in the Main Range and travel north collecting waters form Abell Creek and numerous other unnamed water ways before flowing north west of Forest Hill township and into Laidley Creek just north of the railway line.

The precinct includes the locations of Blenheim and Glen Cairn in the upstream reaches, and Forest Hill, College View and Crowley Vale on the lower floodplain.

6.7.1 Flood Risk Narrative

The upper reaches, south of Blenheim are characterised as steep mountain ranges with waters confined to deep channels. After Blenheim the catchment transitions to a floodplain landscape, widening as it flows further north to meet Laidley Creek.

Sandy Creek breaks its banks flowing east towards Laidley heights and fanning out across the floodplain with significant areas of floodway and flood storage (Figure 5-17). From Glen Cairn this flood behaviour continues, surrounding Forest Hill and inundating Crowley Vale and College View.

Forest Hill has experienced at least three severe floods including 1974, 2011 and 2013. Substantial damage was caused to residential homes and to agricultural properties. Flooding along Sandy Creek and Laidley Creek cuts access in and out of the main town in Forest Hill and can make evacuation challenging. During a major flood event, the Lockyer Creek Floodplain Risk Management Study and Plan (SKM, 2014) notes that 80% of the total flow from Sandy Creek is on the floodplain and not within the creek channel. The additional risk that comes with creek breaking banks is isolation. Figure 6-22 Forest Hill Potential Hydraulic Risk

Figure 6-23 shows the extent of the potential for low and high flood islands. Forest Hill is highly hazardous as the majority of the region inundates by the PMF. Many of the properties in Forest Hill and surrounding agricultural land are in low flood islands, increasing the risk of not evacuating prior to being inundated. Figure 6-24 shows that the entire precinct has less than 6 hours warning time.

6.7.2 Property and Land Use Impact Summary

For the purposes of detailed analysis, for each locality a number of metrics are prepared

- of the 208 LDR allotments in Forest Hill, 82 (39%) are impacted by >50% of the lot area in HR1&2; of which
- all these allotments are impacted >75% of the lot area

There is one Rural residential allotment nominated for Limited development zone on Old Laidley-Forest Hill Road. It is evident Table 6-12 that 100% of the LDR land in Forest Hill is impacted and large areas are significantly impacted. In addition, the assessment includes vast areas of Community facilities zone including the UQ Campus.

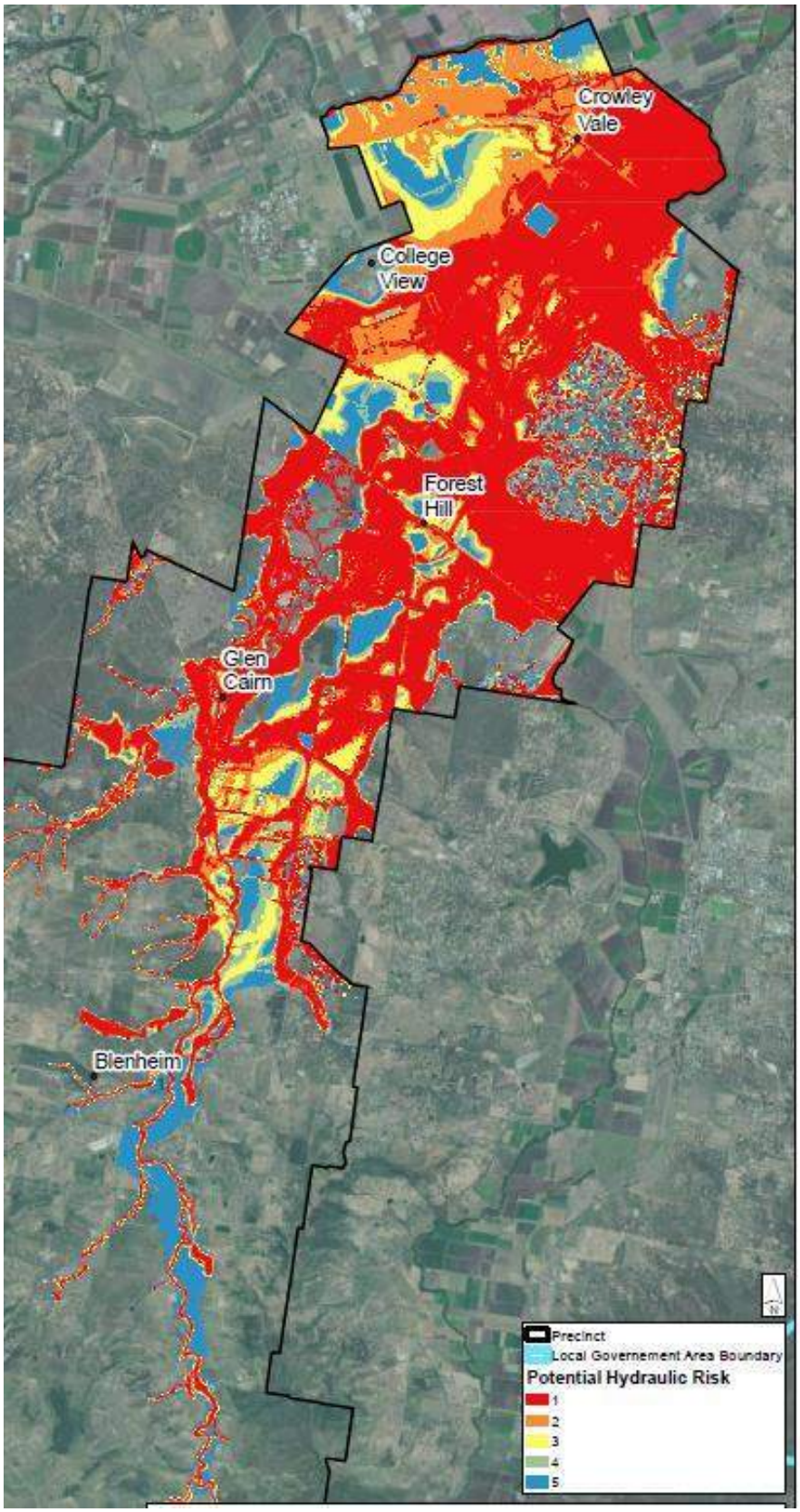

Figure 6-22 Forest Hill Potential Hydraulic Risk

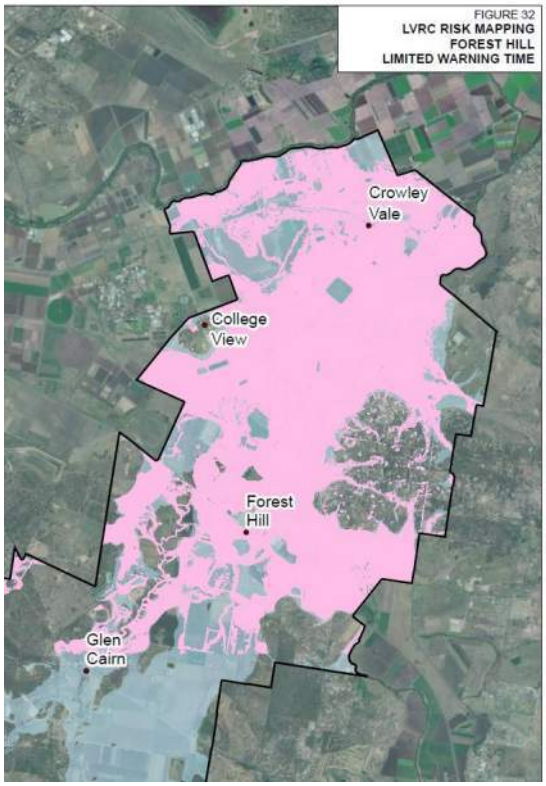

Figure 6-23 (right) Forest Hill Flood Islands

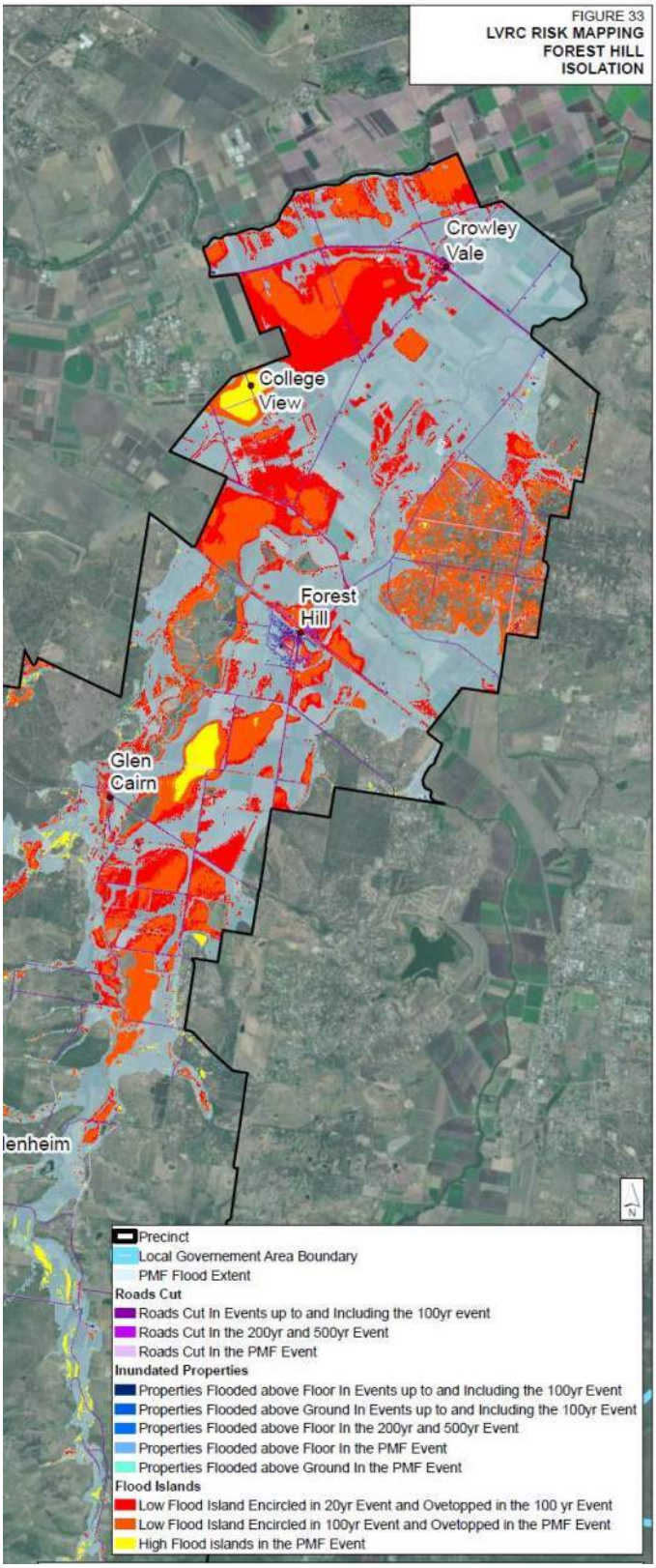

Figure 6-24 (above) Forest Hill - Warning Time and PMF

6.7.3 Draft Planning Scheme Zones and Intent

The area is dominated by Rural zone completely within the upper reaches of the catchment. There is a small area of Community facilities at Blenheim which is the Blenheim State School.

There is no other zone present until Forest Hill township. The town comprises about 200 lots LDR zone, one Sport and recreation allotment which is Furley Park, numerous Community facility allotments scattered about the township, one Open space lot which is Anzac Park and 12 Local centre zoned allotments, all at the junction of Victoria Street. The previous Laidley Shire plan was not materially different.

Table 6-12 Forest Hill - Hydraulic Risk and Lot Area Analysis

Current Scheme Hydraulic Risk Overlay			*Forest Hill*									
			Zoned area		*HR1-2*		*HR-3*		HR4		HR5	
					Overlay area		*Overlay area*		*Overlay area*		*Overlay area*	
Zones	**Total LVRC zone (ha)**	**Total precinct zone area (ha)**	Precinct zone area (ha)	Precinct zone area (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)
Community Facilities Zone	3,921.66	3,657.86	108.99	2.78%	11.37	10.43%	28.65	26.29%	21.56	19.78%	33.17	30.43%
Conservation Zone	33,693.22	23,083.17	44.47	0.13%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Emerging Community Zone	1,299.38	1,299.38	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Industry Zone	363.47	363.47	0.78	0.21%	0.45	58.24%	0.33	41.70%	0.00	0.04%	0.00	0.02%
Limited Development Zone	44.54	44.54	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Local Centre Zone	22.17	22.17	1.15	5.20%	0.22	19.32%	0.80	69.20%	0.13	10.93%	0.01	0.56%
Low Density Residential Zone	1,135.77	1,135.77	32.30	2.84%	18.17	56.25%	5.58	17.29%	5.45	16.88%	3.10	9.59%
Low-Medium Density Residential Zone	90.57	90.57	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Major Centre zone	43.96	43.96	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Mixed Use Zone	7.26	7.26	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Open Space Zone	565.28	565.28	8.64	1.53%	7.96	92.18%	0.30	3.48%	0.17	1.96%	0.06	0.66%
Principal Centre Zone	24.65	24.65	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Rural Residential Zone	9,063.98	8,927.59	365.81	4.04%	38.37	10.49%	44.78	12.24%	82.18	22.46%	35.13	9.60%
Rural Zone	167,203.52	149,962.71	15,423.00	9.22%	2,132.90	13.83%	997.15	6.47%	554.52	3.60%	694.12	4.50%
Special Industry Zone	845.30	845.30	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Sport and Recreation Zone	391.58	387.90	5.92	1.51%	0.35	5.94%	1.32	22.35%	1.69	28.58%	2.51	42.38%
Township Zone	48.07	48.07	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total Area	218,764.38	190,509.64	15,991.05	7.31%	2,209.80	13.82%	1,078.91	6.75%	665.69	4.16%	768.09	4.80%

There are two additional allotments in College view which have transitioned from Rural residential to Community facilities adjacent to the UQ campus. It is anticipated that this land is owned by the University.

At Crowley Vale, there is a collection of commercial uses fronting the highway and in Gunn Court including the Big Orange, Titan garages and Shed, A2 Tyres and Parts and the Western Traders trucking yard. These were previously in the Business zone and are proposed to be in the Rural zone, save the Titan sheds lot which is in the Industry zone.

The Strategic framework zoning has been updated in Forest Hill as an Urban town with a majority of the town being designated as Urban Area. Section 1.2.6 outlines the vision for Forest Hill which is limited to the existing footprint.

6.7.4 Planning Scheme Integration Recommendations

The planning policy applied in the Forest Hill area will be an avoid and arrest position. There is no demonstrated need for inclusion of Forest Hill as an urban area as it is acknowledged that growth is limited due to the floodplain.

Future development will be regulated through strategic intent modifications for the primacy of agriculture. Integration of Flood Risk is achieved by the actions provided in Table 6-11 across strategic and growth intent, specific statutory provisions and non-planning actions. The table is indicative of primary integration actions based on the site analysis above. See also section 9 for Scheme-wide integration recommendations.

Table 6-13 Forest Hill Planning Scheme Integration

	Urban Growth Recommendations
1.	ensure that the message of no further reconfigurations in the rural zone and the primacy of the agricultural industry is reinforced.
2.	remove Forest Hill as an Urban Area and an Urban Town and include the area as a Rural Township. Delete section 3.2.6.1.
	Statutory Planning Recommendations
3.	include the rural zone in the high and extreme risk area in a Valley rural floodplain precinct (see section 8.11)
4.	remove the provision in the RoL code which permits rural lots to be subdivided into 2.5 hectares
5.	elevate the assessment levels of dwelling houses and any other built form (save agricultural purposes) in the Rural zone through a Rural floodplain precinct.
6.	apply strict flood levels for fill and built form controls
7.	apply strict stormwater and localised flooding controls
	Non-scheme Supporting Recommendations
8.	continue to refine the criteria for the Limited development zone candidature outside the urban area on urban sized allotments in the Rural zone.

9.	promote resilient building design and materials
10.	other non-planning responses such as: o additional awareness for all community members on warning times and evacuation o explore interim evacuation routes to the south o targeted awareness for the dwellings identified as candidates for voluntary house purchase; and o ensure the Local Disaster Management Plan includes the most current information

6.8 Laidley and Plainlands

This precinct includes the settlements of Laidley south and west, Laidley township, Laidley Heights, Laidley North and Plainlands. The locality is dominated by Laidley Creek running north south. The creek is a perched channel, so surrounding floodplains are lower resulting in outbreaks conveying the flood events. The LGA boundary is on the eastern side of this locality along the Little Liverpool Range. Further south is the Mulgowie precinct, and the west is Forest Hill.

Laidley South is located between Mulgowie further upstream and Laidley township around the Old Mulgowie Road to Lester Lane, at the foothills of the Little Liverpool Range and the eastern side of Laidley Creek. Lagoon Creek has origins here along with the typical unnamed localised water courses. The area is exclusively rural and is characterised by wide expanse of floodplain where the Laidley creek breaks out from the formal channel. Laidley west is on the opposite bank of the creek and exclusively rural with flows from Manthey's Knob directly into Laidley Creek. The area is also characterised by breakouts, HR1and HR2 flood risk. Laidley height is south west of the township on undulating land, characterised by rural residential development.

In Laidley township the breakout character of the floodway commences much further upstream at Mulgowie and flows into the south end of the township at Narda Lagoon and continues through the heart of the township, in some places with considerable depth. Some flowpaths are full at the 10 per cent AEP event. High velocity is experienced throughout the township. Laidley has the highest average annual flood damages bill of all Lockyer Valley settlements with significant flooding occurring at very regular intervals or 12 times in the years from 1960 to 2013 or every 4-5 years.

At Laidley North, warning times decrease and fast flowing waters from the slopes dominate the flood behaviours. The creek develops large areas of flood storage in this location. From here the Creek travels slightly west, before heading east again and crossing the Warrego highway west of Plainlands. Plainlands straddles the Warrego Highway. It features big-box development with Bunnings, a small shopping centre and large roadside stops on both sides of the highway. New residential development is underway on the northside, and the large Lutheran College is on the southside of this interchange between the highway, Gehrke Road and Laidley-Plainlands Road. The area has limited warning time and is scattered with HR1 and HR2 floodways.

