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# Motueka Aerodrome OLS

**Report to Daniel & Fran Huelsmeyer**

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28 October 2021

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# 1. Motueka Aerodrome

Motueka aerodrome is a non-certificated aerodrome operated by the Tasman District Council located southwest of Motueka township. The aerodrome has one sealed and one grass runway which are parallel to each other designated as 02 and 20 vectors.

The sealed runway is 781m x 12m contained within an 811m x 30m runway strip<sup>1</sup>. A 30m starter extension<sup>2</sup> is provided at the beginning of sealed runway 02. The grass runway strip is designated as 733m x 30m, with no defined runway so the whole area is available for aircraft operations.

The aerodrome is on a block of land which has two roads running across both runway ends; Queen Victoria Street at the 20 threshold and College Street at the 02 threshold. The aerodrome is located at an elevation<sup>3</sup> of 38 feet with runway 02 threshold at 38 feet and runway 20 threshold at 32 feet.

Motueka Aerodrome operates with the designator NZMK and is published in the Aeronautical Information Publication New Zealand<sup>4</sup> (AIPNZ). The AIPNZ details as attached as Appendix A.

The aerodrome has no lighting or instrument approaches published and appears to be designated as a day, Visual Flight Rules (VFR) aerodrome. This is supported by the AIPNZ Motueka published operational data.

As such the applicable obstacle limitation surface (OLS) for the aerodrome operations should be published in the appropriate local authority planning documents e.g., District Plan. In this case the Tasman District Council has published the OLS in the Tasman Resource Management Plan (TRMP) dated 14 July 2018.

The TRMP has published an OLS for both Motueka Airport and Takaka Airport. The Motueka Airport OLS is detailed in Schedule 16.11A using a protection level different to the day, VFR runway OLS which the aerodrome operates at. The TRMP OLS is set at 1:50 which is normally applied to an international airport with aircraft operations requiring a runway much longer than Motueka currently has.

# 2. Civil Aviation System

New Zealand Civil Aviation Rule (CAR) Part 139 prescribes the rules governing the certification and operation of aerodromes. These rules are set and issued by the Minister of Transport. They are aligned with the International Civil Aviation Organisation (ICAO) Standards and Recommended Practices (SARPs) as New Zealand is a signatory to the Convention on International Civil Aviation.

The Civil Aviation Authority of New Zealand (CAA) has a role to see that aviation participants meet the standards set by the Minister of Transport. They also provide oversight, guidance and education on aviation safety.

In regard to aerodromes the requirement for certification is set out in CAR Part 139 and relates to an aerodrome with regular air transport operations over 30 passenger seats or an aerodrome required to be certified by the Director following an aeronautical study.<sup>5</sup>

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<sup>1</sup> Runway strip means a defined area including the runway, and stopway (if a stopway is provided), that is intended—  
(1) to reduce the risk of damage to an aircraft running off the runway; and  
(2) to provide obstacle protection for aircraft flying over the runway strip during take off or landing operations:

<sup>2</sup> A Runway starter extension means an additional runway length made available for take-off, prior to the normal runway end at the commencement of the take-off run. CAA AC139-6

<sup>3</sup> Elevation: The vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level.

<sup>4</sup> The AIPNZ is a publication issued by CAANZ containing aeronautical information essential to air navigation.

<sup>5</sup> Civil Aviation Rule Part 139: 1 December 2020

Certified aerodromes must obtain a Part 139 Aerodrome Certificate issued by the Director of Civil Aviation, comply with CAR Part 139 requirements and are subject to regular surveillance oversight by the CAANZ.

Motueka does not meet either criteria for Part 139 certification, and as such is a non-certificated aerodrome.

Non-certificated aerodromes do have to meet CAR 139.503 regarding unsafe conditions, and CAR 139.505 regarding traffic volume reporting, these are the only mandatory CARs for such aerodromes.

The CAA publishes Advisory Circulars<sup>6</sup> which can contain:

1. Information about standards, practices, and procedures that the Director has found to be an **acceptable means of compliance** with the associated rules and legislation.

