APPENDIX 13: Summary Assessment of Environmental Effects

SUMMARY ASSESSMENT OF ENVIRONMENTAL EFFECTS

The proposal will give rise to a range of environmental effects. The existing baseline environment and effects resulting from the proposal are summarised beneath the sub-headings which follow. Where relevant, the summary is informed by the specialist reports in the Part 3 Appendices.

Background and Baseline Environment

The subject site is a non-Certificated aerodrome located on the southern periphery of Te Kowhai village. The airfield was established by the late Mr. Max Clear with aviation activities beginning in 1965. Activities were formalised in 1970 when application was made for a specified departure to the Waipa County District Scheme to enable operation of a flying strip. The Waipa County District Scheme came into operation on the 1 November 1973 with the Te Kowhai Airfield shown on Planning Map 2 as a "Community Use".

Te Kowhai aerodrome is accessed off Limmer Road (State Highway 39) via an approximate 300m north-south access leg. The access leg leads to a formed, unmarked car park with capacity for over 60 vehicles. In addition to the car park, existing airside infrastructure includes hangars and an above-ground avgas re-fuelling facility. The re-fuelling facility is owned by BP but operated by the aerodrome on a lease basis.

The four westernmost hangars are used exclusively for aircraft storage. The three easternmost hangars are of an older vintage and are variously used for a combination of aircraft storage, commercial operations, clubrooms, office and workshop purposes.

The site is zoned Rural in the Operative District Plan (ODP). Within the Rural Zone, any activity, other than the exemptions listed in Rule 25.10.1, is a Permitted Activity, providing it complies with all 'effects' and 'building' rules.

The only permitted commercial activity within the Rural Zone is that which complies with conditions for home occupation, which aerodrome activities cannot meet. Additionally, the ODP imposes a limit of 500m^2 GFA for non-residential buildings and a maximum site coverage of 2% of the site area, or 500m^2, whichever is the larger. Activities within the aerodrome site already exceed maximum site coverage and there is potential for commercial buildings (such as additional hangars) to exceed 500m^2. Consequently, the aerodrome's permitted baseline has effectively been reached and almost all forms of building development would trigger a consent requirement.

In December 2016, Waikato District Council approved land use consent for the construction of 2 additional hangars at Te Kowhai aerodrome (Council reference LUC 0263/17). One of the hangars has been constructed towards the western boundary of the airpark and the consent has therefore been given effect. Consent remains in place for a second hangar which has not yet been constructed. Once constructed, the combined hangarage at the aerodrome will increase from 55 aircraft to 70 aircraft.

Vehicular Traffic

Traffic effects are detailed in the Integrated Traffic Assessment (ITA) by Bloxam Burnett and Olliver (BBO), a copy of which is attached as Appendix 3 of this s32 report. The purpose of the ITA was to assess traffic-related effects resulting from rezoning of the aerodrome to 'Airpark' or equivalent. A development concept plan was provided by Te Kowhai Aerodrome in order to inform the traffic assessment. The ITA was then prepared in accordance with Appendix 5C of the NZTA Planning Policy Manual.

The airfield site has an existing access off Limmer Road, which is part of the State Highway network (SH39). Limmer Road became State Highway 39 in 2013 after the opening of the Ngaruawahia Section of the Waikato Expressway, and was upgraded at the time to improve shoulder widths and intersections. Limmer Road intersects with Horotiu Road approximately 800m to the west of the existing airfield access and with Hawksgrip Road approximately 550m to the east of the application site. Based on the crash record there does not appear to be an underlying safety problem with Limmer Road or the Limmer Road/Horotiu Road intersection.

The existing Limmer Road access complies with sight distances found in the NZTA Planning and Policy Manual, but does not comply with separation distances to the nearest access to the west. The existing access is unsealed and has not been designed to accommodate a large volume of traffic. The existing access will need to be upgraded to an intersection to accommodate traffic in the event of airpark development.

An access intersection concept design for the upgraded access is included as Appendix B of the ITA. The location is close to the existing access and will meet requirements for sight distance and intersection separation. The access intersection will not meet requirements for separation from other property accesses for three accesses on Limmer Road. However, BBO has assessed the access design as having negligible effects on these property accesses.