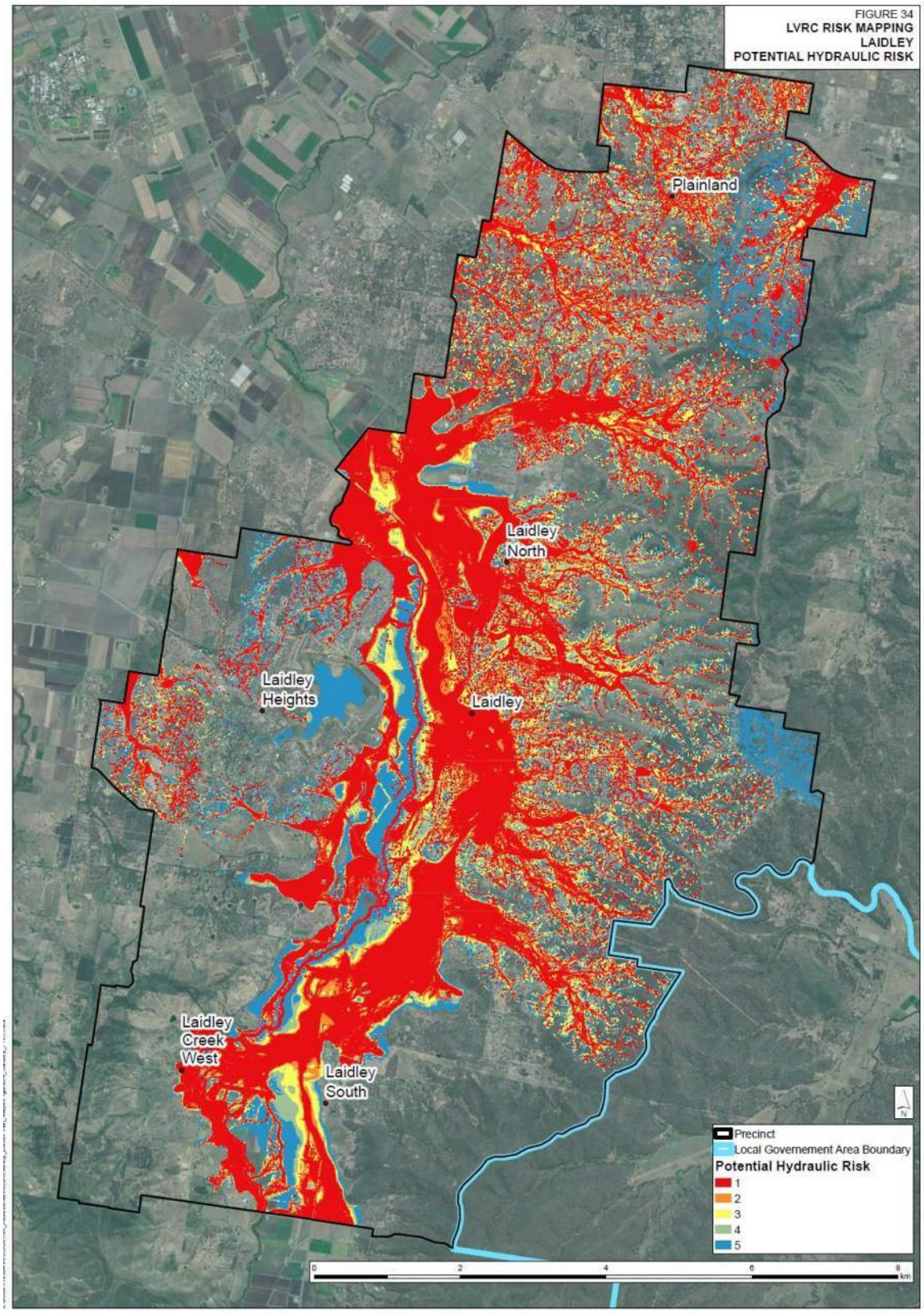

Figure 6-25: Potential Hydraulic Risk - Laidley and Plainlands

6.8.1 Flood Risk narrative

From the risk assessment and local area profiles prepared by WMA, Table 6-4 synthesises the local area details which form the basis of an overall risk profile of 'high'.

Table 6-14: Laidley and Plainlands - Flood Particulars

Element	Comments
Overall Risk (from WMA)	HIGH
Vulnerability	The Laidley and Plainlands locality show a slightly higher vulnerability than the Queensland average across all four measurements of social, demographic, income and mobility especially with new residents, pockets of high age groups in the area and a slightly lower incidence of vehicle ownership in Laidley town.
Flood Behaviour and Multipliers	Flood behaviours are dominated across this locality with the actions of the perched channel producing large breakouts across the floodplain of high velocities and depths. In addition, north of Laidley, warning times decrease as waters are added from the Little Liverpool Range and flood storage starts to spread. There are large areas of high and extreme risk for properties, including commercial areas. The main roads run parallel to the Creek for the most part resulting in evacuation constraints and isolation of many parts of the locality.
Future Outlook	Climate change is not expected to impact this area significantly with depth increasing by about 0.1m
Consequences	• acceptance of regular and sometimes significant flooding especially in the commercial areas; • extensive isolation from north to south and across the creek with many low flood islands prevent fulsome emergency response • low warning times north of Laidley put newer homes at risk • depth and velocity are of concern, especially in breakout areas and older streets; and • expansion areas are at risk
Mitigation Options	• a number of structural interventions have occurred in recent years to alleviate frequent flooding • continue to explore and implement best practice on flood warning infrastructure and explore strategic upgrades for potential evacuation routes • ensure no worsening through land use planning • community awareness

6.8.2 Property and Land Use Impact Summary

For the purposes of detailed analysis, for each locality a number of metrics are prepared

- 223 residential* allotments are impacted by >50% of the lot area in HR1&2; of which
- 185 are impacted >75% of the lot area
- there are significant areas of Emerging community zoned land which are impacted by HR1 and HR 2 areas to a degree
- there are no allotments in Laidley or Plainlands currently in the LDZ

**Residential is LDR, LMDR, RRES and does not include Township or Emerging community Zones*

Table 6-8 below provides a breakdown of flood impacts by zone area and percentage. Laidley has significant areas of urban zones impacted by flood. There are some exceptionally high numbers in the Table 6-15 below. In terms of residential land more than 90 percent of the LDR zone is impacted, over 80 per cent of the Emerging community zone, half of the MDR ad RRes zones.

Economic prosperity is a complex equation when almost three quarters of the industrial land is flood impacted, over 80 per cent of the Major centre zone and 90 percent of the Mixed use zone. Supporting land use zones also show high total in Community facilities (57%), Sport and Recreation (53%) and Open space (76%).

6.8.3 Draft Planning Scheme Zones and Intent

The Strategic Framework nominates Urban Centres, Urban Towns and Urban localities. Laidley and Plainlands are Urban localities and an Urban Centres. As Urban Centres, they have a full range of zones and are intended to cater for growth into the future.

Urban centres Urban areas offer a range of lifestyles with higher order levels of access to employment, infrastructure and services with a strong affinity with community and high tourism visitation. These areas form the Principal and Major growth centres of the Lockyer Valley and are intended for expansion and consolidation. The Principal centre of Gatton forms the highest order centre.	Gatton, Laidley, Plainland

These urban centres are specifically nominated as 'growing communities'. The localities of Laidley, west, heights and north are not mentioned. Laidley South is mentioned for the first time in the Structure plans section 3.2.5:

Structure plan areas are mapped on Strategic Framework Map SFM 1 Growing Communities and include:

1. *Gatton (potential for residential and employment activities);*
2. *Grantham (potential for residential, community and employment activities);*
3. *Helidon (potential for residential, community, tourism and employment activities);*
4. *Laidley south (potential for residential and employment activities);*
5. *Major Enterprise and Industrial Area (potential for employment activities);*
6. *Plainland (potential for residential, community and employment activities);*
7. *Withcott (potential for residential, tourism and employment activities).*

Table 6-15: Laidley and Plainlands - Hydraulic Risk and Lot Area Analysis

Current Scheme Hydraulic Risk Overlay			***Laidley / Plainlands***										***Total***
			Zoned area		*HR1-2*		*HR-3*		HR4		HR5		
					Overlay area		*Overlay area*		*Overlay area*		*Overlay area*		
Zones	**Total LVRC zone (ha)**	**Total precinct zone (ha)**	(ha)	(%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected area (ha)	affected area (%)	affected zone (%)
Community Facilities Zone	3,921.66	3,657.86	326.37	8.32%	42.12	12.91%	46.10	14.13%	39.53	12.11%	58.96	18.06%	57.21%
Conservation Zone	33,693.22	23,083.17	45.26	0.13%	2.95	6.51%	3.91	8.65%	3.63	8.01%	5.21	11.52%	34.69%
Emerging Community Zone	1,299.38	1,299.38	186.01	14.32%	25.71	13.82%	71.34	38.35%	48.22	25.92%	8.53	4.59%	82.68%
Industry Zone	363.47	363.47	47.95	13.19%	7.73	16.13%	12.82	26.74%	10.55	22.00%	3.66	7.63%	72.49%
Limited Development Zone	44.54	44.54	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Local Centre Zone	22.17	22.17	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Low Density Residential Zone	1,135.77	1,135.77	253.15	22.29%	41.42	16.36%	91.26	36.05%	82.27	32.50%	18.43	7.28%	92.19%
Low-Medium Density Residential Zone	90.57	90.57	57.73	63.74%	3.79	6.57%	14.08	24.39%	7.24	12.54%	3.79	6.56%	50.06%
Major Centre zone	43.96	43.96	43.96	100.00%	6.70	15.24%	17.95	40.83%	7.41	16.85%	5.36	12.20%	85.12%
Mixed Use Zone	7.26	7.26	7.26	100.00%	0.57	7.90%	2.80	38.57%	1.38	19.07%	1.97	27.06%	92.60%
Open Space Zone	565.28	565.28	80.19	14.19%	42.67	53.21%	10.15	12.65%	5.81	7.25%	2.33	2.90%	76.01%
Principal Centre Zone	24.65	24.65	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Rural Residential Zone	9,063.98	8,927.59	1,199.99	13.24%	87.06	7.26%	221.94	18.50%	177.48	14.79%	93.80	7.82%	48.36%
Rural Zone	167,203.52	149,962.71	7,292.55	4.36%	1,173.56	16.09%	958.96	13.15%	670.46	9.19%	606.74	8.32%	46.76%
Special Industry Zone	845.30	845.30	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Sport and Recreation Zone	391.58	387.90	89.40	22.83%	21.11	23.61%	8.86	9.91%	11.65	13.03%	6.60	7.38%	53.93%
Township Zone	48.07	48.07	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Total Area	218,764.38	190,509.64	9,629.83	4.40%	1,455.40	15.11%	1,460.18	15.16%	1,065.64	11.07%	815.37	8.47%	

It is assumed that this area is not the area of Laidley South as investigated by the Flood Risk Assessment, but rather the areas zoned Emerging community on the southside of the Laidley township. It is unclear why Laidley south is nominated and not Laidley north for structure planning which also has large areas of urban expansion land.

There are also considerable areas of LDR in Laidley which are not yet developed.

6.8.3.1 Zone Changes

There are a number of zone changes from the Laidley scheme to the LVDPS. These should be reviewed to ensure they are appropriate for the flood risk. The following allotments have been up zoned from Rural landscape to Emerging Community and are recommended to remain in the rural zone until such time as a growth strategy has been developed:

- Lot 75, 95, 101, 102 and 98 on CH3125;
- Lot 88 on SP248990
- Lots 104-106 on CH311683;
- Lots 100 and 103 on CC742
- Lot 6 on SP116029
- Lot 1 on RP25654
- Lot 13 on RP25653
- Lot 800 on SP256785
- Lot 2 on RP209381
- Lot 11 on RP114708
- Lot 805 on SP300510

It is also recommended that the zoning of Lot 998 on SP239294 be review for its appropriateness as LDR as discussed with the Councillors.

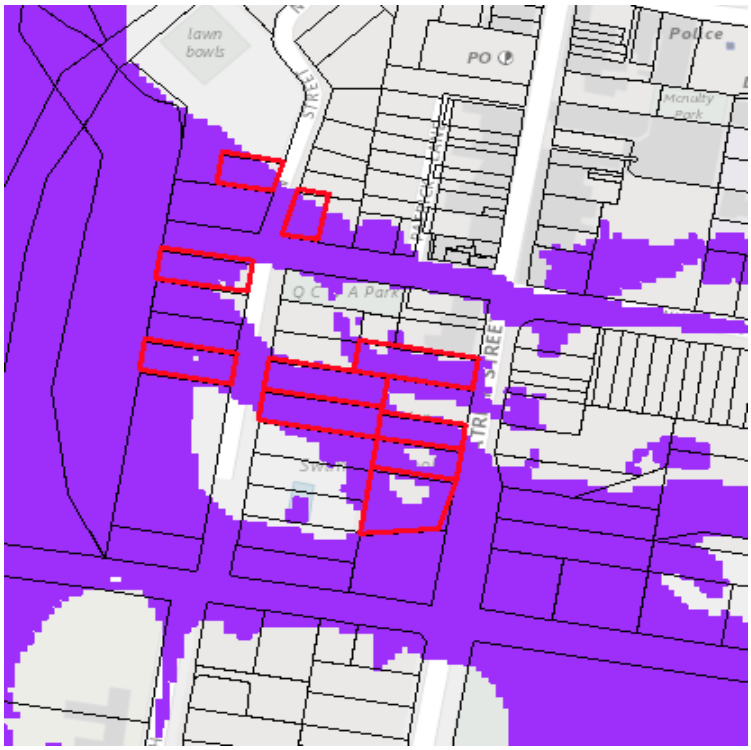

Figure 6-26: Limited Development zone lots - Laidley town centre

There are 10 allotments which have been identified as candidates for Limited development zone. Note that once these allotments have been back-zoned the above boundary for the precinct can be amended. Further candidates include:

- Lots 3 and 4 on RP113010 in the industry zone; and
- Lots 13-17 (inclusive on RP63683 on Alexander Street in the MDR zone

6.8.4 Planning Scheme Integration Recommendations

The planning policy applied in the Laidley and Plainlands locality will have two distinct approaches. In Plainlands, subject to compliance with newly drafted codes and provisions the policy position is one of accept and mitigate. The risk is manageable with adherence to strong planning policy on drainage, localised flooding and flow paths.

The Laidley area will employ policy positions of avoid, arrest, mitigate, and transition. Laidley is intended to support significant growth, which, leads to growth in required supporting services such as schools, shops, recreational opportunities and jobs. Given the extent to which Laidley can support an intensification of supporting land uses and residential expansion in the context of flood risk, it is recommended that Laidley's growth narrative is revisited in the planning scheme.

Future development will be regulated through stronger explanatory narratives in the strategic intent, zone changes, and site based and construction provisions. Integration of Flood Risk is achieved by the actions provided in Table 6-16 across strategic and growth intent, specific statutory provisions and non-planning actions. The table is indicative of primary integration actions based on the site analysis above. See also section 9 Scheme-wide integration recommendations.

6.8.4.1 Laidley Flood Resilient Precinct

To maintain economic function but apply risk appropriate constraints on future development in the high and extreme risk area of Laidley township, a flood resilient precinct is required with a boundary shown in Figure 6-27below. The precinct effectively applies the same rules as the high risk area but further constraints land use types, maintaining and promoting land uses that are less capital intense. The

Figure 6-27 Laidley flood resilient precinct boundary

Table 6-16: Laidley and Plainlands - Planning Scheme Integration Recommendations

	Urban Growth Recommendations
1.	remove all up zoning from Laidley township and maintain the Laidley scheme Rural zone where development has not occurred. Re-examine the Emerging community zoned land in Laidley South
2.	remove Laidley from the Urban Centres in Table 1 section 3.2.3 and replace in the Urban towns. Delete the reference to major centre in Table 1 which relates to Laidley.
3.	delete references to structure planning and growth in Laidley south in Part 3.2.5.
4.	retain Laidley as an urban centre but redraft the growth narrative to recognise the severe limitations from flood risk. Maintaining the growth potential of Laidley in the urban localities section presents conflict between expectations of growth, supporting employment and commercial land uses and natural hazards.
	Statutory Planning Recommendations
5.	include Open space zone drainage corridors in undeveloped greenfield lots
6.	strict land use controls so that high and extreme risk areas do not intensify
7.	limit intensification in the town centre through application of the Laidley flood resilient precinct which should encompass the four centre blocks, bounded by Whites Road, John, Ambrose, Spicer and North Streets as shown above in Figure 6-27
8.	back-zone the lots with greater than 75% extreme risk as shown in Figure 6-26 and any further allotments across the commercial, industrial or residential zones which fit the criteria of 75% lot coverage of extreme risk as outlined in section 5.8.3.1.
9.	ensure all expansion areas or infill include appropriate redirection of localised flows or allocation of drainage corridors with legal rights to Council
10.	remove the provision in the RoL code which permits rural lots to be subdivided into 2.5 hectares
11.	elevate the assessment levels of dwelling houses and any other built form (save agricultural purposes) in the Rural zone, through a Valley rural floodplain precinct (see section 8.11)
12.	apply strict flood levels for fill and built form controls
13.	apply strict stormwater and localised flooding controls
	Non-scheme Supporting Recommendations
14.	continue the voluntary house purchase program for areas of HR1 and HR2
15.	other non-planning responses such as: o additional awareness for all community members on warning times and evacuation

		o explore interim evacuation routes to the south o targeted awareness for the dwellings identified as candidates for voluntary house purchase; and o ensure the Local Disaster Management Plan includes the most current information

6.9 East Lockyer

The precinct of east Lockyer shares a boundary with Somerset and Ipswich Regional councils and is predominantly a rural residential area. It includes suburbs of Regency Downs, Summerholm, Hatton Vale, Kensington Grove, Brightview, Lockrose and Lynford. In the south of the precinct Woolshed creek catches water and flows into Somerset. Likewise, a low lying flow path in the area of Hatton Vale golf course flows parallel north east into Somerset. To the west of the precinct flood water expand from Lockyer Creek and is part of the Lockyer floodplain. Figure 6-28 shows the potential hydraulic flood risk.

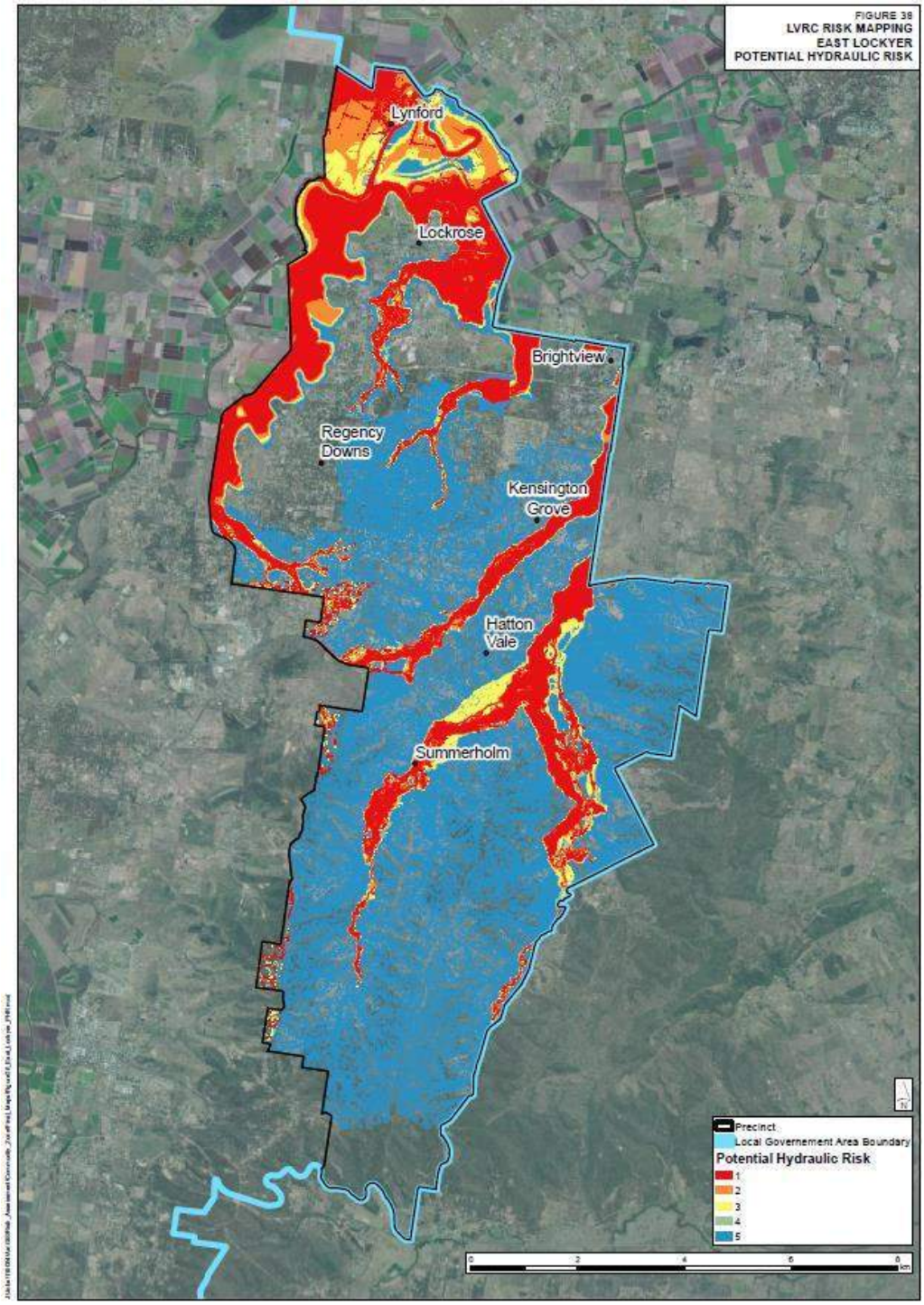

Figure 6-28 East Lockyer - Potential Hydraulic Risk

6.9.1 Flood Risk Narrative

Vulnerability in the area is above Queensland average. As for other catchments the waters flow swiftly from the steep terrain in the south and flow north to the settlements. This is the case for Hatton Vale and Summerholm.

