



CATCHMENT 9 & 16 DRAINAGE PLANNING AND DESIGN

City of Greater Dandenong

CATEGORY: D.1.f
Flood and Drainage
Planning

PROJECT SCOPE

The City of Greater Dandenong engaged Engeny to undertake flood mapping and the detailed design of mitigation works. This work advanced Council's ability to manage flooding across the selected catchments draining into Mile Creek through Engeny's completion of the following tasks:

- Enhancement of Council's digital GIS data including the review and request of survey data and drainage plans to build a robust database which significantly improves Council's understanding of the existing drainage system.
- Development of new hydrologic and hydraulic models covering the selected catchments within the municipality, including Council and Melbourne Water drainage assets, to define floodplain behaviour. These models were created using RORB and TUFLOW, Melbourne Water's preferred modelling software in line with the Australian Rainfall and Runoff 2019 hydrological approaches.
- Analysis of modelling outputs including the interrogation of peak flows, velocities, flood safety hazard categories, etc, for both the 10% AEP and 1% AEP storm events. This analysis established the existing flood risk affecting specific hotspots within the catchment.
- Assessment of structural mitigation works which could be implemented to address flood risk. The resultant flood risk reduction was quantified by considering the changes to the number of properties and dwellings affected in addition to the flood safety criteria within roads.
- Preparation of flood mapping deliverables and associated documentation to assist Council to manage flooding within the selected catchments and also provide the justification / basis behind the proposed mitigation works by summarising the flood mitigation benefits which would be achieved.

Following on from the flood mapping and mitigation study, Engeny has progressed the proposed structural works to preliminary designs. The project is currently in progress however detailed designs plans will ultimately be developed which will inform Council's capital works program for several years to come. This work has included:

- Feasibility assessments including undertaking site visits, Dial Before You Dig enquiries, review of feature level survey data, identification of construction constraints, required authority approvals, etc.
- Preparation of preliminary design drainage layout plans and cost estimates including the approval of drainage connections to Melbourne Water's Mile Creek and works within VicRoads or VicTrack owned reserves.
- Ultimately the preparation of detailed design plans.

START DATE

January 2018

COMPLETION DATE

2019

CLIENT CONTACT

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RELEVANCE TO CATEGORY

The City of Greater Dandenong Flood Mapping and Mitigation study demonstrates Engeny's capabilities in flood and drainage planning, including:

- Flood mapping studies, including preparation of new models using Melbourne Water's preferred flood modelling software, RORB and TUFLOW.
- Flood mitigation studies, including modelling of capital works using flood models.
- Cost-benefit analysis to determine the flood mitigation benefit to existing flood affected properties, dwellings and roads and recommend preferred servicing strategies.
- Preliminary design (and ultimately detailed design) drainage layout plans for recommended mitigation works including cost estimates.

PROJECT INNOVATION

- Engeny's preference for undertaking the existing conditions modelling utilising TUFLOW rather than DRAINS software allowed for a more robust analysis of overland flow paths. In contrast to the previous studies which highlighted the need for extensive mitigation works throughout the catchment, Engeny's TUFLOW modelling approach focused on a targeted approach. This resulted in a significant reduction to the extent of structural mitigation works required, reducing Council's capital cost significantly.
- Engeny's approach to progressing the overall project involved thorough communication and collaboration with Council. Regular discussions and the provision of progress reports allowed for the tracking of data requests and identification of key construction feasibility constraints. As an example this approach highlighted the benefit in undertaking site visits to key locations with sub-contractors to obtain advice on the construction challenges and the potential impacts to the structural integrity of dwellings adjacent to easements. This engagement informed Council's decision making of selecting preferred mitigation works.



PROJECT OUTCOME

Engeny's work improved Council's ability to manage flooding with a targeted approach to implementing structural mitigation works. The review and request of survey data provided confidence on the accuracy of Council's existing drainage system and its performance with the existing conditions modelling highlighting the flooding hotspots.

Structural mitigation works were targeted to resolve these flooding issues with the flood reduction benefits quantified with modelling. Feasibility assessments, which included extensive communication with Council, informed the selection of preferred structural mitigation works and ensured key construction constraints and the potential social, economic and environmental impacts were considered.