The existing airfield has a trip generation of approximately 30 vehicle movements per day (vpd) with a summer average peak of 40 vpd. Although there is no comparable trip generation data for airparks, an assumption has been made that residential activity will generate trip rates which are typical of apartments and residential lots. The ITA recognises that, due to the unique nature of airpark activity, it is unlikely that hangar apartments will ever be fully occupied during the week. The ITA predicts a worst-case scenario of 50% occupancy for apartments during the week. Based on this rate and the trip generation of the balance of the residential lots as well as airfield activities, the Te Kowhai Airpark could be expected to generate approximately 1798 trips per weekday, and 291 trips per weekday AM and PM peak hour.

Sidra modelling of the airpark intersection shows that it performs well, even using 2041 flows on Limmer Road obtained using a 2% growth rate on surveyed traffic counts. Overall the Airpark access performs well with no movement worse than LoS C, even in the 2042 peak periods with 70% occupancy of the apartments. The LoS on SH39 is not affected with through movements operating at LoS A and turning movements into the Airpark also operating at LoS A, even in the 2042 peak periods.

The results of SIDRA analysis for the Horotiu Road intersection indicate that this intersection currently performs well with the worst movement at LoS B with Airpark traffic. Modelling for future years shows that Horotiu Road intersection operates at LoS C in the year 2042 for the right turn out of Horotiu Road, with a 23.7 second average delay in the PM peak period. This delay is considered acceptable.

SIDRA analysis of the Te Kowhai Road intersection indicates that this intersection currently performs well with the worst movement at LoS B with Airpark traffic. Modelling for future years shows that Te Kowhai Road intersection would operate at LoS C in the year 2042 for the right turn out of Te Kowhai Road, with a 19.8 second average delay in the PM peak period. This delay is considered acceptable.

Based upon the findings of the ITA, and assuming that ITA recommendations are fully implemented at the detailed design stage, traffic effects resulting from rezoning of the aerodrome are considered to be reasonable.

Aircraft Movements

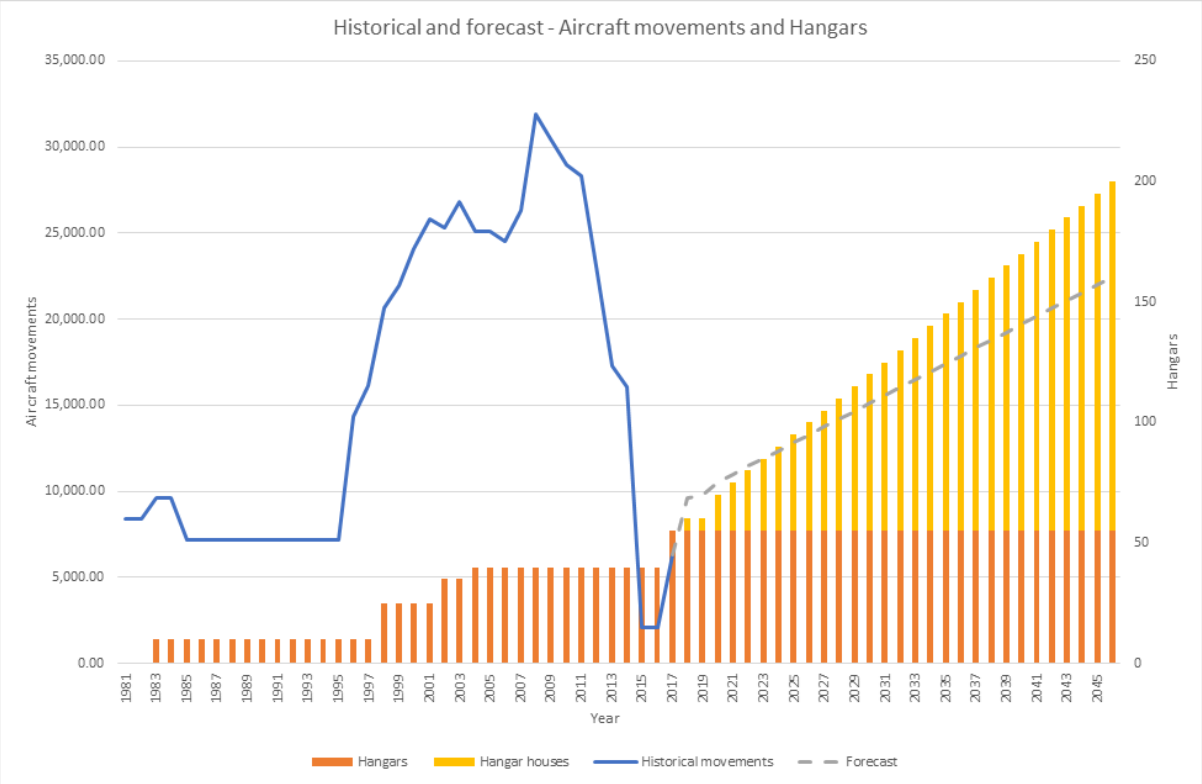
Aircraft movements[1] are dictated by multiple factors including but not limited to, the number of aircraft stored and operated from the aerodrome, the number of visiting aircraft and seasonal conditions.