Regency Downs is located on an elevated region southeast of Glenore Grove. It is predominantly flood-free, however there are localised flooding areas in the southwest and northeast. Regional flows occur along the northwest boundary originating from Glenore Grove. Due to the nature of the surrounding flows, all evacuation and emergency access routes are cut in the 1% (1 in 100) AEP event. Rural properties and properties in the local flow path to the south are flooded above floor in events up to the 1% (1 in 100) AEP event. Lynford is located along Lockyer Creek and is highly flood prone. It is dominated by regional flows from Lockyer Creek and Seven Mile Lagoon.

6.9.2 Property and Land Use Impact Summary

For the purposes of detailed analysis, for each locality a number of metrics are prepared

- 67 Rural residential* allotments are impacted by >50% of the lot area in HR1&2; of which
- 19 are impacted >75% of the lot area
- there are no allotments in East Lockyer in the LDZ
- there are no properties identified for back-zoning.

**Residential is LDR, LMDR, RRES and does not include Township or Emerging community Zones*

Table 6-17 below provides a breakdown of impacted zone by area. T is evident from the table that large expanses of green zones are affected by flood. There is a high proportion of Community facilities zoned land impacted and also about half the Sprot and recreation zone.

6.9.3 Draft Planning Scheme Zones and Intent

There are a number of zone changes from the Laidley scheme to the LVDPS. These should be reviewed to ensure they are appropriate for the flood risk. The following allotments have been up zoned from Rural landscape to Rural residential and are recommended to remain in the rural zone until such time as a growth strategy has been developed:

- Lot 2 on RP117954
- Lot 89 on CH311498
- Lots 3 – 6 on RP200061
- Lot 2 on SP214245
- Lot 199 on SP313144
- Lot 999 on SP309246 maintaining the rural zone or split zone

Part 3 of the LVDPS advises that Rural residential areas are not intended to expand

> *Rural residential areas remain unchanged to protect and retain the land features that constrain their expansion (Part 3, page 7).*

Table 6-17 East Lockyer - Hydraulic Risk and Lot Area Analysis

Current Scheme Hydraulic Risk Overlay			*East Lockyer*									
			Zoned area		HR1-2 *Overlay area*		*HR-3 Overlay area*		HR4 *Overlay area*		HR5 *Overlay area*	
Zones	**Total LVRC zone (ha)**	**Total precinct zone area (ha)**	Precinct zone area (ha)	Precinct zone area (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)
Community Facilities Zone	3,921.66	3,657.86	55.59	1.42%	2.99	5.38%	2.01	3.61%	2.22	4.00%	17.78	31.98%
Conservation Zone	33,693.22	23,083.17	33.87	0.10%	23.95	70.71%	0.59	1.74%	0.05	0.16%	3.17	9.34%
Emerging Community Zone	1,299.38	1,299.38	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Industry Zone	363.47	363.47	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Limited Development Zone	44.54	44.54	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Local Centre Zone	22.17	22.17	3.50	15.79%	0.00	0.00%	0.00	0.00%	0.00	0.00%	1.03	29.49%
Low Density Residential Zone	1,135.77	1,135.77	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Low-Medium Density Residential Zone	90.57	90.57	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Major Centre zone	43.96	43.96	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Mixed Use Zone	7.26	7.26	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Open Space Zone	565.28	565.28	89.17	15.77%	49.37	55.36%	10.30	11.55%	2.01	2.25%	18.81	21.10%
Principal Centre Zone	24.65	24.65	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Rural Residential Zone	9,063.98	8,927.59	3,131.56	34.55%	279.26	8.92%	116.38	3.72%	53.81	1.72%	860.76	27.49%
Rural Zone	167,203.52	149,962.71	7,014.13	4.19%	1,252.79	17.86%	441.81	6.30%	261.42	3.73%	2,805.38	40.00%
Special Industry Zone	845.30	845.30	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Sport and Recreation Zone	391.58	387.90	64.95	16.59%	17.85	27.49%	3.95	6.09%	1.64	2.53%	15.79	24.31%
Township Zone	48.07	48.07	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total Area	218,764.38	190,509.64	10,392.78	4.75%	1,626.21	15.65%	575.04	5.53%	321.16	3.09%	3,722.72	35.82%

6.9.4 Planning Scheme Integration Recommendations

The planning policy applied in the East Lockyer area will be a mitigate and arrest position. There is no demonstrated need for expansion of existing rural residential areas, and the proposed expansion extents into areas of high and extreme risk. This can be avoided by maintaining the rural residential footprint as stated in the Strategic Framework.

Future development will be regulated through strategic intent modifications for the primacy of agriculture. Integration of Flood Risk is achieved by the actions provided in Table 6-18 across strategic and growth intent, specific statutory provisions and non-planning actions. The table is indicative of primary integration actions based on the site analysis above. See also section 9 for Scheme-wide integration recommendations.

Table 6-18 East Lockyer - Planning Scheme Integration Recommendations

	Urban Growth Recommendations
1.	remove all up zoning from the rural residential areas and maintain the Laidley scheme Rural zone
	Statutory Planning Recommendations
2.	include Open space zone drainage corridors in undeveloped greenfield lots as split zones
3.	strict land use controls so that high and extreme risk areas do not intensify through a Valley rural floodplain precinct (see section 8.11)
4.	limit intensification of uses in high and extreme risk areas
5.	any new development must be located outside the risk area
6.	remove the provision in the RoL code which permits rural lots to be subdivided into 2.5 hectares
7.	apply strict flood levels for fill and built form controls
8.	apply strict stormwater and localised flooding controls
	Non-scheme Supporting Recommendations
9.	other non-planning responses such as: o additional awareness for all community members on warning times and evacuation o explore interim evacuation routes to the south o targeted awareness for the dwellings identified as candidates for voluntary house purchase; and o ensure the Local Disaster Management Plan includes the most current information

6.10 Mulgowie

The precinct of Mulgowie is furthest east, sharing a boundary with Ipswich regional council. The precinct is south of Laidley and features the upstream reaches of It is a ling north-south precinct with three townships of Mulgowie, Thornton and Townson.

Laidley Creek starts in the steep and heavily vegetated areas of Main Range. It is joined by Surveyors, Cedar, Clarkes, Shingle Hut, Stony and Main Camp Creeks.

Figure 6-29 shows the potential hydraulic risk in this precinct.

Majority of residents within Mulgowie precinct have lived in the area longer than the Queensland average, with lower percentage of people recently moved. There are higher percentages of home ownership or mortgages but there is also a higher than average age profile.

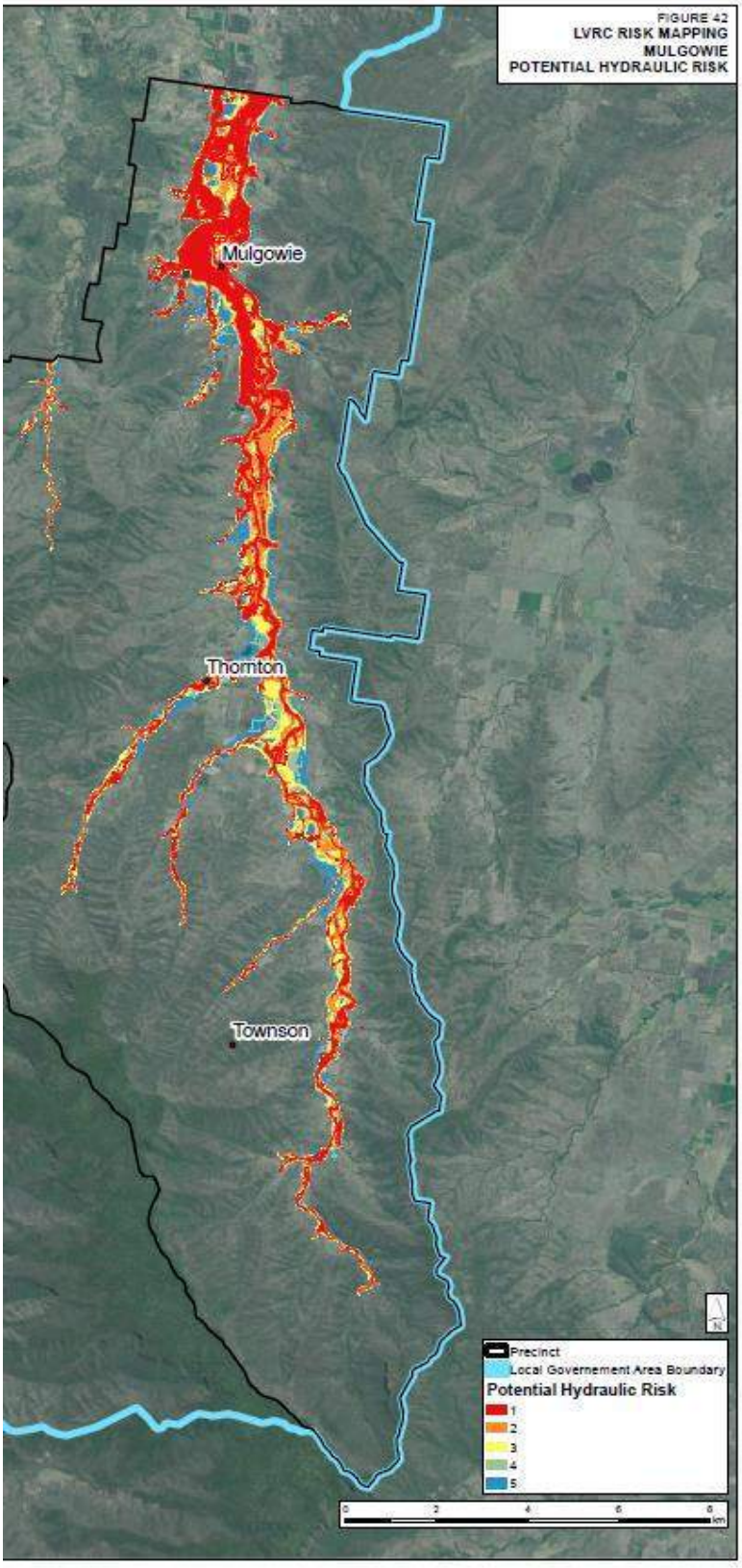

Figure 6-29 Mulgowie - Potential Hydraulic Risk

6.10.1 Flood Risk Narrative

There is a large amount of flood islands within the lower section of the locality as the creeks secondary flow paths are initiated at higher flow rates leading to agricultural land between channels becoming cut off. As floodwaters progress downstream towards Thornton the channel transitions from an incised channel to a perched channel and the flooded width increased and affects more land.

There was significant damage to the creeks and crossings within the region during the 2011 and 2013 flood events. Bridges and approaches were destroyed within the catchment.

Typically, this locality receives the heaviest, and most extensive rain and the catchment can be very responsive.

6.10.2 Property and Land Use Impact Summary

There are no residential zones in this precinct and all impacts are to the rural zone. There are no properties identified for back-zoning.

6.10.3 Draft Planning Scheme Zones and Intent

The draft planning scheme does not alter the zones from the current Laidley Planning scheme. Mulgowie township is specifically mentioned in the planning scheme as a hamlet.

6.10.4 Planning Scheme Integration Recommendations

Policy pathways will be consistent with those applied across the region for the purposes of mitigating risk and compliance with the SPP as shown in the Land Use Policy tables for the Rural zone. There are no specific recommendations for this precinct.

7 Policy Implementation

Land use policy must consider place values and context. For the Lockyer valley some of the place context issues to consider which sets the region apart from neighbours include:

- valuable food bowl to a conurbation of south east Queensland
- unique topography of a small, closed valley surrounded by steep slopes and national parks
- seen as a dormitory suburb of growing neighbours in Toowoomba and Ipswich; and
- significant flood history.

The state planning policy allows policy to be fit for purpose in the context of local government areas. This section looks at some of the attributes which shape local application of a risk based flood policy.

7.1 Local Values

The Lockyer Valley is a 'valley of places'. At the heart of these places is a strong connection to the land and natural resources which support: the five themes outlined in the LVDPS of

1. growing our community;
2. a prosperous economy;
3. connecting infrastructure to places;
4. sustaining and protecting the natural environment; and
5. creating a great place to live.

The planning policy within the scheme needs to enable and facilitate those themes to realise the vision of Locker Valley's people. The planning scheme must drive the underlying elements which achieve the vision and values.

Figure 7-1 below illustrates how the values are implemented as land use policy.

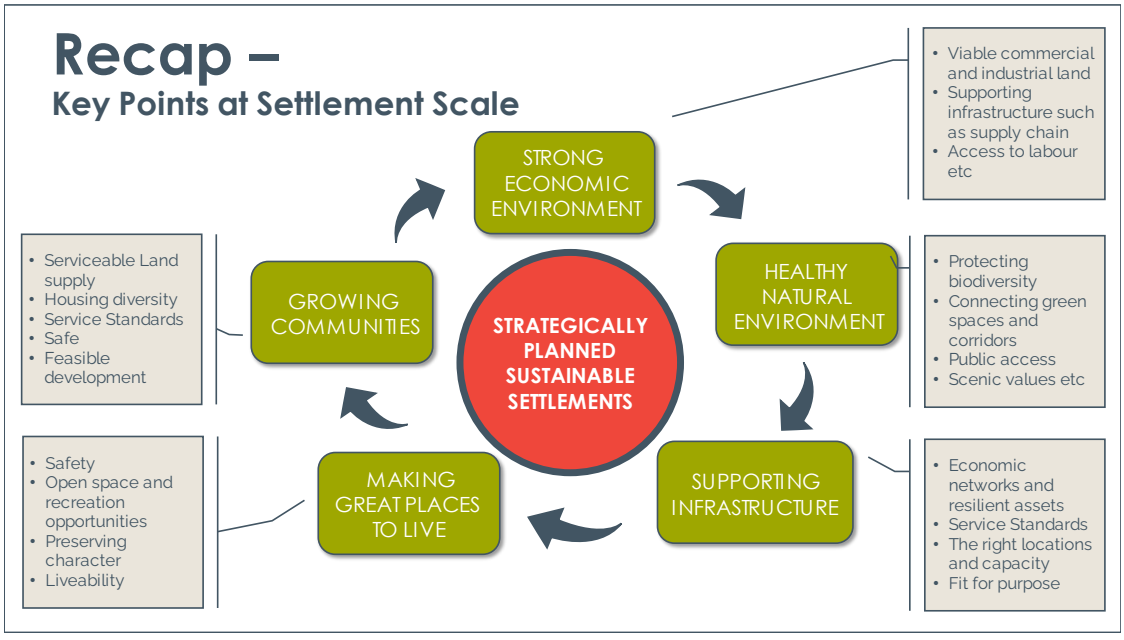

Figure 7-1: Strategic implementation of community values

7.2 Natural Hazard Impacts

Natural hazard impacts go much further than inundation of residential property. Property represents people's lives, employment, education, social connectedness and had underlying stresses and shocks which transcend the material.

Loss of life and property

In recent years, a high proportion of flood-related deaths in Australia have occurred on flooded roads. Fatalities also result from people being swept away while crossing rivers, stormwater channels, overland flow paths or other flooded areas. Properties are being inundated to roof height resulting in complete loss of domestic property, furniture, motor vehicles, and personal effects. Where insurance is not available, this will also result in a loss of savings, and financial hardship sometimes resulting in people who have retired or are unable to work being dependent upon the social funding network and social housing.

Financial personal hardship

For many families, it is both their principal asset and is associated with their largest debt. It is also likely to contain most of their possessions. The size and effect of financial impacts depend on the severity of flooding, the susceptibility of the house and contents, current and projected future income, financial assets and debt, and capacity to recoup the losses sustained. Further, loss of local employment due to flood damage, the added stress of having to move towns without a nest egg to start compounds personal financial hardship.

Mental health and wellbeing

Each disaster brings with it the need for mental health assistance as people grapple with the loss of loved ones, the loss of their worldly possessions and the weight of having to start over again. The realisation weighs heavily that over such a short period their lives can transform. Where some are leaders of a family, they rise above – or seem to. Compounding stress and shocks of enduring multiple events and external pressures of cost of living, insurance assessments, the unknown end, and even more concerning is the current trend of enduring multiple disaster simultaneously or concurrently – fires, pandemic, drought and floods.

Community disruption

Communities are made of people who cumulatively for the community fabric. Where personal hardship overrides people's ability to participate there is an enduring loss to social cohesion. Of course, some events bring communities together and this is an enduring feature in Australian townships, however this is in the immediate aftermath. Recovery for communities is a long haul. Sporting and social groups disband for periods, meeting places and club houses await funding to recommence, and some members leave town. Loss of employment, closure of small business and financial hardship leave little in the kitty to sponsor social activities. Volunteer organisations find it especially difficult to recoup previous momentum.

Regional economy

Impacts of floods cascade. Interruptions to regional supply chain routes prevent some produce from maintaining economic ties, regional supply chain links are broken, and jobs are lost. Where primary employers are affected, loss of workforce can result as people move in the short term in search of work.

Natural environment

Natural waterways change course, suffer from extreme bank erosion, and cause conditions that lead to fish deaths through oxygen depletion or a temporary build-up of naturally found toxins. Significant environmental impacts may also result from the flooding of industrial and

mine sites, particularly those using or producing hazardous materials. Dispersal of top soil and outbreak of common pest and weeds are prevalent. Natural drainage channels clog or change profile and some loss of wildlife.

Built environment

Public assets and infrastructure: which can delay community recovery community infrastructure, such as power, sewerage, water and communication, due to damage to the supply source, treatment facilities or distribution infrastructure, supply chain, roads, rail. Local roads await funding for repairs while locals must use alternate routes or remain isolated.

Structural Flooding can result in significant damage to the contents, fabric and structure of buildings relied upon for community cohesion – and, in severe cases – loss of the structure itself. The scale of impact is influenced by the depth of flooding above the ground and floor level, the velocity of flow, and the design of the house

Best practice encourages the setting of 'flood risk' informed strategic land-use planning directions, and supporting zonings and development and building controls that:

- limit the impacts of new development and the intensification of development on the flood risk of the existing community
- limit the exposure of the new community to flood hazard
- limit damage to new property and infrastructure to acceptable levels
- consider public safety and the associated needs of emergency response management.

