

21 August 2019

NL181648vD

Third Aged Villages
C/- Catalyst Project Consulting Pty Ltd
Tim Mackiewicz
110 King Street
Newcastle NSW 2300

Dear Tim,

Re: Merewether Golf Club Seniors Living – Civil and Structural Preliminary Advice

It is understood that Third Age Village are lodging a Site Compatibility certificate application for Senior Housing within the existing Merewether Golf Course. Northrop have been engaged to provide preliminary Civil and Structural Engineering advice for the development to ensure spatial planning and efficient design of Structural and Civil elements are incorporated from this early stage.

The following review and advice have been based on Marchese Partners layout and footprint plans received from Catalyst on the 29th May 2019. A copy of these plans is contained in Appendix A.

It is noted that the designs and advice provided are at a preliminary level only and require further design coordination and refinement throughout the Development Application and Detailed Design Phases.

Stormwater

Stormwater management will need to be in accordance with Newcastle City Council's DCP Section 7.06 and the Technical Manual for Stormwater Efficient Design and Development.

In relation to the proposed development the philosophy for Stormwater Management on site would likely include:

- Runoff from the roof will be collected and diverted to reuse tanks. Water collected in these tanks will then be used in the development for toilet flushing, internal cloth washing and external irrigation. Tanks will be sized in accordance with Newcastle City Council guidelines and likely situated within the basement or underground on the northern side of the development
- Runoff from new vehicular and pedestrian pavements will be collected via a pit and pipe systems and treated via rain gardens or sand filters spaced throughout the development prior to being released into existing drainage lines and systems

		Date
Prepared by	BC	21/08/2019
Checked by	AB	21/08/2019
Admin	HB	21/08/2019

- Excess runoff the development will be directed in a controlled manner to the existing swales and contour banks within the Golf Course. For the main portion of the new development this will be to the north western corner of the Golf Course and ultimately Drew Street. While a small portion of the new car park may be directed to the north east and Ella Street.

Full design of the items mentioned above will be provided with Development Application documentation. Based on the assessment undertaken we can see no reason why these devices cannot be sized and situated within the current footprint for the development.

Vehicle Circulation and Parking Layout

Northrop have been working with Catalyst and Marchese Partners to provide feedback on the current parking and circulation arrangements. This advice has specifically sort to incorporate within the design compliance in accordance with AS2890.1 – Off-street Carparking, AS2890.2 – Off Street Commercial Vehicle Facilities, AS2890.6 – Off-street parking for people with Disabilities, and AS1428 - General Requirements for Access and Mobility - New Building Work.

In general, the plans typically comply with many of these design requirements with the exception of fine tuning to improve circulation at the top and bottom of ramps, access ramp grades and radii for larger vehicles and blind aisle turning areas.

Based on our review it is expected that these items can be incorporated at the Development Application phase of the project and should not impact the current footprint of the development.

Mine Subsidence

A meeting with SA NSW was held on Tuesday 20th November 2018. Attendees at the meeting included:

- Steve Ditton – Ditton Geotechnical Services
- Scott Shaffren – on behalf of Third Age
- Tim Mackiewicz – Catalyst
- Christian Kirrage – Northrop

During the meeting, Ditton Geotechnical Services (DGS) tabled the Mine Subsidence Risk and Preliminary Mine Workings Remediation Assessment for the proposed development.

DGS advised that there is a level of uncertainty around the mine workings in relation to the stability of the workings and the extent of pillars that may have already collapsed.

DGS went on to advise that on the basis that the workings have not collapsed then the proposed buildings could be subject to a potential vertical subsidence in the order of 500mm.

This is outside what would generally be considered acceptable to SA NSW and if the workings have not collapsed then a risk mitigation strategy implementing suitable grouting measures would be required.

As part of the DGS report, a preliminary grouting strategy was developed and was based upon achieving the following residual subsidence parameters:

- Subsidence < 100mm
- Tilt < 3mm/ m
- Curvature < 0.2km - 1

- Horizontal Strain < 2mm/ m (over 10m)
< 0.5mm/ m (over length of structure of 40m)

Subsidence Advisory NSW (SA NSW) confirmed that, if the above subsidence parameters were achieved with the implementation of a grouting strategy, then they would have no objections to the proposed development as it is proposed i.e. with the basement carpark as documented, on the condition that structural design and detailing of the building of the building was completed by a suitable qualified structural engineer to ensure that the impact of a potential subsidence event on the building would be minor, localised and readily repairable.

Notwithstanding the above, Northrop advised SA NSW that, on behalf of our client, we would like to carry out investigations into the condition of the existing mine workings by drilling a number of bore holes to the workings with the endeavour to confirm whether or not the pillars have already collapsed.

DGS tabled a preliminary investigation strategy that included drilling a minimum of 5 boreholes to the workings with an additional two boreholes potentially required, pending findings of initial investigations.

This proposal was discussed with SA NSW and they were generally in agreement with the proposed investigation.

Further to the above, DGS advised that if the workings were found to have collapsed, and if this is demonstrated by the investigation works outlined above, then the residual subsidence parameters for the site would likely be similar to those outlined above. i.e. management of damage as a result of subsidence can generally be managed by appropriate detailing of the building e.g. articulation and structural design and detailing by a suitably qualified structural engineer experienced in the design of structures subjected to mine subsidence.

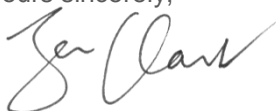
To this end, the following is a summary of what may be considered a suitable course of action with respect to obtaining approval from SA NSW:

1. SA NSW had no objections to the proposed development if a suitable grouting strategy was implemented to appropriately manage the risk of subsidence
2. DGS to confirm details of suitable investigation strategy that will enable assessment of the existing workings i.e. are they still standing, or have they collapsed
3. On the basis that the workings are found to have collapsed, DGS to provide suitable residual subsidence parameters and design criteria. Northrop to review and advise if risk of damage from subsidence can be managed by design
4. If workings are found to not be collapsed sufficiently, DGS to confirm suitable grouting strategy and residual subsidence parameters and design criteria

Conclusion

Based on our review it is expected that the above items can be incorporated at the Development Application phase of the project and should not impact the current footprint of the development.

Yours sincerely,



Ben Clark
Principal | Civil Engineer
BEng (Civil) MIEAust CPEng NER RPEQ

Appendix A

Development Plans and Layouts Supplied