Currently, the aerodrome provides hangarage for approximately 55 aircraft, with consent for an additional hangar which is yet to be constructed. Once constructed, that will increase hangarage capacity to 70 aircraft. Based upon the proposed performance standards for Precincts C and D, the airpark would have estimated capacity for approximately 130 sections. If all dwellings and apartments were designed with hangars, this would equate to an additional 130 aircraft. Combined with the aircraft already hangered on site, this would mean that the total number of aircraft stored and operated from the aerodrome could be in the region of 200.

As noted, aircraft movements are partially dictated by seasonal conditions with peak usage typically between November and March over summer months. Aircraft movements then decline to a low point in mid-winter until improved spring conditions lend themselves to flying. TKA data indicates that, on average, hangered aircraft move one cycle (i.e. one take off, one landing) once every two weeks.

The graph below provides an overview of historic aircraft movement for Te Kowhai aerodrome between 1981 and 2017, as provided by TKA. It indicates that movements increased steadily from approximately 6,000 movements in the 1980s to the mid-1990s until it reached a peak of approximately 32,000 movements in 2007. The peak period between 1998 and 2007 coincided with microlight production, pilot training and the construction of additional hangars. Between 2007 and 2015 movement numbers declined sharply to approximately 2,000 movements, due in part to the illness and eventual death of Max Clear in 2012.

[1] Aircraft arrival = 1 movement. Aircraft departure = 1 movement.



Te Kowhai Aerodrome Aircraft Movements: Historic and Predicted

Aircraft movements increased following a change in ownership and the construction of additional hangars in 2016. Data provided by TKA confirms that there were 6323 movements in 2017, inclusive of 'aerodrome based' and 'visiting' aircraft. Of those, approximately 55% of the movements were from visiting aircraft, and 45% from aerodrome-based aircraft. The combined total equates to approximately 17 movements per day, a level comparable to the 1980s and early 1990s.

Aircraft movements will inevitably increase as a result of airpark development. Based upon historic and current data, TKA projects that hangarage of 200 aircraft has the potential to generate in the region of 21,000 aircraft movements per annum, equating to an average of 57 movements per day. Although the increase may be notable, relative to the status quo, it is significantly less than the peak movements experienced in the early 2000's. In practical terms, there is no guarantee that the airpark would reach full capacity and therefore the projected 21,000 movements represents a conservative scenario.

Service Infrastructure

Rezoning of the aerodrome to 'Airpark' or equivalent has the potential to give rise to multi-lot subdivision and development and essential services would be necessary to support any such development. At present, Council reticulated services are not available for the aerodrome site. Therefore, airpark development would be reliant upon self-contained essential services until such times as Council reticulated services were available in the locality.

Water, wastewater and stormwater considerations have been addressed in the 'Te Kowhai Airfield Development 3 Waters Feasibility Report' by Holmes Consulting Ltd ('3 Waters Report'). A copy of the 3 Waters Report is attached as Appendix 5 of the s32 report with a summary provided as follows.

Wastewater

The 3 Waters Report provides a breakdown of wastewater production relative to anticipated activities within the airpark precincts. It predicts that peak day total wastewater production is expected to be in the order of 70,000 litres.

The 3 Waters Report considers the feasibility of a number of options for wastewater treatment and disposal. Neither a conventional gravity sewer nor a Septic Tank Effluent Pumping (STEP) system were considered viable due to cost and general disruption. Instead, an on-site treatment and disposal system was shown to be the most feasible.

Treatment options considered by the 3 Waters Report included Recirculating Textile Packed Bed Reactors (PBR), Submerged Aerated Filtration (SAF), Sequencing Batch Reactor (SBR) and Membrane Bioreactors (MBR).