These best practice principles should be adhered in regions of strong flood history and known consequence without question.

7.3 Determining Local Tolerability

Under the SPP, Council is obligated to ensure that new development achieves an acceptable or tolerable level of risk to natural hazards, including the impacts of climate change. This means Council must decide on behalf of the community what represents an acceptable or tolerable outcome for new development. As part of identifying the planning pathway to respond to the level of risk within an area, there needs to be a consideration of the acceptability of that level of risk for land uses in existing and planned zones. The acceptability of the risk may vary for different land uses. For example, the risk may be tolerable for land in a rural zone where access to safe refuges exists, but intolerable in an urban zone with a greater population and population density, or for specific vulnerable uses. Table 7-1provides a summary of the risk acceptability considerations relative to the planning pathways.

Table 7-1 - Risk acceptability considerations

Risk description	Pre-treatment risk profile	Governance implications	Summary of strategic policy approach	Key development control considerations	Post-LUP treatment risk levels
Extreme	Intolerable	Growth and settlement pattern effort to ensure the long-term intent complies with SPP. Uphold avoidance principles in all decision-making circumstances Consider all opportunities and mechanism for voluntary house purchase	Avoid the risk and actively transition away from the risk	• Strong conveyance of risk narrative in the Strategic Framework • Highest level of assessment • Strong land use limitations • Back zone to LDZ • Split zone	Acceptable
High risk	Intolerable	Growth and settlement pattern effort to ensure the long-term intent complies with SPP. Uphold avoidance principles in all decision-making circumstances Consider implementation of a voluntary house purchase program Disaster management • Other future LFMP recommendations Availability of insurance influences the ability to recover	• Avoid the risk • Strong overland flow and fil policy • No increase in risk to life • Limit land uses- - vulnerable uses - urban development - rural industry - intensification of existing uses - greenfield expansion • Flood Resilient Precincts in locations risk where unique solutions apply	• Strong conveyance of risk narrative in the Strategic Framework • Highest level of assessment • Avoid reconfigurations • Strong land use limitations • Back zone or limit use rights • Split zone • Local area or precinct approaches • Use of Disaster Management-related performance outcomes i.e., flood emergency management plans (FEMP)	Tolerable
Medium risk	Tolerable	Growth and settlement pattern effort to ensure the long-term intent complies with SPP. Uphold mitigation to acceptable principle in all decision-making circumstances Focus efforts on awareness	• Arrest future increase in risk • Limit intensification where mitigation cannot occur • Retain undeveloped or rural areas in current state • Encourage resilient built form • No vulnerable uses	• Strong performance outcomes to mitigate to acceptable risk in the overlay code • Zoning is aligned with development capacity • Strong development policy and codes for associated works and reconfigurations	Tolerable/ Acceptable

Risk description	Pre-treatment risk profile	Governance implications	Summary of strategic policy approach	Key development control considerations	Post-LUP treatment risk levels
		• Other future LFMP recommendations	• Any new urban development must mitigate • Limited Rural industry • No greenfield expansion		
Low risk	Acceptable	Uphold no worsening in decision making and maintaining acceptable risk Focus efforts on awareness • Other future LFMP recommendations	• Mitigate the risk • Built form and resilient building materials • Land uses align with zone intent • Avoid greenfield expansion • Support built form change in existing areas over time • Address isolation issues through design • Responsive land use Permissibility: - no vulnerable uses - strong focus on built form controls - no adverse impacts on flood behaviours - strict filling controls	• Strong performance outcomes to maintain to acceptable risk in the overlay code • Zoning is aligned with development capacity • No up zoning • Strong development policy and codes for associated works and reconfigurations • Built form controls Any development controls for residential uses to the HR4 category to include the 1 in 500- year H3 hazard category	Acceptable
Very low risk	Acceptable	Uphold no worsening in decision making and maintaining acceptable risk Focus efforts on awareness • Other future LFMP recommendations	• Mitigate the risk • Built form controls • No vulnerable uses	Continue existing requirements in the current planning scheme that promote built form and resilient building materials as an acceptable mitigation response such floor level above flood	Acceptable

7.4 Engagement

Throughout the project there has been considerable engagement. Table 7-2 below documents the primary engagement events, purpose and outcomes. The table highlights the larger workshops and meetings and considerable discussion between Council and the project team were undertaken throughout.

Table 7-2: Project engagement dates and purpose

Date	Title	Purpose	Outcomes
24 January 2020	Officer Workshop	• project start-up • desired outcomes • themes and topics for councillor workshop	Direction for project next steps
3 February 2020	Councillor Workshop	• brief council on the project • current best practice, benefits of a risk based approach and challenges • our role as advisors and the LFMP • compliance with the SPP	Councillor understanding of the key issues and purpose of the project
9 November 2021	Councillor Briefing with WMA Water	• process for the LFMP and hazard assessment so far (by WMA) • policy options and challenges • SPP tests • hot spots for policy application	Councillor understanding of the challenges of the region and governance options
14 April 2022	Leadership Briefing	• flood risk assessment outcomes vs SPP • pathways forward for policy and governance • first principles in flood risk management • presentation of zoning analysis • tensions with the process, planning scheme, community, state and options for pathways forward	Senior leadership direction on the pathways forward for the overlay drafting, flood policy implementation and planning scheme submission to the state

Date	Title	Purpose	Outcomes
19 April 2022	Councillor Workshop	• as above plus • testing Councillor tolerability to risk • outlining magnitude of risk • need for growth management plans • risk in community consultation	Councillor direction on pathways forward for scheme and general understanding of risk tolerance **Councillors requested an additional workshop to understand implications of magnitude of risk and set tolerability levels**
28 April 2022	Councillor Workshop	• Recap on settlement scale issues • Expansion of key issues: o risk based approach o risk vs extent o isolation and flood islands • planning tools such as precincts and split zones • worked examples of DA scenarios • criteria for back zoning • a strategic view of implications	The workshop was interactive with decision pathways along the walls Provided clear direction for council risk tolerance **Councillors requested alterations to the very high risk category to determine areas where no development should occur**
9 June 2022	Departmental Briefing	• project brief • magnitude of risk • strategic settlement implications • minimum lot size and density • land use tensions	Pre-briefing to the State for an appreciation of the challenges for scheme lodgement
23 June 2022	Councillor Briefing	• revised risk levels – WMA extracted an extreme risk category to test for tolerance to back zoning • number of properties this may impact	**Agreement from Councillors on back zoning approach aligning with the extreme risk category developed following the April workshop. All lots with greater than 75% affected in urban zones to be subject to LDZ**

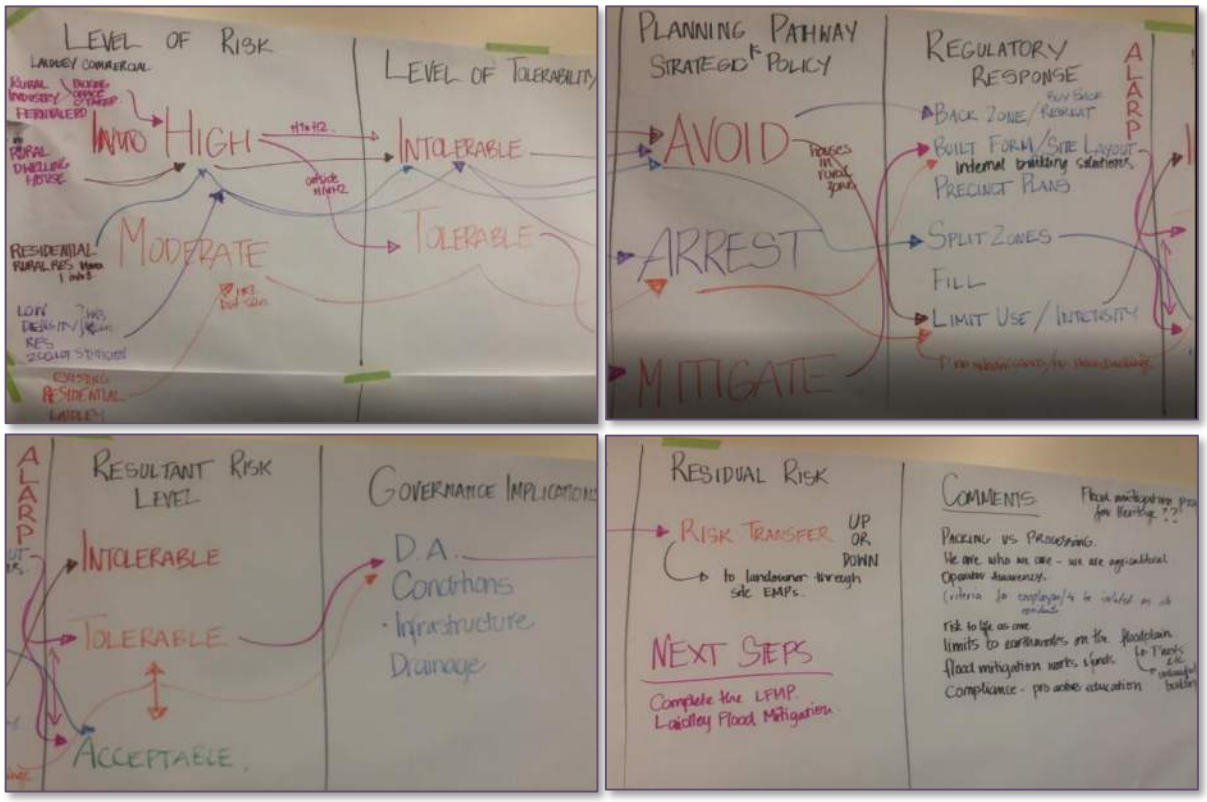

Figure 7-2: Tolerability testing with Council on 28 April 2022

Plate 7-1: Tolerability testing with Council on 28 April 2022

7.5 Strategic Implementation

Community is a system which land use planning seeks to enable across all the key components that council has already identified in the strategic framework (see figure 7.1 and inset below). For the system to function, the components must be correctly weighted and balanced and externalities, community context, function and limitations must be considered.

The settlement pattern of Lockyer Valley has some legacy issues which require addressing through holistic policy approaches in order these can filter logically through the societal, regulatory and economic systems.

Land being zoned for growth will not result in that growth unless other factors of the system function concurrently. Figure 7-3 illustrates some of the externalities which need to function to give effect to land use policy. For the vision and outcomes of the strategic framework to be realised, the region will benefit from stepping back to ensure all the elements of a functioning systems, tailored for the conditions of Lockyer Valley are in place.

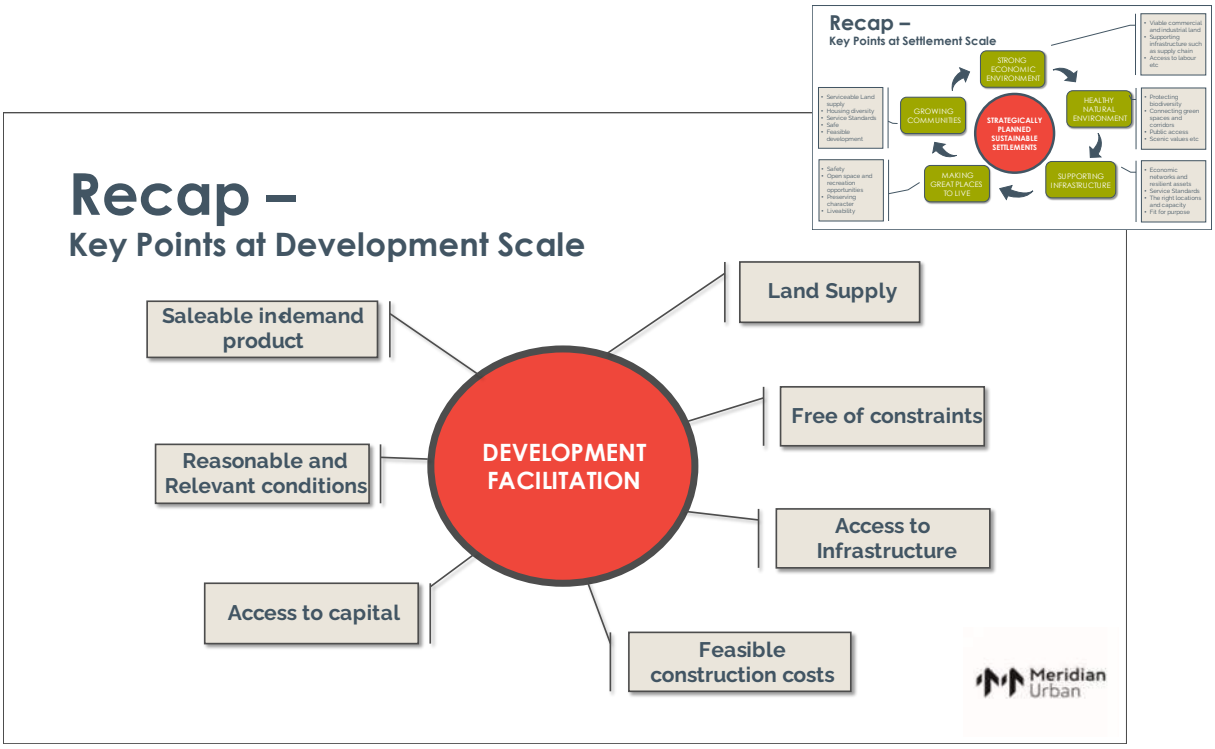

Figure 7-3: Facilitating development holistically (and Figure 7-1 inset)

7.5.1 The Lockyer Valley Imperative

The table below shows the extent of flooding impacts across zones for the Lockyer Valley region. It shows that:

- Over **42 percent of the local centre** zoned land is impacted by HR1 and 2 level floods. A further 20 percent at high risk, and 20 per cent at low risk. Cumulatively this means that almost **all the commercial enterprise** in Withcott, Grantham, Forest Hill, Murphy's Creek, Helidon (all towns mention in the strategic framework and some as growth areas) are impacted.
- Over **55 per cent of the major centre** zone is impacted by HR1 to HR3 flood. Cumulatively almost **90 percent of the commercial areas** are flood impacted in Laidley a principal economic hub; and.

Table 7-3: Level of flood risk exposure - hydraulic risk per zone

Levels of Hydraulic Risk Per Zone ***Draft Planning Scheme***		***Lockyer Valley Regional Council***							
		HR1-2		*HR-3*		HR4		HR5	
		Overlay area		*Overlay area*		*Overlay area*		*Overlay area*	
Zones	**Total zone area (ha)**	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area not affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)	Precinct zone area affected (ha)	Precinct zone area affected (%)
Community Facilities Zone	3,657.86	513.26	14.03%	512.04	14.00%	203.94	5.58%	305.97	8.36%
Conservation Zone	23,083.17	585.17	2.54%	74.61	0.32%	100.46	0.44%	181.19	0.78%
Emerging Community Zone	1,299.38	106.08	8.16%	189.56	14.59%	215.05	16.55%	146.51	11.28%
Industry Zone	363.47	97.66	26.87%	57.77	15.89%	37.67	10.36%	39.74	10.93%
Limited Development Zone	44.54	32.81	73.67%	0.36	0.81%	3.88	8.72%	7.49	16.81%
Local Centre Zone	22.17	9.33	42.07%	4.67	21.05%	1.12	5.07%	4.52	20.38%
Low Density Residential Zone	1,135.77	118.23	10.41%	212.17	18.68%	183.72	16.18%	152.84	13.46%
Low-Medium Density Residential Zone	90.57	6.75	7.45%	26.03	28.74%	16.03	17.70%	9.82	10.85%
Major Centre Zone	43.96	6.70	15.24%	17.95	40.83%	7.41	16.85%	5.36	12.20%
Mixed Use Zone	7.26	0.57	7.90%	2.80	38.57%	1.38	19.07%	1.97	27.06%
Open Space Zone	565.28	299.70	53.02%	49.68	8.79%	24.53	4.34%	56.89	10.06%
Principal Centre Zone	24.65	2.09	8.47%	8.85	35.89%	5.15	20.90%	3.81	15.44%
Rural Residential Zone	8,927.59	1,021.26	11.44%	722.09	8.09%	668.76	7.49%	1,482.84	16.61%
Rural Zone	149,962.71	13,215.63	8.81%	7,174.61	4.78%	4,489.15	2.99%	9,509.62	6.34%
Special Industry Zone	845.30	4.48	0.53%	5.25	0.62%	1.87	0.22%	47.75	5.65%
Sport and Recreation Zone	387.90	121.65	31.36%	46.45	11.98%	29.93	7.72%	45.91	11.84%
Township Zone	48.07	10.08	20.96%	8.01	16.67%	10.67	22.20%	6.91	14.38%
Total Area	190,509.64	16,151.46	8.48%	9,112.90	4.78%	6,000.74	3.15%	12,009.13	6.30%

- Over **40 percent of the industrial land, principal centre, low density residential and township zoned land** is similarly impacted

The above figures demonstrate that the region cannot function effectively as a system when key parts of that system are so significantly at risk of flood damage.

The extent and magnitude of the Lockyer Valley exposure to flood risk across all its land use zones is a barrier to achievement of a sustainable settlement pattern which requires a commitment to a bespoke approach for long-term land use planning.

The extent and magnitude of Lockyer valley's flood risk severely stymies the region's ability to grow sustainably and for the long term without considerable and regular economic disruption. There is an urgent need for a growth plan to revisit the settlement pattern and plan for a flood-aware future.

7.5.2 A New Growth Plan

Settlement patterns are underpinned by the central form and range of land uses and services it provides residential land uses. Although risk to life analysis centres on residential land uses, settlement function as a system with interdependencies across the full range of land uses

The core principle of strategic planning is that all elements of the settlement can function together, meet the needs of residents, trade and operate profitably and continue to grow in a sequenced manner. Where one part of the system cannot fulfil its strategic role, other functions will similarly not be able to function as intended. The below map shows the risk level of the precincts in green, amber and red for Lockyer Valley,

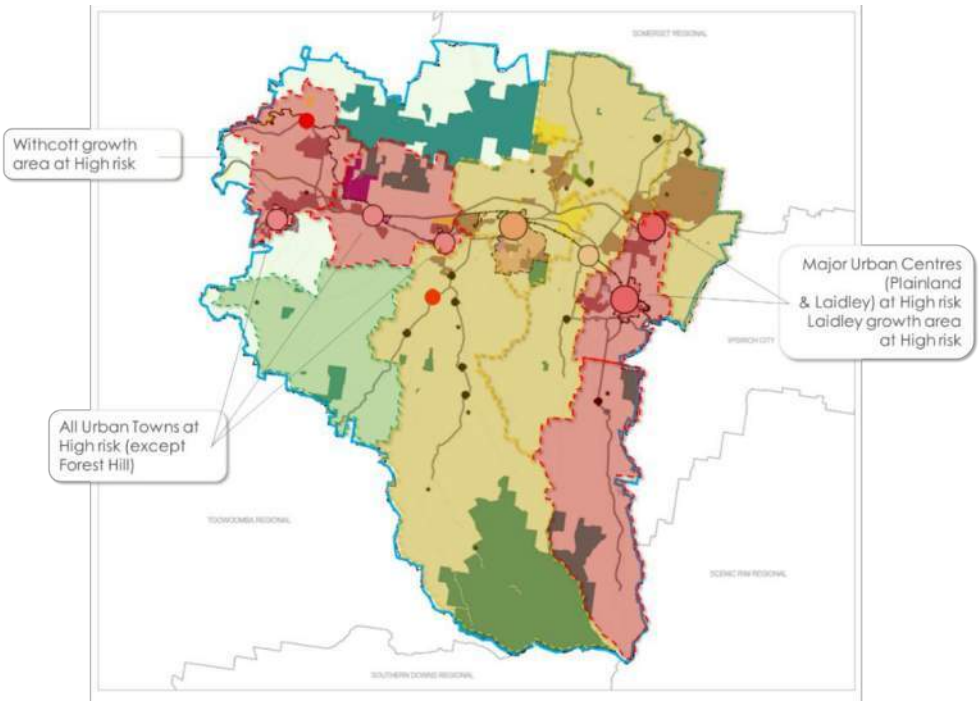

Figure 7-4: Growth and economic areas at risk

The integration of flood risk is a key consideration for a future sustainable and economically prosperous settlement pattern for Lockyer Valley and this can be achieved through a growth and settlement pattern strategy for future planning scheme changes. Land use planning is the most appropriate and strongest tool Council has to set the future prosperity of the region.