*These are when a rule specially stipulates that some information or process must be “acceptable” to the Director. An example is CAR 139.51(d)(2).*

2. Guidance material generally including **guidance** on best practice as well as guidance to facilitate compliance with the rule requirements. However, guidance material must not be regarded itself as an acceptable means of compliance.

3. **Technical information** that is relevant to the rule standards or requirements.

*Advisory circulars reflect the Director’s view on the rules and legislation. They express CAA policy on the relevant matter. They are not intended to be definitive. Consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate advisory circular. Should there be any inconsistency between this information and the rules or legislation, the rules and legislation take precedence.*

The CAA has published two Advisory Circulars pertinent to an obstacle limitation surface:

1. AC139-6 Aerodrome Design Requirements:
  - All Aeroplanes Conducting Air Transport Operations
  - All Aeroplanes above 5700 kg MCTOW
2. AC139-7 Aerodrome Standards and Requirements - Aeroplanes at or below 5700 kg MCTOW Non Air Transport Operations

Based on the published data in the AIPNZ, Motueka Aerodrome should be adhering to CAA AC139-7 guidance material to ensure aircraft safety and publish appropriate aerodrome information.

CAA AC 139-7 provides guidance material for:

- the operation of aerodromes serving aeroplanes at or below 5700 kg MCTOW on non air transport operations; and
- the operation of aeroplanes at or below 5700 kg MCTOW on non air transport operations to facilitate compliance with the use of aerodrome requirements under CAR Part 91.

The published information in the AIPNZ allows a pilot to meet their rule requirements under CAR 91.127 regarding the use of an aerodrome in particular CAR 91.127(a):

*(a) No person may use any place as an aerodrome unless that place is suitable for the purpose of taking off or landing of the aircraft concerned.*

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<sup>6</sup> Civil Aviation Authority Advisory Circular AC139-6; 9 August 2016

## 3. Obstacle Limitation Surfaces

### 3.1. OLS and operating distances

CAA AC139-7 defines a OLS as defined areas about and above an aerodrome intended for the protection of aircraft in the vicinity of an aerodrome.

The purpose of the defined areas is detailed by the ICAO in Annex 14 to the Convention on International Civil Aviation as:

#### CHAPTER 4. OBSTACLE RESTRICTION AND REMOVAL<sup>7</sup>

*Note 1. — The objectives of the specifications in this chapter are to define the airspace around aerodromes to be maintained free from obstacles so as to permit the intended aeroplane operations at the aerodromes to be conducted safely and to prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes. This is achieved by establishing a series of obstacle limitation surfaces that define the limits to which objects may project into the airspace.*

A **runway** is the defined and prepared area for aircraft landing and takeoff.

A **runway strip** means a defined area including the runway that is intended to protect an aircraft running off the runway and provides obstacle protection for aircraft flying over the runway strip.

The OLS is assessed along with the runway width and length as well as the runway strip area to determine the aerodrome declared distances<sup>8</sup>:

- a) take-off run available
- b) take-off distance available
- c) accelerate-stop distance available
- d) landing distance available.

These distances are published in the AIPNZ and are what the pilot uses to determine if they can operate at that aerodrome or not based on the aircraft performance and capability. See Appendix A AIPNZ Operational data page.

The CAA AC139-6 diagram of declared distances is shown in Appendix B.

The OLS commences from the runway strip which at Motueka needs to be 10 metres from the end of the runway. The runway end can be moved to avoid any obstacle in the OLS to ensure it is clear. The location where the OLS is clear on the runway becomes the new runway strip location and the associated threshold is now displaced. At Motueka this is located 10 metres in from the identified OLS Runway Strip.

A displaced threshold is often some distance from the end of the sealed portion of the runway.

The OLS defined end of the runway will be where the OLS slope is clear of obstacles and can be well before the end of the sealed portion of the runway.

**An object or structure will only pose a risk or hazard to the aerodrome operation if it penetrates the current operational OLS.**

<sup>7</sup> ICAO Annex 14 Aerodromes 8th Edition, July 2018

<sup>8</sup> AC139-6 Section 2.7

Pilots **do not use the OLS** for operational information as the OLS is an aerodrome design parameter that is the input to develop the declared distances that are published in the AIPNZ. Most pilots would never have seen a published OLS.