Due to low OPEX costs and the potential for staged installation, a PBR is considered the preferred treatment method. PBRs have a proven history of being able to achieve secondary treatment standards of <20 mg/ltr BOD5 and TSS, with total nitrogen to meet the permitted activity threshold of <150 kgN/ha/year, averaged across the development. A STEP system or pressurised sewer is shown to be acceptable to convey such flows.

Dispersal into or onto land, including land treatment, is feasible in a number of ways, including drip irrigation, infiltration trenches or beds, mounds or surface irrigation. The method of disposal is determined by the soils on the site and the sensitivity of the receiving environment. The two main disposal options considered feasible for the TKA development are drip irrigation and traditional trench disposal.

With winter groundwater levels close to current surface both disposal options will require modification of the existing ground to achieve the required minimum 0.6 m unsaturated soil below and thereby achieve appropriate levels of treatment prior to effluent entering the water table. This is achievable by scarifying/ploughing the existing ground surface and then placing suitable fill prior to placement of dripline or pipe.

Overall, based on the 3 Waters Report, the onsite treatment and disposal of wastewater is deemed an appropriate and feasible solution to support airpark development. Environment Waikato effluent quality standards are expected to be achievable through use of a Packed Bed Reactor or similar. To comply with AS/NZS1547:2012 effluent dispersal will require the placement of suitable fill material to ensure suitable ground water separation and this is expected to be achievable.

Stormwater

As noted, the subject site does not have close access to a council reticulated stormwater network and, given the distance involved, direct discharge to a waterway is not considered feasible. The most appropriate method of disposal is therefore direct

soakage to ground via engineered soak pit/s in accordance with E1 of the Building Code.

It is noted that groundwater levels are at or near the surface in places during winter, and therefore ground soakage will not be possible at all times. Additional stormwater control measures are likely to be required at this site including using proposed rainwater tanks and ponding to attenuate stormwater flows.

Water

Neither Te Kowhai village nor the aerodrome currently have reticulated water. Therefore, the airpark concept is dependent upon roof collection and stormwater recycling to meet potable and firefighting needs. Roof collection is considered viable due to the large roof coverage associated with hangars in Precincts B and C. Development within Precinct D is akin to conventional rural residential development, which typically relies upon roof runoff in order to meet domestic needs.

Archaeology and Heritage

Development of the aerodrome would necessitate soil disturbance, and this has the potential to affect sites of archaeological or cultural significance.

A review of the New Zealand Archaeological Association database confirms that there are no recorded archaeological sites within the proposed airpark site. This aligns with the Waikato District Plan, which does not indicate the site as being affected by sites of archaeological or cultural significance.

Regard has been had to the '*Waikato District Plan Review Archaeological Heritage Project - Phase IV*' by Dr Alexy Simmons (November 2016). The Simmons report confirms that no archaeological sites are recorded in Te Kowhai and no pre-1900 buildings are recorded in the town centre. On the basis of currently available information, and given the modified nature of the existing airfield, the probability of the airpark containing sites of archaeological or cultural significance is considered low.

Waikato Tainui has been consulted as part of the rezoning proposal and feedback to date confirms that there are no known sites of archaeological or cultural significance which could be impacted by airpark development. Waikato Tainui has, however, encouraged the use of indigenous story telling as part of the airpark's detailed design process.

On the above basis, potential impacts upon archaeological and heritage values are considered to be less than minor.

Landscape and Visual Effects

Rezoning of the aerodrome to 'Airpark' or equivalent can be expected to facilitate intensified development (relative to the status quo), and therefore impacts upon existing landscape and visual amenity values will be notable.

Landscape and visual effects have been considered in a 'Landscape and Visual Effects Assessment' (LVA) by Boffa Miskell Consultants dated April 2018. The LVA considers the existing landscape characteristics of the site and gauges the impact of visual change

caused by development of an airpark. A copy of the LVA is attached as Appendix 2 of this s32 report.

Although part of the aerodrome site is used as an airfield, the majority of the land holding is currently used for stock grazing or crop cultivation. As such, the character of the site is largely consistent with that of the wider rural landscape. In this regard, the proposal will result in an intensification of the site's current use and will result in the site having a more urbanised character overall. This is inevitable as the characteristic open fields are replaced with new development, and will result in an overall reduction in the ratio of open space to development.