We strongly recommend that council undertakes a growth management study to drive a settlement pattern that is flood resilient and ensure that a growth pattern orients towards prosperity of key industry and risk minimisation. Such a growth management plan will stem from first principles of highest and best land use and combine opportunities and constraints to make a step change in growth policy.

7.6 Non scheme based integration

Land use planning is only one tool. As we have seen through this project, addressing legacy issues is difficult. Land use planning is fundamentally a forward looking action which shapes future development. Addressing flood risk must be approached through a range of actions outside development including:

- continued preparation of candidates and participation in any funding for voluntary house purchase
- targeted awareness for the dwellings identified as candidates for voluntary house purchase
- active promotion of resilient house building, house raising projects with local builders and home owners
- ongoing participation in community awareness programs through a variety of mediums
- targeted awareness for business – rural and built, promotion of Emergency Management Plans where beneficial
- additional awareness for all community members on warning times and evacuation
- continuing to explore strategic upgrades of key evacuation routes
- continuing to enhance the flood warning system
- continuing to upgrade and maintain drainage networks and existing corridors to prevent localised flooding issues
- ensure the Local Disaster Management Plan includes the most current information on warning times, evacuation routes and updates the risk assessment generally
- ensuring local Council owned assets are retrofitted to be resilient to flood; and
- ensuring Council asset management, maintenance and new projects have resilience to flood as a consideration

8 Planning Scheme Drafting

An effective planning scheme will be well aligned throughout its parts, both vertically from the strategic framework and horizontally across land uses in various circumstances. This section discusses some of the matters which will need to be reviewed for integration into other parts of the planning scheme especially Parts 1, 3, 5 and 6. To assist in final drafting of the LVDPS the following principles (in addition to the state best practice principles) can be applied as a cross check:

- use consistent language of intolerable, tolerable and acceptable risk
- introduce concepts early and throughout Part 3 such as precincts and the narrative of the floodplain
- ensure language and terminology is consistent with overlay mapping labels and definitions in Schedule 1 and any future Planning scheme policy
- maintain the SPP first position of avoidance in areas of intolerable risk
- uses that should not occur due to intolerable risk should be brought into the strategic framework for effective impact assessment
- circumstance for use of "does not occur" should be consistent with the strongest position of the overlays and apply to situations of refusal
- maintain the SPP requirement for limiting burden on emergency services
- the settlement pattern is inextricably linked to Council's responsibility to provide infrastructure. Ensure that any standards for development, such as mitigation to acceptable level of risk, includes new infrastructure and whole of life is considered
- the need to avoid risk should be peppered throughout Part 3 especially in locations where infrastructure, settlement pattern and growth are discussed.

This section of the report should be read in conjunction with review of:

- the draft Flood hazard overlay code
- the draft Tables of assessment for flood and coastal hazards; and
- the suggested amendments to the Strategic Framework and LVDPS

It is drafted to assist understanding and future actions required to fully integrate the flood and coastal hazard components into the planning scheme.

8.1.1 Drafting Philosophy: Promoting change

The new instruments are drafted with some key principles in mind in relation to assessment under the Planning Act 2016 and implications for policy positions which intend to strictly limit development potential in some cases. These are intertwined with key parts of the planning scheme drafting and especially:

- the role of the various parts of the scheme in decision making or code or impact assessment;
- the ability for the assessable development options to be challenged
- the compliance rules as drafted in the scheme and
- the need to amend or fine tune assessment practices in a new decision making frame.

Council has taken some significant steps forward in scheme drafting by reducing zone code content. This in turn means that the zone overall outcomes need to take the role of the POs and AOs as the only benchmark for code assessment.

Code assessment is a much safer route for approvals and also refusals under the *Planning Act 2016* bounded assessment. The risk with impact assessment is that the proposals and appeals can draw in a broad array of other matters to consider. Code assessment confines the assessment to the benchmarks of the scheme and where these are drafted tightly, this provides concise bounded assessment and a clear ability to refuse.

This shift requires assessment officer to have confidence in the scheme and ensure that the bounded assessment philosophy us upheld.

8.2 Actions and Recommendations

The following sections contain a number of actions and recommendations for Council which are all highlighted in boxes as illustrated below.

Drafting Action: This is an action that must be completed by Council to give effect to the instruments as drafted. Components of the draft instruments rely upon this action occurring elsewhere for example, updating definitions in schedule 1.

Drafting Recommendation: This is a recommendation for Council to consider which would improve scheme alignment, functionality or policy consistency. The recommendations have not been acted upon in drafting the instruments, for example, reviewing and making amendments to a zone code for consistency.

All actions and recommendations are summarised in Section 9 of this report.

8.3 Scheme-wide Flood Integration Recommendations

There are a number of matters across the planning scheme which are not directly flood related but indirectly will require review and attention when drafting a well-aligned planning scheme. These matters have stemmed from engagement and discussion accentuating the need for natural hazard risk to help shape the strategic view of how Lockyer Valley can or should grow (see section 7.5). These include:

- strengthen the messages of primacy of agricultural land using a focussed floodplain narrative, exceptional fertility for cropping, supporting rural industry and activities to grow without being hampered by residential uses. It is recommended that all refences to circumstances where subdivision and residential development may occur in the rural zone are removed from the strategic framework, overall and performance outcomes. Having these provisions in the top tiers of the scheme will undermine any ability to refuse them as by inclusion, infers there are circumstances for approval. Minimising opportunity to develop in the rural zone will assist in minimising risk support an efficient agricultural industry and consolidate growth areas.
- review extensive community facilities zone at high or extreme risk which could be rezoned to better represent the land use for infrastructure. In a practical sense, there

is risk that Council is approached by local not for profit agencies for land and premises where risk from natural hazards is not well understood. The codes and strategic framework for natural hazards avoid and, in some cases, actively do not permit placing Essential community infrastructure or Vulnerable uses at risk.

- zoning following ownership and not land use is risky for Council. This practice pre-empts future expansion (e.g., extensive Community Facilities zone around the USQ campus) which may not occur. Arguably, the rural zone would serve the University well and risk of unintended uses in the area presents itself as the University may sell part of its holdings. The land is not suitable for urban purposes. Especially when it appears the intent would be NOT to have built form but to support the University with rural-focussed land uses.
- extensive Sport and recreation zoned land in marginal and high and extreme risk areas is an additional risk for Council. As above with the Community facilities zone, community groups put pressure on local government to locate community assets in this cheaper land, which they can ill afford to lose like historical societies, club houses etc. It is suggested that a review of holdings is undertaken to convert some land at intolerable risk to Open space.
- ensure all expansion areas or infill include appropriate redirection of localised flows or allocation of drainage corridors with legal rights to Council especially the ECZ and the RoL code and any accompanying Planning scheme policy.
- all up-zoning from the Gatton or Laidley scheme in the flood zone should be removed until further planning is prepared. This uplift has not yet been provided to the community. Providing uplift without the necessary background studies and growth plans adds the risk of inappropriate development. There is significant opportunity in current zones for expansion in the short term.

The draft scheme has been reviewed across most sections and notations made throughout for Council to consider. The minor recommendations are not necessarily all repeated in this report.

8.4 Strategic Framework Amendments

Part 3 of the LVDPS has been reviewed in detail and additional commentary provided to strengthen and align the sections as shown in Table 8-1. Other isolated and minor changes are within the document. Highlights of changes and recommendations for the strategic framework include:

- introduce the concepts of the Laidley and Withcott flood resilient precinct and the valley rural floodplain precinct
- strengthen commentary around the floodplain and agricultural narrative
- follow the language and key policy positions of the SPP
- introduce uses that are impact assessable and should not occur in the floodplain
- redefine Laidley as an urban town, Grantham and Withcott as growth areas
- review narrative on structure planning

Drafting Action: that Council implements all changes provided in Table 8-1 below; and

Drafting Recommendation: that Council consider further refinements as provided in the annotated LVDPS document.

Table 8-1: Part 3 Strategic Framework Drafting Recommendations

Scheme Part	LVDPS	Suggested Changes	Rationale
Part 3, Section 3.1.2 Strategic Intent	Silent	**New Point 6** The Lockyer Valley understands the natural hazard risks we face and promotes a settlement pattern and development that maintains economic prosperity while keeping our community safe.	The inclusion of a statement of this nature will introduce the importance of planning for natural hazards.
Part 3, Section 3.2 Theme 1 Growing Communities	1. (f) Urban localities i. Forest Hill; ii. Gatton; iii. Grantham; iv. Helidon; v. Laidley; vi. Plainland; vii. Withcott	1. (f) Urban localities i. Gatton; ii. Grantham; iii. Helidon; iv. Laidley; v. Plainland; vi. Withcott	See discussion in section 5.7 There is no demonstrated need for inclusion of Forest Hill as an urban area as it is acknowledged that growth is limited due to the floodplain.
Part 3, Section 3.2.1, Element 1 – Growth Management	2. (c) avoids natural hazards, including an allowance for the predicted effects of climate change that may worsen these hazards;	2. (c) does not occur in areas of extreme natural hazard risk, avoids other areas of natural hazard risk or is able to mitigate risk to an acceptable level. ~~including an allowance for the predicted effects of climate change that may worsen these hazards;~~	The provision has been drafted for natural hazards generally and Council may wish to alter the wording for flood.
Part 3, Section 3.2.3 Element 3 – Local land use response	**Urban centres** Urban areas offer a range of lifestyles with higher order levels of access to employment, infrastructure and services with a strong affinity with community and high tourism visitation. These areas form the	**Urban centres** Urban areas offer a range of lifestyles with higher order levels of access to employment, infrastructure and services with a strong affinity with community and high tourism visitation. These areas form the	See section 5 for discussion on all urban centres and townships. And section 7 for discussion on growth and settlement patterns. Recommendations include removal of

Scheme Part	LVDPS	Suggested Changes	Rationale
Table 1 – Description of Localities	Principal and Major growth centres of the Lockyer Valley and are intended for expansion and consolidation. The Principal centre of Gatton forms the highest order centre - Gatton, Laidley, Plainland	Principal ~~and Major~~ growth centres of the Lockyer Valley and are intended for expansion and consolidation. The Principal centre of Gatton forms the highest order centre - Gatton, ~~Laidley,~~ Plainland	any up zoning in flood affected areas and containing development to substantial in fill opportunity and on land already zoned for development rather than expansion. Inferring that these areas will expand spatially puts pressure on local centres and employment opportunities and services to expand which in almost all of these communities, is problematic without further growth planning due to the magnitude and extent of flood risk.
Part 3, Section 3.2.3 Element 3 – Local land use response **Table 1 – Description of Localities**	**Urban towns** Urban towns offer a range of lifestyles with moderate levels of access to employment, infrastructure and services and a strong affinity with community and rural areas. These towns also often have medium to high tourism visitation values. Most Urban towns are intended to expand to accommodate future growth. Consolidation of established areas is expected. - Forest Hill, Grantham, Helidon, Withcott	**Urban towns** Urban towns offer a range of lifestyles with moderate levels of access to employment, infrastructure and services and a strong affinity with community and rural areas. These towns also often have medium to high tourism visitation values. ~~Most Urban towns are intended to expand to accommodate future growth.~~ Consolidation of established areas is expected. - ~~Forest Hill,~~ Grantham, Helidon, Withcott, Laidley	See section 5 for discussion on all urban centres and townships. And section 7 for discussion on growth and settlement patterns. Recommendations include removal of any up zoning in flood affected areas and containing development to substantial in fill opportunity and on land already zoned for development rather than expansion. Inferring that these areas will expand spatially puts pressure on local centres and employment opportunities and services to expand which in almost all of these communities, is problematic without further growth planning due to the magnitude and extent of flood risk.

Scheme Part	LVDPS	Suggested Changes	Rationale
Part 3, Section 3.2.3 Element 3 – Local land use response **Table 4 – Description of Localities**	**Rural Townships** Glenore Grove, Ma Ma Creek, Murphy's Creek	**Rural Townships** Glenore Grove, Ma Ma Creek, Murphy's Creek, Forest Hill	As above
Part 3, Section 3.2.3.1 Rural Areas	*Rural areas of the Lockyer Valley are protected and improved as they fulfill a range of roles, being the location of rural industries, tourism, special uses, food production, drinking water supply, life sustaining services, ecological areas, cultural heritage and scenic landscapes, as such they are to be retained for these purposes due to their economic, cultural, social and environmental values.*	Rural areas of the Lockyer Valley are a natural fertile floodplain. The Rural areas are unique in their capacity as the food bowl to the state capital. They enjoy proximity to markets providing efficient supply chain and prosperous primary production and regional employment. To ensure the food bowl remains sustainable into the future, it will be protected from urban encroachment and land uses which do not directly support Rural activities. Rural landscapes also perform vital natural functions of drinking water supply, ecological services, scenic landscapes, flood storage and air quality. Rural land fulfils a range of secondary roles, being the location of rural industries, tourism, special uses, life sustaining services, cultural heritage and as such they are to be retained for these purposes due to their economic,	The primacy of the agriculture and the reinforcement of Lockyer valley's topography can be strengthened by making these natural and agricultural uses primary over all others.

Scheme Part	LVDPS	Suggested Changes	Rationale
		cultural, social and environmental values.	
Part 3, Section 3.2.3.1 Rural Areas	2. *Subdivision of Rural areas for rural residential or urban purposes does not occur.* 3. *Rural areas **support opportunities for rural living in the form of Dwelling houses, Dual occupancies**; Rural worker's accommodation and where suitable tourism related accommodation.* *7.* ***Urban and rural residential development** which is suitable in a Rural area is separated and visually screened from important agricultural areas and provides effective buffering within the development to both protect residential amenity and ensure that normal farming practices in Rural areas are not constrained.*	Reinforce through the balance of the planning scheme by • Aligning the OO of the RoL code which currently says: o *Subdivision that would result in decreased viability of the sites or surrounding lots for rural purposes and increasing difficulties with land management as well as potential for conflict between adjoining land uses is **avoided*** • Aligning to OO of the Rural Zone code which says (b) "not supported" or (t) "discouraged" • removing the ability for boundary realignments in the rural zone irrespective of circumstance • suggest replacing items 3 and 7 with: ***Non rural land uses, such as residential development are located on the least productive part of the land and directly support the rural productive capacity of the land*** • Introduce the Valley Rural Floodplain Precinct	Minimising risk in the floodplain can be achieved through minimising options for development. In the case of Lockyer Valley, elevating rural land to a primary purpose of agriculture and limiting fragmentation and subdivision which can become attractive for residential uses plays a significant role. Items 3 and 7 are not strategic initiative and it is recommended they are deleted. Dual occupancies are impact assessable in the Rural zone and not a consistent land use. Items 3 and 7 appear contrary to item 2. Urban and residential development should be a last resort for rural productive land and only occur where in direct association with an existing rural activity. Many land uses will be impact assessable in this location and therefore it is important to introduce this concept in the strategic framework.

Scheme Part	LVDPS	Suggested Changes	Rationale
		2. Rural productive and exceptionally fertile land co-exists on the Lockyer Creek floodplain. The Valley Rural Floodplain Precinct promotes risk-aware, low intensity rural land uses while limiting uses which put people and property at intolerable risk	
Part 3, Section 3.2.5 – Structure Plan Areas	1. Structure plan areas are mapped on Strategic Framework Map SFM 1 Growing Communities and include: a. Gatton (potential for residential and employment activities); b. Grantham (potential for residential, community and employment activities) c. Helidon (potential for residential, community, tourism and employment activities); d. Laidley South ((potential for residential, community and employment activities) e. Major Enterprise and Industrial Area (potential for employment activities); f. Plainland (potential for residential, community and employment activities); g. Withcott (potential for residential, tourism and employment activities)	Structure plan areas are mapped on Strategic Framework Map SFM 1 Growing Communities and include: a. Gatton (potential for residential and employment activities); ~~b. Grantham (potential for residential, community and employment activities)~~ c. Helidon (potential for residential, community, tourism and employment activities); ~~d. Laidley South ((potential for residential, community and employment activities)~~ e. Major Enterprise and Industrial Area (potential for employment activities); f. Plainland (potential for residential, community and employment activities); ~~g. Withcott (potential for residential, tourism and employment activities)~~	See also the place based analysis: Grantham – while expansion may be desirable, this could only occur on the land at New Grantham. The SFM currently shows the locality of Grantham (the dot on the map) where the old town centre is transitioning which is not appropriate. Laidley is recommended to be contain and shifted from an Urban centre to an Urban Town. Laidley cannot support significant growth free of intolerable risk. Withcott has ample residential land for expansion but is unable to facilitate more employment or commercial growth in a risk tolerable area until further planning is completed. For all localities references should be deleted until Council has completed town-specific structure plans or includes the structure plan from the

Scheme Part	LVDPS	Suggested Changes	Rationale
			Grantham Development Scheme or has completed a growth strategy.
Part 3, Section 3.2.6 – Urban Localities	Various comments and section	Various comments and section including introduction of Laidley and Withcott Flood Resilient Precinct. 3. The Laidley Flood Resilient Precinct limits development to low intensity which is flood risk aware and responds to the local risk level.	To align the scheme with the place based risk assessment and to align with changes to the commencement of Part 3. Many land uses will be impact assessable in this location and therefore it is important to introduce this concept in the strategic framework.
Part 3, Section 3.3.4.1 – Agriculture Areas	N/A	Insert reference to the new Valley Rural Floodplain Precinct 4. Development in the Valley Rural floodplain Precinct promotes risk-aware, low intensity rural land uses while limiting uses which put people and property at intolerable risk	Many land uses will be impact assessable in this location and therefore it is important to introduce this concept in the strategic framework.
Part 3, Section 3.5.7 – Safety and Natural Hazards	This section is separated into an overall strategic outcomes introduction and then into bushfire, flood and landslide. The risks associated with natural hazards, including the projected impacts of climate change, are avoided or mitigated to protect people, property, the environment and	Living in a floodplain and a region surrounded by significant national parks and steep, heavily vegetated landscape, means that the environment brings with it a need to understand the potential risk from natural hazards. The risks associated with natural hazards, including the projected impacts of climate change, are avoided in the first instance and where possible can be mitigated to	Reflecting the SPP. Policy principles are the same across natural hazard in the strategic context. Separating hazard does not add any value at this point.