The OLS is usually published in the local authority district plan for protection of the aerodrome from encroachment of obstacles. A planned OLS not reflecting current operations would normally be based on an Airport Master Plan<sup>9</sup>.

A Master Plan is a specific assessment of the growth potential of the available land and the capacity of the airport's runway system and terminal area to ensure future operations can be undertaken. It is a planning tool to ensure that any adverse impacts on the businesses of the airport and its stakeholders both on and off the airport site are minimal this includes the local community.

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## 3.2. AC139-7 Day Visual Runway OLS

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It should be noted CAA AC139-7 combines the Approach and Take-off surfaces into one OLS assessment, for larger aircraft operations and runways the departure and approach OLS are different as per CAA AC139-6.

The Take-off climb/approach surface as detailed in CAA AC139-7 for the Motueka Aerodrome as a day, VFR runway would be-

The runway should have a take-off climb and approach surface which should:

- a) Rise from the end of the runway strip<sup>10</sup>; and
- b) Be obstacle free above a gradient of 1:20; and
- c) Extend horizontally 1200 m from the inner edge; and
- d) Have sides that are splayed outwards at the rate of 1:20; and
- e) Not turn before 300 m from the inner edge if a turn is necessary.

If the 1:20 gradient rising from the runway strip end does not clear all obstacles, a displaced landing threshold should be marked at the position necessary to ensure that the approach surface clears the obstacles.

In determining that no obstacle penetrates above the approach surface, account should be taken of roads and railways that are in the approach area. If they are present, **a height of 4.5 m** should be allowed for road vehicles.

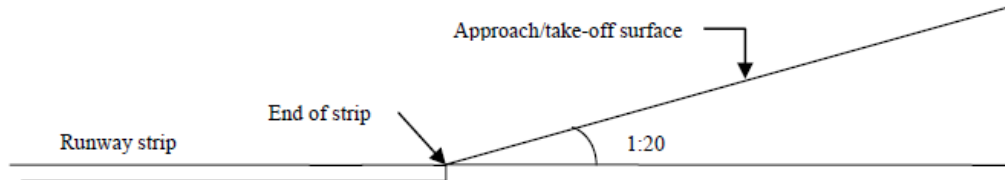
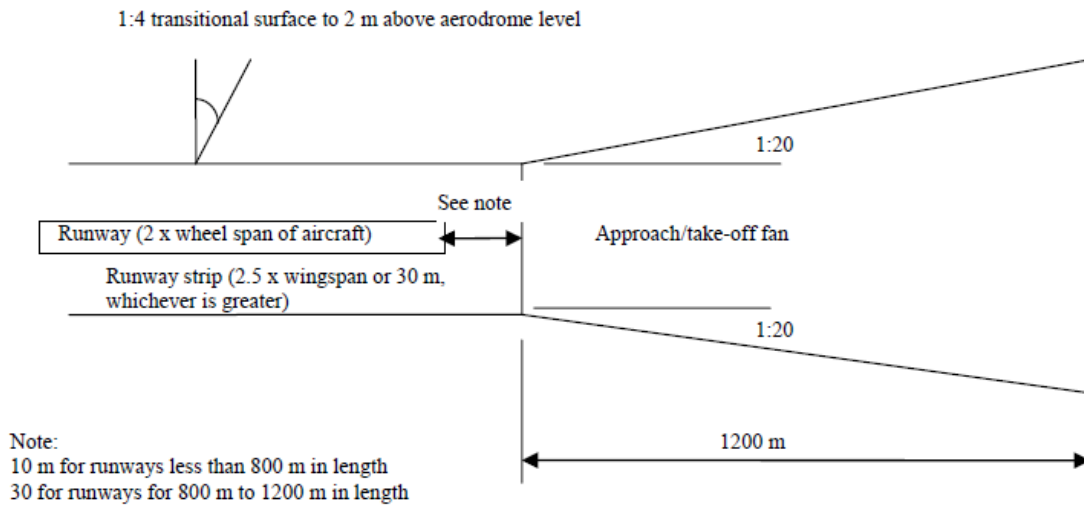
### **Transitional side surface**

The runway strip should have a surface clear of obstructions extending sideways and upwards from the sides of the runway strip and the approach/take-off surfaces. The surface should be at a gradient of 1:4 till it reaches a height of 2 m above the runway strip.