In considering the susceptibility of the landscape to change, the aerodrome site is generally flat and forms part of a network of open fields, interspersed with hedges and sporadic boundary planting. The LVA notes that this type of landscape is generally more conducive to absorbing change. Further, the existing hangar complex is well integrated into the wider landscape to the extent that it is not especially prominent or noticeable from any public view point.

A combination of topography and screening provided by above ground features means that overall, the wider landscape has a relatively low susceptibility to change. Notwithstanding that, the susceptibility of the landscape to change will be more pronounced on Limmer Road due to the proximity of the aerodrome to SH39 and the sporadic public views along that corridor.

To assist with mitigating that effect, the airpark concept promotes the internalising of higher density development and the placement of larger lot sizes on the southern boundary of the site on the interface with SH39. Whilst these measures will not eliminate a perceived urbanisation of Te Kowhai village when viewed from the south, nor will it significantly affect the relationship between the village and the wider rural landscape. In contrast, the landscape context is less affected when viewed from the north and west of the aerodrome because only fleeting views are available from Te Kowhai Road and Horotiu Road. There is also greater separation between the aerodrome and public roads in these locations.

The importance of the airpark's integration with Te Kowhai village is an important landscape consideration. Recognising that, the airpark concept includes scope for future connectivity with Te Kowhai village via a footpath on the western boundary. Although implementation of the footpath is contingent upon future landowner support, the provision is consistent with the general objectives for improving walking opportunities at Te Kowhai, as identified in the Ngaruawahia Structure Plan and the Te Kowhai Community Plan. Connectivity with the village is considered important to ensure that the airpark functions as part of the existing community, rather than as a 'satellite' private community.

A detailed assessment of visual effects (visual amenity) is provided in section 7 of the LVA and is summarised in the table below.

Viewing Audience	Viewpoint Number	Effects During Construction	Effects Following Completion (Including Establishment of Boundary Planting)
Road users Te Kowhai Road	1	Low Adverse	Very Low Adverse
Residents to the north east of the site	2	Up to Moderate-High Adverse	Up to Moderate Adverse
Residents to the north of the site (No. 703B Te Kowhai Road)	3	Moderate Adverse	Low to Moderate Adverse
Road users Horotiu road	4	Very Low Adverse	Very Low Benign
Residents to the west of the site	5	Up to Moderate-High Adverse	Moderate-Low Adverse
Road users Limmer Road 'west' (SH39)	6	Low Adverse	Low to Very Low Adverse
Residents to the south of the site	7	Up to Moderate Adverse	Up to Moderate-Low Adverse
Road users Limmer Road 'middle' (SH39)	8	Moderate-Low Adverse	Low Adverse
Road users Limmer Road 'east' (SH39)	9	Low Adverse	Low to Very Low Adverse
Residents to the east of the site	10	Low Adverse	Low to Very Low Adverse

The assessment demonstrates that audiences immediately to the north-east, west and south of the site would be most affected by future development. Relative to their current outlook, these locations could experience up to moderate-high adverse effects on amenity values during construction. This is largely because their outlook will change from an open, rural environment to a more urbanised form.

Post-construction effects on visual amenity are expected to range from 'very low benign' to 'moderate adverse'. Improvements to visual amenity will result from the establishment of perimeter vegetation which is a requirement of the airpark subdivision process. Once established, the perimeter vegetation will assist with the

absorption capability of the landscape, as will the individual landscaping which is likely to result from large lot development within Precinct D.

The LVA demonstrates that, in general, effects on public views will be limited. This is helped by the separation distance between the airpark site and any notable public viewing areas (primarily confined to Te Kowhai, Horotiu and Limmer Road).

The placement of larger residential lots around the periphery of the development, and the provision for boundary planting is expected to assist in the visual integration of the development with the landscape. As a result of that, and the lack of viewing opportunities more generally, adverse effects on public amenity values are expected to be no greater than 'moderate-low' during construction and 'low' following the airpark's completion.

The LVA concludes that, as a result of the existing runway and associated aviation infrastructure, Te Kowhai is a logical location for an airpark development. The conclusion takes into account the scale of the wider agricultural landscape and the lack of scheduled areas or sensitive viewing audiences.

Noise and Acoustic Considerations

Noise and acoustic considerations have been addressed by Rhys Hegley of Hegley Acoustics Ltd. A copy of the Acoustic Assessment is attached as Appendix 4 of this report.