Scheme Part	LVDPS	Suggested Changes	Rationale
	improve the community's resilience and adaption to natural hazards. 1. Impacts of climate change are avoided or mitigated to protect people, property, the environment and economic activity to improve the community's resilience to natural hazards. 2. Development avoids natural hazard areas. Where development cannot be practicably located to avoid natural hazard areas, development mitigates the risk form natural hazard areas to people and property to an acceptable or tolerable level and; a. Avoids increasing the cumulative impact, exposure or severity of the hazard and the potential for damage; and b. Maintains or improves protective function of landforms and vegetation that can mitigate risk associated with natural hazards 3. Development supports and does not unduly burden a disaster management response or recovery capacity and capabilities.	protect people, property, the environment and improve the community's resilience and adaption to natural hazards. The planning scheme is responsive to climate change recognising the need to maintain natural corridors and processes and respect increasing urban heat, intensifying storms, more frequent flooding and fire events among other discrete changes. The scheme enables mitigation methods to achieve acceptable risk levels form natural hazards. 1. The known impacts of climate change are incorporated though adaptive measures in development, avoided or mitigated to protect people, property, the environment and economic activity to improve the community's resilience to natural hazards. 2. Areas at intolerable risk of natural hazards identified in the planning scheme are avoided in the first instance for all development. 3. The Valley Rural Floodplain Precinct and the Laidley Flood Resilient Precinct promotes development, which is risk aware, low intensity	

Scheme Part	LVDPS	Suggested Changes	Rationale
		which avoids putting more people at risk 4. Where development cannot avoid intolerable risk, urban development does not occur 5. Existing development in areas of intolerable risk is not intensified and has a long term transition plan away from risk. 6. New urban areas must mitigate risk to demonstrate development can proceed with an acceptable risk level. Residual areas with intolerable risk may remain undeveloped. 7. Infill development should proceed on the part of a site that has the lowest level of risk, reducing the risk level to acceptable, which may involve specific built form or site based mitigation methods. 8. Development maintains or improves the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard to the expected need in 2100- 9. Development supports and does not unduly burden a disaster	

Scheme Part	LVDPS	Suggested Changes	Rationale
		management response or recovery capacity and capabilities. 10. Development ensures that adequate evacuation routes and emergency service access are available in a natural hazard event. 11. Critical infrastructure is designed and constructed to ensure it remains functional during a natural hazard event and can operate in a whole of life context considering risks from all natural hazards and climate change. 12. Vulnerable land uses and Essential community Infrastructure are located outside areas of intolerable and tolerable risk and proceed in areas of acceptable risk.	

8.5 Zoning Approaches

To activate the flood risk policy approaches put forward and align the planning scheme with consistent messaging and zoning practices a number of reviews, minor changes and alignment tasks are recommended. Table 8-2 below outlines the recommended zoning actions and reviews.

Drafting Action: that Council undertakes the reviews outlined in Table 8-3 to ensure alignment with flood policy and preparation for the Feasible Alternative Assessment Report.

Drafting Recommendation: that Council undertakes further reviews for zones impacted by flood (e.g., LDZ, Rural and Rural Residential) to ensure alignment and note minor recommendations in the annotated LVDPS

It is noted that the scheme does not have POs and AOs for any zones. The deviation from the QPP is commendable however the scheme needs to be drafted with the zone OO's as benchmarks in clear and measurable terms. It is considered that the OOs of the zone codes required additional clarity and measured compliance actions. The code should only apply to Lockyer Valley when read and steer clear of homogenous or subjective statements.

The focus in the zone code is beneficial when it describes clearly what the character, function, primary activities are specific to the region. For example, the Rural zone code should describe Lockyer valley as a floodplain, food bowl, primary production hub, supply chain hub, etc to give the underlying reasons why development should occur in a particular manner.

Finally, the compliance rules may need reviewing because some codes do not have AOs and POs and compliance will need to be expressed differently. The Flood hazard overlay has been drafted assuming compliance must be achieved with either the AO or PO ***and*** the OO (see also section 8.5.1).

8.6 Levels of Assessment

Section ***5.10 – Categories of development and assessment – Overlays***, of the LVDPS currently shows 'no change' for the Flood hazard overlay. The current practice is to rely heavily upon code assessment and accepted development is not frequently used. The drafted Tables of assessment to accompany the new flood hazard overlay code follows this lead but foreshadows a number of significant changes to accommodate various risk levels and consistent land uses. The drafted TOA delivers a flood overlay that responds to the zone reviews outlined above, such as:

- the application of zones drives strategic intent rather than land use and assessment levels;
- precincts will have different the same assessment levels to the high risk categories, but limit development potential
- the policy of no fill in the floodplain is upheld with code assessment for all operational works involving filling and excavation
- vulnerable uses and essential community infrastructure are specifically considered in the context of all risk factors; and

Table 8-2: Zone Review Recommendations

Zone	Review Required	Relationship to Flood Hazard
Split Zones	Split zones should be applied to the following circumstances: • Large urban lots with development potential in any zone and especially Emerging Community • Large rural residential lots; and • Any other allotment where it is considered that the application of a split zone is required to illustrate the natural hazard risk and prevent placing people and property at intolerable risk	Indicates a proportion of the lot is not suitable for development according to the purpose of that zone. Indicates an essential flood conveyance, flow path, flood storage location or green corridor which must be preserved for that purpose.
Precincts	Precincts should be applied when a small and contained area has particular characteristics which differ from other areas and requires a bespoke approach. The project has identified the need for two precincts: • The Valley Rural Floodplain precinct; and • The Laidley and Withcott Flood Resilient precincts the extent of the precincts will need to be mapped and included on the overlay maps	Precinct approaches are appropriate for: • Laidley and Withcott town centres which are principally in the Local, Major centre and Industry zones. Development can proceed in accordance with the zone, however there will be particular constraints. (See the place-based assessment for further detail). • Lockyer Valley Rural Floodplain Precinct to limit dwelling house construction, lifestyle lots, and capital investment without risk awareness for rural industry. This precinct should be identified simply as: o all land in the rural zone; and o within the high and extreme flood risk area o defined by risk category rather than cadastre This precinct will stretch across several localities in the place-based assessments.

Zone	Review Required	Relationship to Flood Hazard
Zone Provisions Review – Rural Zone	The rural zone code should be reviewed for consistency with strategic messaging and the intent to avoid further risk on the flood plain through • Strengthen the narrative of the primacy of agricultural land • Review the vertical calibration of the scheme with regard to ability to subdivide land in the Rural zone • remove the provision in the RoL Code (AO1.1) which permits Rural lots to be subdivided o 2.5 hectares (as above) • review provision generally to remove provisions which infer development may be approved be the Rural zone.	The Rural zone in Lockyer Valley is primarily the fertile flood plain and provides a good indicator of where development should not occur unless it is rural and agricultural in nature. Therefore, part of the risk minimization strategy is to reinforce the primacy of agriculture which is integral to sustainable growth patterns and limit other forms of development.
Zone Provisions Review – Major Centre Zone	Laidley town centre is located in the Major centre zone. The code has "Additional Major Centre Outcomes for Laidley".	These should be reviewed and potentially an outcome for flood risk included in section 6.10.2.3.
Limited Development zone application	There are approximately 80 lots identified across the region as having greater than 75% coverage in the extreme risk category which Council will back-zone to Limited development. Council is undertaking further refinement of these lots prior to finalisation of the list.	These are allotments at immediate and extreme risk to life and property from flood.
Zone allocations review	To support the Feasible Alternatives Assessment Report, prepare a review of all lots with adverse planning changes including: • lots identified by WMA as potential for back zoning with 75% or greater impacted by extreme risk (as above) • lots where zoning has been removed due to natural hazards (from ECZ back to Rural) • lots where split zones have been applied; and • lots where any development rights have been impaired, and an adverse planning change affected	The FAAR will require support from detailed and accurate analysis of lots affected.

- hazard and risk categories clearly show where development is appropriate and where risk is too great and should be avoided.

Thus, appropriate land uses for risk levels are articulated within the Tables of Assessment and in some instances the overlay code. The TOA has four sections:

- development in the low and very low flood risk area
- development in the moderate flood risk area
- development in the high flood risk area and the Laidley and Withcott flood resilient precinct and Valley rural floodplain precinct; and
- development in the Extreme flood risk area.

If appropriate and fit for purposes responses are to be the outcome, then some land uses will be inconsistent in some risk levels, but not necessarily the zone. It is for this reason that the new overlay code is constructed by risk level rather than assessment level. Within each section there are approximately five or six circumstances for levels of assessment such as:

- MCU for low risk development – Dwelling house and Dual occupancy
- MCU for Vulnerable uses, Essential Community Infrastructure and Critical Infrastructure where appropriate to call out
- MCU not involving building works
- MCU in other circumstances and induvial land uses for the precincts
- Building work
- Operational work; and
- Reconfiguration of a Lot.

In the past, drafting instruction and practice has provided consistent assessment levels across both zone and overlay codes as good practice. In the context of a risk-based natural hazard, continuation of this practice would indicate that the overlay is either not of great concern; would not provide vastly different outcomes; or is of equal merit to zone codes, neither of which are appropriate approaches to flood risk. Levels of assessment are a useful tool to convey risk and will likely be different to other levels of assessment.

8.6.1 Tables of Assessment

The Tables of Assessment include recommendation for review. The principal queries with the current draft include:

- omission of 'accepted' development in some locations
- the drafting of the compliance rules; and
- the variation in expression across the Tables.

In section 5.3.3, the scheme sets out the rules for when compliance is achieved with codes. The current wording is a little cumbersome and in essence should state that compliance is only achieved when there is alignment with either an AO or a PO ***and*** the OOs. Otherwise, code compliance is achieved without reference to the multiple parts of the code. The Codes have been drafted in the traditional hierarchical manner of AO to PO to OO where there is non-compliance.

A review is recommended of the text to streamline terminology and ensure there is only 2 or 3 expressions of assessment levels. Existing expression includes:

- accepted development
- accepted development – approval not required
- accepted development - no approval required (with a qualifier such as: *where for a local government purpose*)
- accepted development - (with a threshold) If not a boarding kennel or cattery
- accepted development where consistent with the assessment benchmarks; and
- accepted development- where complying with the requirements for accepted development

Some of these variations alternate between the heading band and the cell below. It is recommended that Part 5 is review for consistency, and potentially one of the follow options taken up.

Option 1

Use the band headings to describe the assessment level in two ways:

- accepted development - no further text in the band is required, no application is needed.
- accepted development subject to requirements; and

Then use the cell below as the qualifies for all additional text "no approval required" (although this is not necessary as this is what accepted development means), thresholds and qualifies.

Option 2

Use only accepted development per the Act in the band and include "subject to requirements" in the cell below. Whichever method Council uses, clarity and consistency across the scheme is paramount.

Drafting Action: that Council reviews the Tables of assessment to ensure the compliance rules are fit for purpose.

Drafting Recommendation: that Council reviews the Tables of Assessment for consistency and clarity in expression of assessment levels.

8.6.2 Operational Works

The triggers for earthworks are difficult to follow, repeated in several places, are sometimes contradictory and attempt to apply stringent controls but are not elevated into overall outcomes or performance outcomes, but sit in the Acceptable outcomes. For example, the flood overlay states (emphasis added):

*AO14.2 - Works (including buildings and earthworks) in non-urban areas either: do not involve a net increase in filling **greater than 50m3**; or complies with fill requirements in Table ##.*

But the Earthworks Code says:

*AO1.4 Earthworks, excavation or filling **is not undertaken** at or below the defined flood level*
*AO7.1 Earthworks **do not occur** in the mapped areas on: OM3A to C Biodiversity overlay maps; OM7A Flood hazard overlay map; or OM11 Steep land overlay map;*

There is no mention of this policy position or circumstances where fill should not occur in the overall outcomes of either code.

Currently, all operational works is triggered for code assessment in the flood hazard area through virtue of definitions. Filling or earthworks (excavation) on the flood plain is not defined as minor, therefore it is "Filling and Excavation" in all cases and assessable development. The Tables of assessment propose "no change" in most circumstances to enable other variations of operational works to continue without change.

The definition of earthworks is provided below in Table 8-3. Minor Operational works includes Minor filling and excavation, however Minor filling and excavation does not include any work in the flood hazard area. Thus, filling and excavation is currently code assessable in the floodplain and that remains the case unless in the high, extreme or Valley rural floodplain precinct where it is elevated to impact assessment. Suggested refinements are included for Council consideration.

Table 8-3: Definition of Filling and Excavation or Minor OW

Term	Definition
Filling and Excavation	Means - Removal or importation of material to, from or within a lot that will change the ground level of the land.
Minor filling and excavation	means any filling or excavation that involves: a. contour banks, berms or mounds associated with a rural activity; or b. ~~reinstating earthworks destroyed by floods or landslides~~; or c. the following where all i – xii are met: i. changing the natural ground level by less than 1m in depth; and ii. involving the moving of less than: A. 500m^3 of earth in the Rural zone or Special industry zone; or B. 50m^3 of earth in the Low density residential zone, Low-medium density residential zone, Conservation zone, Limited development zone, Township zone, and Mixed use zone; or C. 200m^3 of earth in any other Zone; and iii. is non-structural fill; and iv. is not undertaken within a public utilities' easement; and v. is not within 10m of: A. a property boundary; or B. public infrastructure; or C. an overland flow path; and vi. is not within a flood hazard area on OM7A Flood hazard overlay map; unless reshaping land after a flood event to a maximum of item C (i) above; and ~~vii. is not within a steep slope or very steep slope on OM11 Steep Land Overlay Map~~ viii. is not within a mapped area on OM13 High risk soils overlay map; and ix. the site is not on a local or state heritage register; and x. the fill is clean; and xi. earth batters (not including a retaining wall) have a slope less than 1:6; and

Term	Definition
	xii. any overflow is in line with a natural overland flow path as it leaves the property.
Minor Operational work	means any of the following is minor operational work: a. Landscape work where: i. a fence or boundary fence; or ii. not more than a cumulative site area of 50m2 (over any period) where not in association with a material change of use or reconfiguring a lot; or iii. for the conservation or restoration of natural areas; or iv. associated with a Dwelling House (not involving a fence or boundary fence); or v. outside a High or Extreme flood hazard area mapped on OM7A Flood hazard overlay except where a fence or boundary fence and the fence is less than 50% permeable; or b. Vegetation clearing where exempt clearing; or c. Minor filling and excavation; or d. Works for infrastructure where for Minor electricity infrastructure; or e. Works for infrastructure where for the maintenance or repair of existing infrastructure: i. in an on-maintenance period before transfer of ownership to a public entity; or ii. where for lawfully approved private infrastructure; or iii. where for lawfully approved gates and grids; or Advertising device where not a billboard or pylon sign.

Drafting Action: that Council reviews the policy across the planning scheme for filling and excavation in the flood hazard area:

- **to confirm the policy position and circumstances of no filling in the flood hazard area**
- **to apply consistency across codes where regulation of filling and excavation is relevant to avoid inconsistencies and duplication**
- **to delete references to filling and excavation in acceptable outcomes which do not add value**
- **to consider making minor amendments to definitions outlined in Table 8.2 of this report.**

8.6.3 Building work

Building work generally progresses without change in the very low, low and moderate risk levels. In the high risk level building work is code assessable and higher risk including both precincts, building work is impact assessable and also captures Minor building work. This reinforces the policy position of arresting development in areas of intolerable risk.

Minor building work	**Building work that increases the gross floor area of a building by no more than the lesser of the following—** **50m²; or** **an area equal to 5% of the gross floor area of the building.**

8.7 Definitions

Suggestions for definitions to be integrated into the code and the scheme are provided in the table below for review and discussion. These include confirming across the scheme the definitions of vulnerable uses, essential community infrastructure, and critical infrastructure outline below and streamlining terminology used. Flood related definitions also require clarification in Schedule 1 or a future Planning scheme policy.

8.7.1 Vulnerable, sensitive and essential uses and terms.

The planning scheme currently uses a raft of terms which are used interchangeably, some are defined some are not. Some have multiple definition while others are expressed in different ways. There has been much thought about the definitions of sensitive and vulnerable uses in our experience. It is not uncommon for them to be used interchangeably and confusingly. One of the problems is that some defined uses which might normally be suitable in a flood area may not be supported because of inclusion in a collective definition, or there may be an element of the definition that would not be acceptable if it was proposed for a flood area. A collective of land uses is unlikely to ever be suitable in all instances and therefore a proposed course is to align the collective definitions with areas of the scheme used most frequently.

Adjustments can be made through thresholds or itemising land uses where they are not suitable in all cases. For example, a nature-based tourism use under the Planning Regulation definition (such as for bird watchers in an open setting with boardwalks and trails) can include short term accommodation. The birdwatching and boardwalks or trails elements are appropriate, whereas the short-term accommodation (likely to involve activities such as caravan sites and camping) is not, even though it is envisaged as part of the nature-based tourism definition. Similarly, some forms of light industry may be suitable but those specifically involving chemical storage are not.

The proposed definitions seek to include or limit aspects and characteristics of certain activities in the Flood hazard area rather than entire land uses. Land uses may be able to be modified to suit development in the Flood hazard area. Table 8-4 below traces the inconsistencies in the terminology used across the planning scheme and provides examples of issues this may invoke while Table 8-5 provides recommended definitions for the three use groups for use across all natural hazards.

Drafting Recommendation: that Council undertake a review of the terms across the entire planning scheme with a view to deleting references to undefined terms, using one source of information, deleting references to sensitive uses for all natural hazards, and deleting refence to vulnerable people, unless specifically intended to reference the users. Helidon management area and associated Table of assessment may require rewording.

Drafting Action: that Council adopts the definitions, provided in Table 8.5 for Vulnerable Uses, Essential Community Infrastructure and Critical Infrastructure across the planning scheme.

Table 8-4 Definitions Tracing Table

Term	Used	Defined	Issues
Vulnerable people	Flood Overlay OO (a) the development in the high and intolerable risk category is not intensified and is limited to uses without substantial built form, or value and does not **involve sensitive land uses or vulnerable people**	No	The planning scheme should maintain definitions around land uses rather than the people who use them for the purposes of regulation.
Vulnerable uses	Flood Overlay OO (b) the development in the moderate and tolerable risk category is compatible with the level of flood risk, or mitigation can be incorporated and **does not involve sensitive land uses or vulnerable uses;** The only other place this definition is used is in the Helidon area.	Yes, Schedule 1 BUT The Bushfire hazard overlay has its own table and definition.	This OO says that Sport and Recreation or Nature based Tourism should not occur even if the risk is tolerable? Two definitions – one in Schedule 1 and one in the bushfire code
Critical Infrastructure and Community infrastructure	**Flood Hazard Overlay PO6** Sensitive land uses, vulnerable uses; **critical infrastructure;** or **community infrastructure** are not established or intensified within flood hazard area or within high, moderate or low risk hazard area unless:	No	This is not defined and so unclear on what uses this involves.
Essential Community Infrastructure	Schedule 1 otherwise termed as below throughout the scheme	Yes Schedule 1	This is not based on land uses and hard to correlate to land use planning
Community infrastructure for essential services	P.188, 237, 246– 'essential community infrastructure and services'	In the Bushfire Overlay Code only	The Bushfire code has a different meaning to schedule 1.
Sensitive land uses	Flood Overlay OO (b) the development in the moderate and tolerable risk category is compatible with the level of flood risk, or	Defined in Schedule 1 per the planning regulation	Sensitive land uses are those which are sensitive to an external influence such as noise, and dust, indicating a delicate receptor. They are not used in planning for natural hazards. The list of land uses which

Term	Used	Defined	Issues
	mitigation can be incorporated and **does not involve sensitive land uses or vulnerable uses**;		are included is not appropriate to regulate natural hazards This OO says that houses should not occur in the moderate and tolerable risk area?