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<sup>9</sup> Airport Master Planning Good Practice Guide February 2017. [www.nzairports.co.nz](http://www.nzairports.co.nz)

<sup>10</sup> The runway strip is beyond the end of the runway.



### CAA CA139-7 Day Visual Runway OLS

Motueka Aerodrome has displaced thresholds for all four runway vectors and therefore an OLS assessment has already taken account of obstacles resulting in the depicted displaced thresholds. The displaced thresholds therefore become the default runway start and end with the runway strip being 10 metres beyond these points.

### 3.3. AC139-7 Night or instrument approach runway

If the runway was to be used at night or an instrument approach was designed and published for the runway the following changes would apply:

- The obstacle free gradient would increase to 1:40; and
- Extend horizontally 1600m; and
- Have sides that are splayed outwards at the rate of 1:10; and
- Not turn before 300 m from the inner edge, if a turn is necessary.

## Transitional surfaces

The transitional surfaces would increase to a gradient of 1:5 to a height of 10 m above the strip.

## Inner horizontal surface

An inner horizontal surface should be provided 45 m above the aerodrome elevation datum out to a distance of 2500 m from the runway centre line and the end of the strip.

## Runway Strip

The runway strip would need to increase to 60 metres wide.

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## 3.4. Published OLS Tasman Resource Management Plan

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The published Tasman District TRMP uses a 1:50 inclination out to 15 kilometres and a 1:6:6 side splay for height provisions that apply. Little detail is provided in the TRMP, and no survey plans have been provided to support the TRMP information.

When questioned on the need for such an OLS the Tasman District Council provided a reply<sup>11</sup> that confirms some points:

- *No instrument flight Rules (IFR) facilities at Motueka Aerodrome.* (I presume this means no instrument flight procedures)
- *Motueka Aerodrome has not reached capacity and its aerodrome designation allows for greater coverage.*
- *Regarding the OLS, Motueka Aerodrome is a refueling point used by aircraft passing by. Quite often when transiting between the North and South Islands. Some of these aircraft are not modern and current OLS allows the older aircraft still to land and take off from this facility.*

(I am not sure what this means as pilots do not use an OLS to operate at an aerodrome and aircraft age has no bearing on operating at an aerodrome, it is the aircraft performance and the aerodrome published operational distances that determine operations).

From analysis of the TRMP it appears the OLS parameters used are for:

1. An Approach runway for a non-precision instrument approach for an international runway or a precision instrument approach runway, being either a Code 3 (1200m up to 1800m) or a Code 4 (1800m and over)<sup>12</sup>.
2. A Take-off runway being either a Code 3 (1200m up to 1800m) or a Code 4 (1800m and over)

The OLS published is therefore for a large runway, at least 1200 metres long with an instrument approach.

There is no supporting data as to why this OLS was chosen especially given that a Code 3 Runway would need to be 30 metres wide (45 metres Code 4) and have an instrument runway strip of 150 metres wide laterally from the centreline being 300 metres in total width with a 60 metre Runway Strip end.

## Vehicles on the road

The TRMP OLS as published starts at the end of the runway strip and does not seem to account for the roads at each end of the runways and the 4.5 metre vehicle height as recommended by the CAA. The vehicle on the road becomes the “controlling obstacle” and would push the OLS start from the end of the runway back down the

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<sup>11</sup> Letter of 27 August 2021 from Barry Dowler, Motueka Ward Councillor, Chair Motueka Aerodrome Advisory Group.

<sup>12</sup> CAA AC139-6 Table 4-1. Dimensions and slopes of obstacle limitation surfaces



runway effectively reducing the runway operational lengths. The current 1:20 seems to have accounted for the road.