The Acoustic Assessment distinguishes between noise effects from aircraft arrivals and departures, noise from taxiing aircraft and noise from on-site commercial activity. The former is managed through NZS 6805 and NZS 6807 and noise management provisions for arrivals and take off are already in place in the form of the Te Kowhai Air Noise Boundary (ANB) and Outer Control Boundary (OCB). The management provided by the ANB means that aircraft arrivals and departures are not subject to the noise rules of the Proposed District Plan.

The Acoustic Assessment considered noise from taxiing aircraft on nine potentially sensitive receivers who adjoin the aerodrome site. Three of these receivers were considered too far removed from the proposed Airpark to be unreasonably affected by taxiing noise. Five of the remaining receivers are supportive of the proposed airpark and have provided written support to the proposal. As a result of that support, the acoustic effects of the proposal on those properties has not been considered further.

With respect to one landowner (176 Limmer Road), the Acoustic Assessment identified that, if written support were not available at the time of airpark development, noise mitigation would be required in the form of an acoustic barrier. If required, the barrier will need to be constructed from a material with a surface density of 10kg/m^2 or greater.

Consideration has been had to the correlation between taxing noise and permissible aircraft movements. The noise that each of the surrounding houses would experience from taxiing aircraft would depend upon the type and numbers of aircraft using the

taxiway, the latter being influenced by externalities such as time of year and weather. In order to determine whether perimeter taxiing can operate within the allowable noise limits of the Proposed District Plan, the Acoustic Assessment modelled noise from both 'typical' and a 'noisy' aircraft which are known to use the aerodrome at present.

Table 4 of the Acoustic Assessment illustrates the range of permissible aircraft movement in any 15 minute period and over the course of the day, relative to adjoining sensitive receivers. For typical General Aviation aircraft (such as the Cessna 172), the range of aircraft movements was shown to vary between 17 movements per 15 minute period and 220 movements total, to 194 movements per 15 minute period and 724 movements. For noisier aircraft (such as the Yakovlev YAK), the range of aircraft movement was shown to vary between 2 movements per 15 minute period and 9 movements total[2], to 27 movements per 15 minute period and 103 movements total. It is reasonable to assume that, in reality, these numbers would not be reached because aircraft movement is typically spread throughout a day, is weather and seasonally dependent. Additionally, it does not follow that all sections within the airpark would be permanently occupied or that all pilots would choose to fly at the same time.

The Acoustic Assessment demonstrates that, with proposed mitigation in place, and factoring in the written approvals provided by a number of adjacent landowners, it will be practicable for Te Kowhai Airpark to operate in an unencumbered manner with regards to perimeter taxiways.

Activities within the proposed commercial precinct (Precinct B) are assessed as being nominally 360m from the closest existing dwelling and at least 100m from future development to the north of the runway. As a result of this, combined with the fact that activities will be screened by intervening buildings, noise from commercial activities are expected to readily comply with District Plan noise rules.

Notwithstanding predicted compliance with regards noise to notional boundaries, the Acoustic Assessment recognises the potential for future dwellings to be constructed in proximity to the airpark site, particularly on the northern boundary which is (in part) a Deferred Village Zone under the PDP. There is potential for new buildings erected in proximity of the airpark to receive noise levels above those experienced by existing dwellings. The Acoustic Assessment recommends a 55m 'buffer zone' to manage the construction of new dwellings and to minimise reverse sensitivity risk. Rather than prohibit residential construction within that 'airpark buffer zone', the assessment recommends that new dwellings are designed to meet reasonable acoustic standards. Rules to this effect are proposed in Appendix 9 of this s32 report.

In addition to the above, the Acoustic Assessment includes recommended operational controls which to assist in the management of noise to reasonable levels. This includes but is not limited to the following:

a) Aircraft should not idle beyond standard start up procedures or be run up in any area other than Precinct A or Precinct B;

[2] Upper limits for 176 Limmer Road with acoustic fencing in place.

b) There should be no night time taxiing. Any aircraft that arrive at Te Kowhai between 10.00pm and 7.00am the following day should park outside of the airport hangars or on the apron outside of the existing terminal building; and

c) In precinct C, only microlight or GA aircraft of up to 6 seats should use the boundary carriageway.