Table 8-5: Recommended Definitions

LVRC Bushfire Code	Meaning LVRC Schedule 1	Recommended Definition	Rationale
Vulnerable Uses			
• childcare centre; • community care centre; • detention facility; • educational establishment; • hospital; • nature-based tourism; • relocatable home park; • residential care facility; • resort complex; • retirement facility; • rooming accommodation; • tourist park.	• air service • childcare centre; • community care centre; • community residence; • community use; • detention facility • educational establishment; • healthcare centre • hospital • indoor sport and recreation; • major sport and recreation • nature-based tourism; • outdoor sport and recreation; • residential care facility; • resort complex; • retirement facility; • tourist attraction; • tourist park.	• childcare centre • community care centre • detention facility • educational establishment • hospital • rooming accommodation • residential care facility; and • retirement facility	Uses involving people who • require assistance in times of natural hazards due to age (young and old) or physical conditions • are difficult to evacuate due to numbers, conditions and options to shelter Note – Home based business involving childcare service licensed under the *Child Care Act 2002;* and Nature-based Tourism which does NOT involve accommodation are specifically called out in the TOAs The existing definition is problematic as it is too broad and should be confined to land uses which have the above characteristics.

LVRC Bushfire Code	Meaning LVRC Schedule 1	Recommended Definition	Rationale
Essential Community Infrastructure			
• Educational establishment; • Emergency services; • Hospital (Note – two of these definitions already appear above vulnerable uses)	• transport infrastructure as defined in the Regulation; • hospitals and associated institutions; • emergency services facility; • water cycle management infrastructure (water treatment plant); • sporting facility; • community centre; • meeting hall.	• emergency services • hospital; and • community use	The existing definitions are problematic as they are themselves does not land uses and not otherwise defined. Uses involving essential services to support the community and should operate during and immediately after a natural hazard event. The community uses are often public asset that contain matters of considerable community values and complex to replace such as museums, art galleries, libraries.
Critical Infrastructure			
N/A	N/A	• renewable energy facility • substation • utility • telecommunications facility • major electricity infrastructure	The group includes infrastructure networks which are critical to settlement function

8.7.2 Flood related definitions

The SPP guidance material, the Planning Regulation and the Planning Act dictionaries and the Technical Evidence Report (planning) from the BSFMP have been used as guidance to prepare a suggested list of definitions which the planning scheme could contain to make navigation and understanding of the flood overly simpler. Changes to Schedule 1 include:

- defining the flood hazard area which may also link to the definition in the Building Queensland Development Code MP3.5

  flood hazard area *means an area, whether or not mapped, designated by a local government as a flood hazard area under the Building Regulation, section 13.*

- defining the flood level as the same meaning as in Mandatory Part 3.5 of the Queensland Development Code.

- ***The DFL for a lot in a flood hazard area*** *is— (a) the level declared by a local government, under section 13 of the Building Regulation 2006, to be the DFL for the part of the area where the lot is located; or*

- amending the definition of the defined flood event for consistency with the new approach, Table 8-6 below provide a suggested structure of the definitions based on conversation to date however this is – **subject to council confirmation**:

Table 8-6: Proposed Definition - Defined flood event

Existing Definition	Suggested Definition
a. Where for habitable rooms of buildings level of the DFE plus 500mm where a 1% AEP flood event inundation line has been designated; or **b. Where for vulnerable uses the level of the probable maximum flood plus 500mm.** **c. Where for non-habitable buildings (except for buildings classified under the Building Code of Australia as Class 7a and Class 10):** **i. level of the DFE where a 1% AEP flood event inundation line has been designated; or** **ii. the highest recorded flood level where no 1% AEP flood event inundation line has been approved.**	a. Where for habitable rooms of buildings level of the DFE plus 500mm where a 1% AEP flood event inundation line has been designated; or b. The flood level from the 2011 flood event upstream of Grantham c. Where for vulnerable uses the level of the probable maximum flood plus 500mm. d. Where for non-habitable buildings (except for buildings classified under the Building Code of Australia as Class 7a and Class 10): iii. level of the DFE where a 1% AEP flood event inundation line has been designated; or iv. the highest recorded flood level where no 1% AEP flood event inundation line has been approved Upstream of Grantham – the 2011 event Downstream of Grantham - the 1% AEP at 2100

It is recommended that council include flood associated definitions in the administrative definitions section (or a flood PSP) such as intolerable risk.

Drafting Action: that Council updates Schedule 1 with the definition for the DFE provided in table 8-6 above.

Drafting Recommendation: that Council includes other flood related definitions such as risk levels and policy positions in a new Planning scheme policy or in Schedule 1.

8.8 Draft Flood Hazard Overlay Code

The new draft code is presented in a separate word document to council in order comments can be made in the tracked changes version. The intent of the work done so far on the new draft code is to reflect the policy positions agreed by Council and comply with the SPP.

The Application section of the code includes greater explanation of the applicability across the flood planning area at various risk levels and across types of development and assessment levels. Together, all these elements form the flood hazard area for the purposes of the Building assessment provisions and discussion more broadly on the entirety of the area taken up by flooding impacts. It includes:

- extreme flood risk area
- the Laidley flood resilient precinct
- the Withcott flood resilient precinct
- the Valley rural floodplain precinct
- high flood risk area
- moderate flood risk area
- low flood risk area; and
- very low flood risk area

At the time of writing, Council was also considering a number of localised factors to be included in the overlay mapping such as "Special Areas" where the DFL maybe otherwise defined and "Investigation Areas" where the modelling has some gaps requiring additional work. Where included these will result in some minor amendments to the codes to give them effect.

The Purpose statement for the overlay has been adjusted to reflect an overarching purpose statement at (1). The section then continues into 15 outcomes that the overlay seeks to achieve. This may seem many, however it is important to mention each of the risk area, the precincts, built form, infrastructure, vulnerable uses, emergency management and the like with reflect the direction of the SPP. The code is set out in five tables structured with common headings. The tables are:

- Table 1 — Assessment benchmarks for accepted and assessable development in the low and very low flood risk areas
- Table 2 — Assessment benchmarks for assessable development – Moderate flood risk areas
- Table 3 — Assessment benchmarks for assessable development – High risk flood hazard area, Laidley and Withcott Flood Resilient Precinct and Valley Rural Floodplain Precinct
- Table 4 — Assessment benchmarks for assessable development – Extreme Risk
- Table 5 — Assessment benchmarks for assessable development – Reconfiguration of a Lot

The common headings include:

1. **Responding to flood risk** – which details up front uses which are appropriate and uses which should not occur. This section has basic principles for risk minimisation such as using the part of the site with the lowest level of risk. This section outlines the acceptable uses or the precincts.

2. **Flood resilient built Form** - provides minimum floor levels and provision for building on a floodplain for non-habitable structures
3. **Flood conveyance and site works –** includes provisions for circumstances of fill, or compensatory fill
4. **Hazardous Material and Dangerous Goods;** and
5. **Disaster Management**

This is generally aligned with the topics covered by the model code. There are a number of matters which will be finalised once the project proceeds a little further such as content of the development manual and whether this impacts references to engineering design and planning scheme policies.

Given there are seven tables in the code the PO and AO numbering has been customised to allow for differentiation of each table, using an extended PO with letters from the table heading. For example, a PO in the low risk table is POLR01, where a PO in the high risk table is POHR01 and so on.

8.9 Reconfiguration of a Lot

The LVDPS refers to a number of tables which have not yet been completed, one of these is flood immunity levels for new lots. Setting of immunity levels for new lots either in the RoL code, Overlay code or planning scheme policy will need to occur prior to drafting completion. The draft Flood overlay code adopts recommended immunity levels for Council's consideration on PORL3 and AORL3.

The draft overlay code contains provisions about flood immunity for arterial roads and also for connection to evacuation routes which seem conflicting. The two percent AEP immunity for arterial roads has been left in the code (see AORL4.2), but this is in competition with the provision requiring new lots to have access above the DFE(AORL4.1).

Drafting Action: that Council includes and confirms flood immunity levels for new lots as drafted in the Flood Overlay Code or otherwise; and that Council confirms flood immunity for new roads and evacuation points in the draft Flood Overlay Code.

8.10 Building Controls

Section 1.6 of the planning scheme is a quick reference for building professionals to advise the elements of the planning scheme which assist, support or override building assessment provisions (BAP) in the context of the limits of regulation through a planning scheme. Typically, this involves highlighting alternative BAPs where they exist and confirming the extent of a flood hazard area in relation to Mandatory Part 3.5 of the Queensland Development Code.

The scheme is required to declare and define certain elements to enable the building assessment provisions to function, for example, the Defined Flood Levels for the "flood hazard area" of the region. The building regulation was updated in 2021 and an extract is below in Box 4-1 showing the matters the scheme must address.

Part 1.6 outlines BAPs in the planning scheme and this table will require updating to reflect the *Building Regulation 2021*. Table 4-2 below provides the entries required for flood. It is noted that the *Building Regulation 2021* (s8 (3)) states that the planning scheme must reiterate which section of the Building Act the provision applies to. The table includes velocity, which Council has indicated will be advised through a velocity map. If this is the approach will the velocity

map need to be part of the Flood hazard overlay? The accompanying annotated scheme provide comments on the section 1.6 table.

In addition, there are a number of minor notes to integrate which have been included in the draft overlay code:

- a notation that the flood hazard area is defined for the purposes of the Building Act - is an 'editor's note' directly under the overall outcomes, which is included in each draft code; and

Note – The flood hazard area defined by this planning scheme is taken to be the flood hazard area pursuant to section 8 of the Building Regulation 2021. Building work in a designated flood hazard area must meet the requirements of the relevant building assessment provisions under the Building Act 1975.

8 Designation of area liable to flooding

(1) A local government may in a planning scheme, temporary local planning instrument under the Planning Act or by resolution—

(a) designate all or part of its area as a flood hazard area; and

(b) declare the following matters for all or part of the designated flood hazard area—

(i) the defined flood level;

(ii) the maximum flow velocity of water;

(iii) an inactive flow or backwater area;

(iv) a freeboard that is more than 300mm;

(v) the finished floor level of class 1 buildings built in all or part of the flood hazard area.

(2) The local government must, in designating a flood hazard area, comply with—

(a) a State planning policy; and

(b) if a temporary State planning policy is in effect when the designation is made—the temporary State planning policy to the extent it applies in relation to the designation.

(3) If the local government makes a designation or declaration under subsection (1), the local government **must state in the planning scheme**, temporary local planning instrument under the Planning Act or resolution, **that the designation or declaration is made under this section.**

Box 8-1: Extract from the Building regulation 2021

- an editor's notation reinforcing that the Acceptable Solutions of the Building Assessment Provisions (BAPs) of MP3.5 do not apply in flood hazard areas with a velocity greater than 1.5 metres per second to be included in section 1.6 of the scheme.

Editor's Note: Building works in high risk areas with velocity greater than 1.5metres per second will require a structural engineering design capable of withstanding the nature of the hazard(s) to which the building will be subject consistent with the requirements of the relevant building assessment provisions, to be supported by a report (or multiple reports) prepared by a Registered Professional Engineer Queensland that identifies the flood hazard and the structural approach to be utilised.

Drafting Action: Review section 1.6 and 1.7 of the planning scheme, to ensure integration of building matters including referencing the appropriate section of the *Building Act 1975*.

8.11 Planning Scheme Policy

The LVDPS does not yet have completed Planning scheme policies (PSPs), and in discussion with Council there may also be a development manual underway. The current view in the Planning and Environment Court is that 'relevant matters' external to a planning scheme have almost no bounds where matters are not covered off by the planning scheme or in the absence of clarity and policy understanding. Therefore, it is recommended that a PSP is drafted to convey the following potential table of contents to support Council's flood history and policy position (in no particular order):

- relationship to the planning scheme
- explanation of the policy positions and the intent for each: accept, avoid, arrest, mitigate and transition
- risk assessment outcomes and clear translation of hydraulic risk through technical evaluation to SPP risk definitions
- the role for everyone, Council and the LDMG or emergency services
- definitions for berms, mounds, farm levees and relationship with operational works
- circumstances for back zoning
- understanding of precincts
- understanding of isolation and flood islands, evacuation and sheltering in place
- circumstances for filling and when additional flood studies may be required or compliance with compensatory fill provisions
- circumstances for easements, split zones or dedication to Council
- assistance with supporting material from the Queensland Government for building on a floodplain
- flood history and the Grantham Development scheme
- glossary of terms
- diagrams or sketches as required
- circumstances and contents of a Flood Evacuation Management Plan

This information will greatly assist in supporting the policy position taken throughout the scheme and enhance industry understanding. It also strengthens the scheme when challenged and defers the need to go to further relevant material outside the scheme.

Drafting Recommendation: that Council include a comprehensive PSP to support the flood risk policy and regulatory provisions.

8.12 Precincts

The precinct provisions are contained within the overlay code because they will require compliance with a number of provisions already contained within the high and extreme risk code tables. That the zone codes have no Pos or AOs, it is not suitable to have precinct performance measures in those codes. Table 8-2 above provides the circumstances to map the precincts:

Laidley town centre which is in the major centre Zone, and the Withcott town centre land in the Local centre and the Industry zones. Development can proceed in accordance with the zone, however there will be particular constraints. **The Laidley and Withcott Flood Resilient Precincts** should be identified as shown in the respective locality profiles: Section 6.1.4.1 and section 6.8.4.1.

The purpose of the **Valley Rural Floodplain Precinct** is to limit dwelling house construction, lifestyle lots and capital investment without risk awareness. This precinct should be identified simply as:

- all land in the rural zone; and
- within the high and extreme flood risk area
- defined by risk category rather than cadastre

There may be cause to include other zones such as open space, community facilities and the like. The assessment benchmarks for the Laidley precinct and the Valley precinct are found in Table 3 as for development in the high risk area. All uses remain code assessable with strong code provisions.

9 Next Steps

The next steps for Meridian Urban are to assist with drafting the FAAR report. To proceed with this task, supporting information will be required to submit with the written substance including maps, lot identification and categorisation into the change implemented such as back zone, split zone, limited use rights and the like.

Prior to this, we will need to work with council to identify final zones of many areas in conversion from the Laidley and Gatton schemes and are guided by Council on how these should occur.

9.1 Drafting Actions and Recommendations Summary Table

The following table summarises all the actions and recommendations of this report.

Table 9-1: Summary Table of Actions and Recommendations

Action or Recommendation	Description	Rationale
ACTION	**that Council implements all changes provided in Table 8-1 (Part 3)**	See section 8.2
ACTION	**that Council undertakes the reviews outlined in Table 8-2 to ensure alignment with flood policy and preparation for the Feasible Alternative Assessment Report.**	See section 8.3
ACTION	**that Council reviews the Tables of assessment to ensure the compliance rules are fit for purpose.**	See section 8.5.1
ACTION	**that Council reviews the policy across the planning scheme for filling and excavation in the flood hazard area:** • **to confirm the policy position and circumstances of no filling in the flood hazard area** • **to apply consistency across codes where regulation of filling and excavation is relevant to avoid inconsistencies and duplication** • **to delete references to filling and excavation in acceptable outcomes which do not add value** • **to consider making minor amendments to definitions outlined in Table 8.2 of this report.**	See section 8.5.2
ACTION	**that Council undertake a review of the terms across the entire planning scheme with a view to deleting references to undefined terms, using one source of information, deleting references to sensitive uses for all natural hazards, and deleting refence to vulnerable people, unless specifically intended to reference the users. Helidon management area and associated Table of assessment may require rewording.**	See section 8.6

Action or Recommendation	Description	Rationale
ACTION	**that Council updates Schedule 1 with the definition for the DFE provided in table 8-6 above.**	See section 8.6.2
ACTION	**that Council includes and confirms flood immunity levels for new lots as drafted in the Flood Overlay Code or otherwise; and that Council confirms flood immunity for new roads and evacuation points in the draft Flood Overlay Code.**	See section 8.8
ACTION	**Review section 1.6 and 1.7 of the planning scheme, to ensure integration of building matters including referencing the appropriate section of the *Building Act 1975*.**	See section 8.9
RECOMMENDATION	**that Council consider further refinements as provided in the annotated LVDPS document.**	See section 8.2
RECOMMENDATION	**that Council undertakes further reviews for zones impacted by flood (e.g., LDZ, Rural and Rural Residential) to ensure alignment and note minor recommendations in the annotated LVDPS**	See section 8.3
RECOMMENDATION	**that Council reviews the Tables of Assessment for consistency and clarity in expression of assessment levels**	See section 8.5.1
RECOMMENDATION	**that Council adopts the definitions, provided in Table 8.5 for Vulnerable Uses, Essential Community Infrastructure and Critical Infrastructure across the planning scheme.**	See section 8.6.1
RECOMMENDATION	**that Council includes other flood related definitions such as risk levels and policy positions in a new Planning scheme policy or in Schedule 1.**	See section 8.6.2
RECOMMENDATION	**that Council include a comprehensive PSP to support the flood risk policy and regulatory provisions.**	See section 8.10

9.2 State Planning Policy Compliance Tables

Suggested text has been provided in Appendix A below to demonstrate compliance with the State Planning Policy and to assist Council in preparing a report for State Interest Review. The columns which are filled in pale red indicate partial responses depending on Council decision and other parts of the planning scheme.

Appendix A - SPP Compliance Tables

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
Approach:	Establish strategic outcomes that align with the state interest and inform provisions through the balance of the planning scheme			
Considerations The strategic outcomes provide the planning scheme intent for delivering the state interest. The level of detail contained in the strategic outcomes will be informed by the local government context. In preparing strategic outcomes, address the following:		**Relevant to state interest policies:**	**Lockyer Valley Planning Response:** **Discussion**	**Lockyer Valley Planning Response:** **Demonstration**
1.	Do strategic outcomes acknowledge the role in factors such as climate change in the need to respond to natural hazards four current and future development?	4	Yes	See Council's drafted Section 3.4, Theme 4 – Sustaining the natural environment which includes forward focus narrative on the impacts and effects of climate. For Flood Hazards specifically see Element 3.4.7 – Safety from natural hazards, which forward the impacts of climate change in the context of flood.
2.	Do strategic outcomes acknowledge the interrelationship of different parts of the water cycle in the management of flood, such as urban and rural development adopting best practice water catchment planning, using water sensitive design and climate responsive building?	4	Yes	See Council's drafted Section 3.4, Theme 4 – Sustaining the natural environment, section 3.4.9, Waterways and water quality. Element 3.4.7 does not see to repeat these provisions but notes: *The planning scheme is responsive to climate change recognising the need to maintain natural corridors and processes and respect increasing urban heat, intensifying storms, more frequent flooding and fire events among other discrete changes. The scheme enables*

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
				mitigation methods to achieve acceptable risk levels form natural hazards.
3.	Do strategic outcomes acknowledge the presence of flood prone areas in the planning scheme area? The response to flood involves avoidance and mitigation, given the extensive urban development and infrastructure investment that has already occurred in the floodplain	1 and 4	Yes	For Flood Hazards specifically see Element 3.4.7 – Safety from natural hazards, which opens with the text: *Living in a floodplain and a region surrounded by significant national parks and steep, heavily vegetated landscape, means that the environment brings with it a need to understand the potential risk from natural hazards.* *The risks associated with natural hazards, including the projected impacts of climate change, are avoided in the first instance and where possible can be or mitigated to protect people, property, the environment and improve the community's resilience and adaption to natural hazards.*
4.	Do strategic outcomes promote a risk-responsive settlement pattern that avoids inappropriate development in flood hazard areas?	4 and 5	Yes	For Flood Hazards specifically see Element 3.4.7 – Safety from natural hazards, items 1 and 2. 1. The known impacts of climate change are incorporated though adaptive measures in development, avoided or mitigated to protect people, property, the environment and economic activity to improve the community's resilience to natural hazards. 2. Areas at intolerable risk of natural hazards identified in the planning scheme are

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
				avoided in the first instance for all development.
5.	Do strategic outcomes identify land for future flood hazard mitigation works and protect this land from development where it may prevent the delivery of this function?	4	Yes	For Flood Hazards specifically see Element 3.4.7 – Safety from natural hazards, item 6 and 8. 6. New urban areas must mitigate risk to demonstrate development can proceed with an acceptable risk level. Residual areas with intolerable risk may remain undeveloped. 8. Development maintains or improves the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard to the expected need in 2100.
6.	Where appropriate development may occur in flood hazard areas, do strategic outcomes promote strategies to mitigate risks associated with that development to an acceptable or tolerable level, to protect the safety of people, property and the environment?	4	Yes	For Flood Hazards specifically see Element 3.4.7 – Safety from natural hazards, item 6 and 7. 6. New urban areas must mitigate risk to demonstrate development can proceed with an acceptable risk level. Residual areas with intolerable risk may remain undeveloped. 7. Infill development should proceed on the part of a site that has the lowest level of risk, reducing the risk level to acceptable, which may involve specific built form or site based mitigation methods.