### **Operational Impact of a 1:50 OLS**

The current sealed runway is 781 metres, and the grass runway is 733m in length. The operational lengths as published in the AIPNZ seem to have been reduced from those lengths to meet a 1:20 OLS.

If either runway was to change to the 1:50 OLS, used by the TRMP, the runway length would reduce to approximately one third of the current runway operational lengths which would stop most current aircraft movements. To meet the 1:50 with the current aircraft operational length then the runways would need to be lengthened possibly by up to 500 metres. Given the location of existing roads and property boundaries, this is not physically possible.

I do not consider that it is feasible for the Motueka Aerodrome OLS, which is currently 1:20, to be altered to match the 1:50 OLS in the TRMP.

If either runway and supporting infrastructure was altered to provide for night operations or an instrument approach procedure, the applicable OLS would be 1:40. For a night or an instrument runway the Runway Strip would also need to increase to a minimum of 60 metres wide and the runway width may also need to increase.

The implementation of a 1:40 OLS may mean more obstacles have to be accounted for and the runway thresholds moved to reduce the operational runway length by a minimum of 100m at each end. This would still not be as restrictive as the TRMP 1:50 OLS.

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## **3.5. Vehicles**

The Tasman District and the associated Motueka aerodrome roads seem to also be able to have vehicles with high loads up to 5 metres<sup>13</sup>. This height is above the CAA AC139-7 guidance and there seems to be no height limit on the roads at the end of each runway to prevent vehicles above 4.5 metres from operating. If this is the case, then the roads would need to be closed to some vehicles whilst an aircraft is landing.

This currently means Tasman District Council may be allowing penetrations of the current operational 1:20 and therefore creating an aviation safety risk.

## **4. Assessment**

I assessed the Application by Ruru Building Limited for a Resource Consent regarding 54 Green Lane, Motueka<sup>14</sup>.

In Section 5.6 of this application a OLS survey at 1:20 was included and analysed. The survey data<sup>15</sup> appears to be correctly assessed using CAA AC139-7 and plots specific heights on the site. The heights on that survey indicate that at its closest point to the runway, the OLS lowest point will be 10.28m above ground level on the Ruru property and 18.36m above ground level at its furthest point from the runway.

Based on this information and a 1:20 OLS undertaken on the current Motueka Aerodrome layout and thresholds I can confirm any structure or object that is on the property and remains below the OLS 1:20 surface will have no adverse impact, cause a hazard or impact the safe operation of Motueka Aerodrome.

This is based on the survey data and published data in the AIPNZ for Motueka Aerodrome:

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<sup>13</sup> Network Tasman Limited High Load Policy: NTL-E-OP-E001-02 – 1 June 2016

<sup>14</sup> Application for Resource Consent, Operation of industrial activity within the Rural 1 Zone at 54 Green Lane, Motueka 24 August 2021.

<sup>15</sup> Newton Survey – OLS Motueka Aerodrome Drawing To1. 08/07/2021

- NZMK AD 2-51.1 Aerodrome Chart (Effective 22 April 2021)
- NZMK AD 2-52.1 Operational data (Effective 18 July 2019)

I consider that it is not feasible or practical that the current 1:20 OLS will be amended to a gradient that matches the TRMP 1:50.

An amendment to 1:40 might be possible if the Motueka Aerodrome were to provide for night operations or an instrument approach procedure.

A 1:50 OLS in accordance with CAA Advisory Circulars accounting for the road would allow for a structure or object up to approximately 9m at the closest point of the Ruru property to the runway and up to 13m at its furthest point from the runway before it would penetrate the OLS. A 1:40 OLS would be slightly less restrictive.

Any structure or object that is on the property and remains below the OLS 1:40 surface will have no adverse impact, cause a hazard or impact the safe operation of Motueka Aerodrome.

I know of no proposal to seek to change a runway to enable night or instrument approaches. However, if this were to occur, it would result, as observed, in a clearance height of at least 9m at the closest point of the Ruru Property to the runway, increasing from there away from the runway.