Future Proofing and OLS Changes

The proposal includes a proposed change to Te Kowhai aerodrome's Obstacle Limitation Surfaces (OLS). The existing approach surface OLS is a truncated fan originating from a 45m wide base centred at both ends of the runway strip[3]. The approach surface extends either side of the extended centre line of the runway strip for a horizontal distance of 1200m (1.2km) at a gradient of 1 vertical to 20 horizontal (1:20). The sides of the approach surface splay outwards at a rate of 1 vertical to 20 horizontal. The existing transitional side surface OLS rise upwards and outwards from the sides of each approach surface at a gradient of 1 vertical to 4 horizontal (1:4) to a height of 28.5m above Moturiki Datum.

The proposed change to the OLS is driven by sustainability considerations and TKA's desire to future proof the aerodrome to meet the long-term needs of the aviation community. That includes the ability to operate on an IRF basis, which is becoming increasingly available due to technological advances in navigation. Importantly, the proposed airpark development and the change in OLS are complimentary but are not dependent upon each other.

TKA commissioned a preliminary assessment from Astral Limited (aviation consultants) in November 2017 and a follow-up report in April 2018. OLS advice was sought to enable the protection of the airfield's flight path and runway areas to improve safety, to allow for enhanced aircraft operations and to facilitate development of a proposed airpark.

Aerodromes in New Zealand are regulated by the Civil Aviation Authority of New Zealand (CAA), with regulation being almost exclusively safety focussed. The CAA has extensive aerodrome design, operation and compliance rules and standards for "certificated[4]" aerodromes. Although there are significantly lesser standards for "non-certificated" aerodromes (such as Te Kowhai), the Director of the CAA can determine aerodromes to be a "Qualifying Aerodrome" in the event of specified activity or development triggers (e.g. if there is a significant change in the aerodrome's physical characteristics).

[3] Runway strip is a defined area including the runway, that is intended to reduce the risk of damage to an aircraft running off the runway and to provide obstacle protection for aircraft flying over the runway strip during take off or landing operations

[4] Certificated" in this context means an aerodrome certificated by the CAA under CAA Rule Part 139, which is a requirement for all aerodromes receiving regular air transport operations by aircraft with 30 or more passenger seats.

The November 2017 Astral report identified CAA requirements with respect to long term development of the airfield. The assessment considered existing and proposed aircraft design categorisation as well as required OLS and dimensional specification required to support IFR capabilities. The three design options considered provided the following outcomes:

- Option A - Day/ night[5] / IFR, Non-air transport Code 1A+ (18m maximum wing span) and Air Transport Day VFR only Code 1A+ (18m ma wing span');
- Option B – Day VFR only, Non-air transport Code 1A (14.99m max wing span); and
- Option C – Day / night / IFR Non-air Transport Code 2A+ (18m max wing span) **and** Air Transport Day VFR only Code 1A+ (18m max wing span)

Astral Consultant's recommended design code for the Te Kowhai facility is Code 1A+ (the plus being an allowance for a wing span of up to 18m compared to the normal 14.99m maximum for Code A). The report recommends designing Te Kowhai to accommodate IFR operations by Code 1 non-air transport aircraft because developments in satellite-based navigation are expected within the next 10 years in New Zealand, and this will permit IFR approaches to aerodromes without ground-based navigation aids. The report notes that this is already happening in the USA and Europe, and New Zealand will follow suite as technology becomes more widely available.

In order to provide for IFR and Code 1A compliance, it will be necessary to amend the dimensions of Te Kowhai's existing runway strip as well as the existing OLS. The OLS and the runway strip width are inextricably linked because the OLS surface originates from the sides and end of the runway strip.

Compliance with Code 1A and IFR requirements will require the following physical changes:

(a) A separation of 30m between the ends of the runway and ends of the strip ("strip ends"). Although there is no proposed increase to the length of the runway, the runway strip *width* will increase to 60m.
(b) The approach surface OLS will change to a 1:40 gradient and extend for a distance of 2500m from the ends of the runway strip.
(c) The side splays of the approach surface OLS will change from a rate of 1:20 to a rate of 1:10.
(d) The transitional side surface will change from 1:4 to a 1:5 gradient to a height of approximately 10m above the runway level, then vertical to a height of 45m.
(e) An inner horizontal surface is introduced at a height of 45m extending outwards 2500m from the runway centreline and strip ends.