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
7.	Do strategic outcomes specifically discourage development in the flood hazard area where this may: 1. Place additional burdens on disaster management capacity, the community and government? 2. Risk disruption to the effective functioning of essential community infrastructure or vulnerable uses during and immediately after a hazard event? 3. Result in the loss of valuable property? 4. Increase the severity of the flood event?	5	Yes	For Flood Hazards specifically see Element 3.4.7 – Safety from natural hazards, item 9 and 10. 9. Development supports and does not unduly burden a disaster management response or recovery capacity and capabilities. 10. Development ensures that adequate evacuation routes and emergency service access are available in a natural hazard event.
8.	Do strategic outcomes support development that is compatible with maintaining the natural functions of the floodplain and the retention of existing riparian vegetation that can mitigate some risks (for example, stream bank erosion) from flooding?	5	Yes	For Flood Hazards specifically see Element 3.4.7 – Safety from natural hazards, item 1 and 8. 1. The known impacts of climate change are incorporated though adaptive measures in development, avoided or mitigated to protect people, property, the environment and economic activity to improve the community's resilience to natural hazards. 8. Development maintains or improves the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard to the expected need in 2100.
Approach:	Prepare state interest specific mapping			

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
Considerations Mapping helps users understand and interpret where and how state interest policies apply in the local government area. *Note – Where content is to be identified on a map, consider where this is best located within the planning scheme (such as the strategic framework or an overlay or local plan map).* *Note – The SPP identifies the mapping that a planning scheme must appropriately integrate – this is discussed in the 'Mapping' section below.*		**Relevant to state interest policies:**	**Lockyer Valley Planning Response:** **Discussion**	**Lockyer Valley Planning Response:** **Demonstration**
9.	Does planning scheme mapping identify the location of and (where appropriate) refine, the flood hazard areas in the planning scheme area (and otherwise identify areas where no flood information is available) These elements are mapped in the SPP IMS. Note – The SPP identifies when layers may be locally refined.	1	Yes	The mapping elements are outlined in section 8.7.1 – Application. This includes b. extreme flood risk area c. the Laidley flood resilient precinct d. the Withcott flood resilient precinct e. the Valley rural floodplain precinct f. high flood risk area g. moderate flood risk area h. low flood risk area i. very low flood risk area (PMF) j. investigation areas; and k. special defined flood events areas

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
Approach:	Articulate outcomes for areas by allocating zones and locally specific provisions (such as overlays and local plans)			
Considerations Land should be able to be used for the purpose it is zoned. In allocating a zone to land, or in applying locally specific provisions (such as a zone precinct, overlay or local plan), address the following:		**Relevant to state interest policies:**	**Lockyer Valley Planning Response:** **Discussion**	**Lockyer Valley Planning Response:** **Demonstration**
10.	When updating a settlement pattern or changing a land use intent: Does the choice of zone/locally specific provisions avoid allocating land for new urban development in areas of unacceptable flood hazard and discourage expansion and intensification of inappropriate urban settlement in existing areas of flood hazard? For example: Identify new urban areas for expansion or intensification in new or existing areas with acceptable or tolerable flood risks and safe evacuation routes for flood events greater than the Probable Maximum Flood (PMF). Limit increases in density relative to the flood risk in existing urban flood hazard areas. Promote more compatible and resilient land uses in flood hazard areas.	4		Recommendations to Council in this report are sensitive to future growth and highlight the need for a growth strategy to ensure settlement is directed in a risk aware fashion. Generally, recommendations for Safety, risk and resilience have applied a conservative approach to any up zoning prior to completion of a growth strategy. See section 7.5 of this report. Recommendations are included for extending the limited development zone throughout this report.

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
	In areas of intolerable risk where future uses are highly constrained, including land in the Limited development zone may provide transparency regarding the level of hazard.			
11.	When updating a settlement pattern or changing a land use intent: Does the choice of zone/locally specific provisions support anticipated development types that would not be of a form that is likely to result in increases in water-flow velocity or flood levels or increase the potential for damage on the site or to other properties?	5		Throughout this report, and the supporting land Planning for Flood Hazards Report recommendations on appropriate zoning and land uses is provided in a place-based assessment for Council's consideration when integrating other plan-making actions. To assist with legacy settlement issues, the Overlay proposes a number of flood-resilient precincts: (b) the Laidley flood resilient precinct (c) the Withcott flood resilient precinct; and (d) the Valley rural floodplain precinct With specific limitations aligning with risk, to allow risk understanding and slower transition or market-led change without zone amendments.
12.	Where land is included in a flood hazard area: Does the choice of zone/locally specific provisions consider the uses envisaged by each zone and whether the risks associated with flood can be mitigated to acceptable or tolerable levels for those uses?	4, 5 and 6		Throughout this report, and the supporting land Planning for Flood Hazards Report recommendations on appropriate zoning and land uses is provided in a place-based assessment for Council's consideration when integrating other plan-making actions.

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD			
The zone and/or locally specific mapping intent may then be adjusted to reflect flood-appropriate land uses / provide guidance on the compatibility of different uses, considering: i. The flood scenario under which the use will cease to function effectively and the likelihood of such an event. ii. The consequences of and community tolerance to loss of a community service during and immediately after a flood hazard event. iii. Whether the use will place additional burden on government disaster management operations or on recovery capacity. iv. The degree of sensitivity of the use to property loss or damage. For example, intents discourage the following uses from establishing in flood hazard areas. As a minimum these uses should be located outside areas affected by the DFE: i. Uses catering to vulnerable persons requiring unique evacuation requirements (such as hospitals, education establishments, childcare centres, aged care accommodation, nursing homes, and high-security correctional centres). v. Community infrastructure that will perform an important role and be required to function during and immediately after a flood hazard event (also consider other uses that may need to perform a role during or after a flood event, for example showgrounds and sports facilities can perform an active role in flood response and recovery, serving			To assist with legacy settlement issues, the Overlay proposes a number of flood-resilient precincts: (b) the Laidley flood resilient precinct (c) the Withcott flood resilient precinct; and (d) the Valley rural floodplain precinct With specific limitations aligning with risk, to allow risk understanding and slower transition or market-led change without zone amendments. Local tolerance to risk and loss sensitivity was extensively tested which informed additional number of lots to be included in the Limited Development zone. Evacuation routes and flood islands are included in the composition of the risk assessment. The code addresses vulnerable uses, essential community infrastructure and critical infrastructure as definition in schedule 1.2 and see also Element 3.4.7 – Safety from natural hazards, item 12. *12. Vulnerable uses, Essential Community Infrastructure, and Critical infrastructure are located outside areas of intolerable and tolerable risk and proceed in areas of acceptable risk.*

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD			
as emergency accommodation and recovery staging points). vi. Expansion of the above existing uses in these areas unless evacuation solutions and resilient design can be achieved – refer assessment benchmarks below. vii. Community infrastructure that protects valuable equipment and artefacts (such as museums, libraries, art galleries, archives) – refer assessment benchmarks for mitigation strategies where this is not possible. **viii.** Hazardous industries and uses that involve the storage of significant amounts of hazardous material**.** ix. Rural land uses such as intensive animal husbandry and intensive agriculture.			In addition, specific land uses have been limited across higher risk categories through the tables of assessment.
Approach:	Set categories of development and categories of assessment		
Considerations The categories of development and categories of assessment support the achievement of the spatial outcomes (zones, overlays, local plans). In setting the categories of development and categories of assessment for development, address the following:	**Relevant to state interest policies:**	**Lockyer Valley Planning Response:** **Discussion**	**Lockyer Valley Planning Response:** **Demonstration**

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
13.	Do the categories of development and categories of assessment reflect the level of risk and vulnerability of the use? For example, are identified vulnerable uses and community infrastructure uses assessable within the flood hazard area? This will enable assessment benchmarks to apply so that impacts can be fully considered.	5 and 6	Yes	The TOAs are structured by risk and the code is also structured by risk, thus particular LOAs need only respond to parts of the code. For example, Development in the low and very low is generally ASTR which need only comply with Table 1 of the code. Vulnerable uses, essential community infrastructure and critical infrastructure (as defined in Schedule 1.2) are elevated to code assessment even in low risk areas. Development in high risk categories, while maintaining code assessment, must respond to benchmarks with more stringent regulatory approach.
14.	Are aspects of development that may impact on, or be impacted by, flood hazard assessable? For example: Reconfiguring a lot facilitating increases in population within the flood hazard area. Significant earthworks and works involving the redirection of the existing overland flow paths. This will enable assessment benchmarks to apply so that impacts can be fully considered.	5 and 6	Yes	There is no change in assessment level, maintaining code assessment for a reconfiguration, however different benchmarks apply aligned with risk. Table 5 of the Flood hazard overlay code applies which does not permit further subdivision in the high or extreme risk area through PO RL2: **There is no increase in people or property in the high or extreme risk area.** There is no change to the level of assessment, utilising the existing fill volumes and assessment triggers but the flood overlay code is triggered

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
				for operational works involving filling within the flood hazard area. Fill is limited to the building footprint and that permitted under the Building Assessment Provisions in low risk areas. Elsewhere only compensatory fill is permitted in the floodplain and only upon demonstration of outcomes provided at POMR7 for example and subject to a hydraulic assessment confirming compliance.
15.	Where for development involving the storage of significant amounts of hazardous material in a flood hazard area: Is development assessable? This will enable assessment benchmarks to apply so that impacts can be fully considered.	5	Yes	Development likely to involve storage of hazardous goods is assessable under the draft scheme and where in the flood overlay the code will apply. Benchmarks for hazardous materials and dangerous goods are provided in each table of the code and require compliance for all ASTR and assessable development.
Approach:	Prepare assessment benchmarks that deliver the outcomes			
Considerations Assessment benchmarks measure the extent to which a development achieves the intended outcome, in this case, the intent of the state interest policy. In preparing assessment benchmarks, address the following:		**Relevant to state interest policies:**	**Lockyer Valley Planning Response:** **Discussion**	**Lockyer Valley Planning Response:** **Demonstration**
16.	Where in areas of potential flood risk: Do assessment benchmarks require site-based investigations?	5	No	The comprehensive risk assessment enables a precise allocation of regulation per risk

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
	For development proposed on land where the potential for flooding is unknown, the assessment benchmarks may require: 1. Information to enable an assessment of whether the subject land is susceptible to flooding. 2. Upon determination that the subject land is susceptible to flooding, more detailed information to allow an assessment of the flood risk. Note – A planning scheme policy may specify the scope and methodology to be followed in preparing a site-based flood study and risk assessment, in support of a development application for a site in a flood hazard area.			category which means that individual site investigations are not required. There are two "investigation areas" council has nominated in the overlay with incomplete modelling which are the only instances across the region where further work on flood risk assessment is required.
17.	Where land is included in low, medium and/or high risk flood hazard areas: Do assessment benchmarks: 1. Set thresholds such as finished floor levels for development, where appropriate? 2. Contain strategies so development does not affect floodplain behaviour in a way that may increase the number of people at risk to an intolerable level or cause or contribute to increase in the level of risk on surrounding people and property? For example, avoid filling, altering flow-paths or adversely changing flood duration, depth, velocity, hazard or warning time. 3. Contain siting, design and transport infrastructure requirements that:	4 and 5	Yes	All risk categories provide **"Flood Resilient Built Form"** sections which prescribe a habitable flood level above the defined flood event plus 500mm freeboard (see for example POLR4). All risk categories provide **"Flood conveyance and site works"** provisions. Fill is limited to the building footprint and that permitted under the Building Assessment Provisions in low risk areas. Elsewhere only compensatory fill is permitted in the floodplain and only upon demonstration of outcomes provided at POMR7 for example and subject to a hydraulic assessment confirming compliance.

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	a. Enable people to safely shelter in place (depending on the nature of the risk)? b. Enable the safe self-evacuation of occupants and visitors from the hazard area? c. Provide for effective disaster response and recovery, such as safe and efficient access and operation for emergency services and the supply of essential goods and services?			All risk categories have **"Emergency management"** provisions which require a minim immunity level for access. Due to the nature of the risk in Lockyer Valley, evacuation is complex, and Council continues to work on evacuation routes and plans.
	4. Require the retention or enhancement of riparian corridors and vegetation that provide a protective function during flood events, maintain the natural function of the floodplain and potentially reduce the need for built mitigation infrastructure?		No	To avoid duplication of regulation, these provisions are contained in the development codes of the scheme and the Stormwater PSP.
	5. Consider requiring evacuation routes and the provision of LGIP infrastructure as potential mitigation measures? *Note – In addition, local government may seek to alert their community to the Flood Resilient Building Guidance for Queensland Homes non-statutory guidance document that contains considerations for improving the flood resilience of homes.*		Yes	All risk categories have **"Emergency management"** provisions which require a minim immunity level for access. Due to the nature of the risk in Lockyer Valley, evacuation is complex and Council continues to work on evacuation routes and plans.
18.	Where for development in a flood hazard area involving vulnerable uses and essential community infrastructure that must continue operating during or after a flood event: Do assessment benchmarks require development to be located above the height of the PMF or other known extreme event to achieve the highest practical level of flood immunity?	5	Yes	Vulnerable uses, essential community infrastructure and critical infrastructure (as defined in Schedule 1.2) are elevated to code assessment even in low risk areas. POLR1 requires demonstration of continued operation during a flood event. Storage of items of value for libraries and such must be above the PMF.

STATE PLANNING POLICY 13- NATURAL HAZARDS RISK AND RESILIENCE - FLOOD				
				POMR1 in the medium risk area requires that these uses are avoided. AOHR1.3 in the high risk area says that development for vulnerable uses, essential community infrastructure and critical infrastructure does not occur.
19.	Where for development in a flood hazard area involving essential community infrastructure: Do assessment benchmarks contain siting, design and access standards to achieve the required level of functionality during and immediately after a flooding hazard event?	6	Yes	As above – see POLR1
20.	Where for development in a flood hazard area for community infrastructure that protects valuable equipment and artefacts: Do assessment benchmarks require this development to be located above the height of the DFE?	6	No	As above – the assessment benchmarks require storage above the PMF
21.	Where for development involving the storage of significant amounts of hazardous material in a flood hazard area: Do assessment benchmarks include design measures so that hazardous materials are not exposed to flood waters and/or are appropriately sealed to avoid the release of hazardous materials because of a flood hazard event and evacuation plans to safely remove hazardous materials to alternative sites are in place in the event of a flood?	5	Yes	Each table in the code contains a section or **"Hazardous Materials"** which requires storage and handling aligning with risk. Storage in all cases occurs either 1m above the DFL or above the PMF.

Appendix B - DSDILGP First SIR Response Table

Draft Lockyer Valley Regional Council Planning Scheme
Outcome of the state interest review – Relevant matters, including state interests, that the local government must consider when preparing the proposed planning scheme

Part B – Further advice

Relevant state interest/legislative matter(s)

State interest	Ref	Policy	PS Ref	Issue	Action to council	Action Taken
Building Act 1975	section 8(5)	A local planning instrument must not include a provision about building work	P204 Flood Hazard Overlay Code	Conflicts with section 8(5) of the Building Act 1975.	Remove AS2.1(c)and (d), AS2.2(c)and(d) which address building assessment provisions contained in the Queensland Development Code MP 3.5 (Building in a flood hazard area) and are in conflict with the scope of section 13 of the Building Regulation 2006.	These items have ben removed. The redrafted code has sub-section; "Flood Resilient Built Form" which includes provisions regarding flood resistant construction style and flood levels without nominating structural standards. See POLR4, POLR5, POMR4, POMR5, and POHR8,
			Part 8.8 Flood overlay code, P217, Portobello Road Estate		Remove items (d)(ii) and (e) which are building assessment provisions addressed in the QDC MP 3.5, P1 and P2 and the National Construction Code.	The same provisions have been removed as has the table for Portobello Road. The table has been superseded with Special Areas nominated as triggered in the Overlay maps for Special Areas with alternate Defined Flood Events.

Natural hazards, risk and resilience

State interest	Ref	Policy statement	PS Ref	Issue	Action to council	Action Taken
Natural hazards, risk and resilience	1	Natural hazard areas are identified, including: (a) bushfire prone areas (b) flood hazard areas (c) landslide hazard areas (d) storm tide inundation areas (e) erosion prone areas.	Section 8.8 Flood Hazard Overlay code and OM7 Flood Hazard Overlay Map	The Flood Hazard Overlay Code uses inconsistent terminology to what is mapped on the Flood Hazard Overlay Map. For example, the code refers to High hazard areas, yet the mapping uses numerical categories.	Consider checking and amending where required terminology used in the flood hazard overlay code and overlay mapping to be consistent.	The Flood Hazard Overlay uses consistent terminology throughout which has been outlined in section 8.7.1 Application of the Flood Hazard Overlay Code and included as necessary in Schedule 1.2 Administrative definitions.
Natural hazards, risk and resilience	2	A fit-for-purpose risk assessment is undertaken to identify and achieve an acceptable or tolerable level of risk for personal safety and property in natural hazard areas.	Flooding: Natural Hazard Risk assessment for Lockyer Valley Regional Council, produced by Environmental Risk Science and Audit, document number	It is noted the fit-for-purpose risk assessment was developed in 2012 using the now superseded SPP1/03 methodology. More comprehensive and recent flood data may be available should the council wish to update the fit-for-purpose risk assessment. It is unclear as to whether the SKM 2011 Flood study has	More comprehensive and recent flood data may be available should the council wish to update the fit-for-purpose risk assessment.	An updated risk assessment has been completed across the Catchments of Laidley and Lockyer Creeks and the SPP compliance demonstration provided through the compliance tables.

State interest	Ref	Policy statement	PS Ref	Issue	Action to council	Action Taken
			ERSA1023-2, version 5.0	underpinned the proposed flood hazard overlay mapping as per recommendations contained in the 2012 ERSA report. The SKM study underpins the fit-for-purpose risk assessment particularly for determining the number of premises existing within the DFE zone.		

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