## 5. Summary

1. The Motueka Aerodrome operates as a Day, VFR Aerodrome as confirmed by the AIPNZ published data. As such the OLS to support such operations and ensure aviation safety are published in CAA Advisory Circular 139-7 Section 3.2 Day VFR Runway.
2. It appears the current aerodrome operation is to a 1:20 Day, VFR OLS design with all four runway vectors having displaced thresholds consistent with this however this cannot be confirmed from the data provided.
3. The 1:20 operational OLS currently in use provides more than sufficient clearance for the proposed activities on the Ruru Property between 10 and 18 metres across the property.
4. The TRMP has a 1:50 OLS that that protects a higher standard and appears to be for runways at least 50% longer than the current runway, using instrument approaches and operating international services.
5. The TRMP OLS even if to be a 1:50 is incorrect and does not meet CAA Advisory Circular requirements.
6. The TRMP OLS does not have supporting information on why this 1:50 OLS is being protected, does not have supporting protection for a wider and longer runway or runway strip, and does not account for vehicles on both roads that bisect the approaches to both runway vectors.
7. Neither the September 2017<sup>16</sup> nor the 09/01/2020<sup>17</sup> Surveys seem to have included the vehicle on the road assessment required by the CAA accounting for a 4.5 metre vehicle height on the road for approach.
8. If the 1:50 as per the TRMP was implemented the runway length would be reduced by a significant amount resulting in a possible loss of two thirds of the runway length based on a June 2021 survey<sup>18</sup> accounting for a 4.5 metre vehicle.
9. The TRMP OLS is neither feasible nor practical as a plan for future aerodrome development.

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<sup>16</sup> Nikkel Surveying Ltd, Motueka Aerodrome OLS Definition – SEPT 2017

<sup>17</sup> Newton Survey, Motueka Aerodrome OLS Definition and Encroachments – 09/01/2020

<sup>18</sup> Newton Survey, Depiction of approximate runway extent derived from 4.5 metre clearance requirement over adjacent roads. (OLS at 1:50) – June 2021

10. The other OLS that might be adopted by Motueka Aerodrome would be a 1:40 if the aerodrome were to provide for night operations or instrument approach procedures. It would still provide more than sufficient height for the proposed activities on the Ruru Property probably between 9 and 13 metres.
11. If the current operational OLS is to the CAA AC139-7 1:20 and it takes account of a 4.5 metre vehicle with the thresholds displaced accordingly then there is an aviation safety risk as vehicles up to 5 metres are allowed to use the two roads bisecting the approaches.

## 6. Conclusion

I therefore conclude that the proposed activities on the Ruru Property will not pose any risk or hazard to the Motueka Aerodrome operations, nor to any future reasonably possible operations, should night or instrument landing certification be obtained for the runway.