Comparisons showing the existing and proposed OLS footprint are attached as Appendix 12 of the section 32 report. The dimensional changes to the OLS will result in a larger OLS footprint, and therefore a larger number of landowners potentially affected by OLS limitations.

[5] 'Night' certification is a bi-product of IFR compliance.

Survey data from Bloxam Burnett and Olliver indicates that, with the exception of one streetlamp on Horotiu Road, no existing buildings or structures will be affected by the proposed OLS change. However, multiple landowners have trees which project into the proposed OLS and therefore the aerodrome operators will need to liaise with those landowners regarding the trimming or removal of trees for CAA compliance purposes. Although tree removal has the potential to affect landowner amenity values, none of the trees affected by the OLS change is listed in the District Plan as being significant or protected. Nor are any of the landholdings affected by the OLS change identified in the District Plan as being significant landscapes.

The proposed OLS change has the potential to impose more stringent set-back and building height limits for properties in immediate proximity to the runway. These effects are generally considered minor for Rural Zoned properties beneath the approach surface OLS because landholdings adjoining the western and eastern ends of the runway have already been developed for rural residential purposes and therefore have limited, if any, future residential development potential.

Further afield beneath the eastern approach, the proposed OLS will impose a height restriction on the 'Gatenby' and 'Ranby' properties which is lower than the current permitted height in the Rural Zone. Plans which illustrate the impact of the OLS on these properties are included as Appendix 12 of this report. In practical terms, the impact of the height restriction on these properties is considered minor because both properties already accommodate rural residential dwellings and therefore have limited, if any, residential development potential under the PDP. Regardless, the OLS would still permit single storey structures on parts of the Gatenby property and throughout all of the Ranby property.

Consideration has also been had to the impact of the OLS change on the development potential of properties which are zoned Deferred Village under the PDP. This primarily affects adjoining properties on the northern boundary of the runway ('Stead' and 'Davis' properties) and the 'Metcalfe' property beneath the western approach OLS. Plans which illustrate the impact of the OLS on these properties are included as Appendix 12 of this report.

Plans for the Metcalfe property illustrate that, generally, the available development height provided for under the revised OLS is greater than the permitted height limit for in the Village Zone (i.e. there would be limited effect with regards future development potential). Notwithstanding that, the undulating topography of the Metcalfe property means that approximately 1% of that site would have a height restriction marginally lower than that permitted by the Village Zone. TKA is in ongoing consultation with that property owner to establish what mitigation, if any, would be required to ensure compliance with OLS. Although development potential on the Metcalfe property is generally unaffected by the OLS, multiple trees would require trimming or removal. Again, this is the subject of ongoing consultation between the landowner and TKA.

Like the 'Metcalfe' property, the 'Stead' and 'Davis' properties have future development potential because of their Deferred Village status under the PDP. TKA has undertaken setback modelling to understand the implications of the OLS on those properties and those plans are included as Appendix 12 of this report.

Factoring in the implications of the Air Noise Boundary and the setback / height requirements for the future Village Zone, the plans demonstrate that the OLS change would not unduly limit the future development potential of any of these properties; this is despite increased setbacks being required for 2 storey development on the 'Sam' and 'Davis' properties and increased setbacks being required for single storey development on the 'Stead' property. TKA is in ongoing consultation with these neighbours to ensure that development potential is not unnecessarily compromised.

From a practical point of view, it is considered likely that future development of these properties would be set back in excess of OLS and District Plan requirements. This is because locating development within 1.5m of the airstrip's northern boundary would result in encroachments of the Air Noise Boundary and thus poor amenity outcomes. Additionally, some of these landowners have requested aircraft access from the (future) Village zone directly onto the runway strip. That would enable maximised use of the runway facility by adjoining landowners with dwellings being located some distance from the strip's northern boundary. Additionally, although two storey development requires a greater OLS setback, the building typology for Te Kowhai is predominantly single storey for both market and economic reasons.

The proposed OLS change will also give rise to beneficial effects for the aviation community. The airspace created by the OLS enables IFR activity and use of the airstrip beyond current VFR limitations. The OLS will result in a safer airspace for pilots on the approaches to and from the runway. The flexibility provided by IFR compliance gives Te Kowhai aerodrome wider operational options, therefore benefitting the sustainability of the aerodrome. By maximising use of an existing resource, it avoids the duplication of facilities in greenfield locations, which would come at a significantly higher environmental and economic cost.