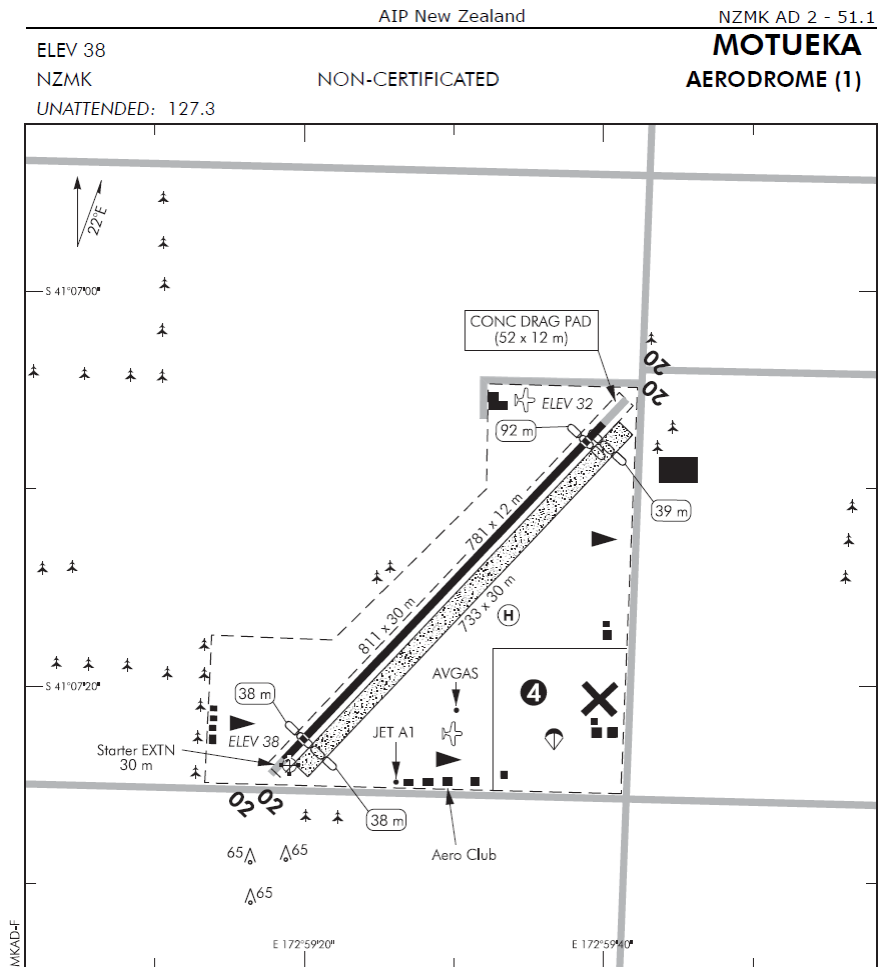
Given the location of the road and accounting for a 4.5 metre vehicle then at 1:40 or even a 1:50 OLS properly designed to CAA Advisory Circular guidance there is no possibility the proposed activities on Ruru property would penetrate the OLS and have any effect on aviation safety.

## 7. Observations

From my review I would suggest the Tasman District Council:

1. Ensure that current Motueka Aerodrome operating OLS is correct and designed in accordance with CAA AC139-7 and that displaced threshold markers are correctly located to avoid obstacles including accounting for a vehicle on the road and the AIPNZ correctly advises pilots as required.
2. Publish the correct day, VFR OLS 1:20 for Motueka Aerodrome for general public to know the height limitations for current operations.
3. Provide the full rationale for protecting Motueka Aerodrome to such a high level of OLS in the TRMP which is not a feasible possibility for the aerodrome. This would include ensuring the published TRMP meets CAANZ guidance.
4. Undertake analysis to ensure any higher OLS for planning is appropriate to the Aerodrome size, future type of operations and be realistic with a supporting Airport Master Plan and be fully consulted with the community.

# Appendix A – Motueka AIPNZ Chart



Changes from 18 JUL 19: Northern Helicopter TLOF removed, aerodrome notes amended.

1. Arrivals are to be in accordance with standard joining procedures; however, pilots should avoid using the overhead join procedure while parachuting is in operation. Joining traffic must remain clear of the overhead until all canopies have landed or join via another procedure.
2. Extensive aircraft training occurs at the airfield and in the surrounding airspace.
3. Simultaneous operations on parallel paved and grass runways prohibited.
4. Parachute landing area. Parachute operations daily.
5. Aerodrome closed periodically to all aircraft, other than approved operators due to drag racing – Refer NOTAM.
6. **CAUTION:** High trees on northern end of runway on approach to RWY 20.  
Mowing of runways and operational areas may take place at any time.  
Large buildings NE of boundary may cause turbulence.  
High trees and power poles on southern end of runway on approach to RWY 02.

(continued)

S 41 07 24 E 172 59 19

**Effective: 22 APR 21**

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**MOTUEKA  
AERODROME (1)**

7. Local Airspace: local operators have a Memorandum of Understanding for the use of the Motueka aerodrome and surrounding airspace. A copy of the MOU may be obtained from the Tasman District Council website at [www.tasman.govt.nz](http://www.tasman.govt.nz).  
All charted routes outside of controlled airspace are aligned with the local operators' MOU for preferred routing to avoid conflicts.

Non-Certificated Aerodrome 1 NM SW of Motueka

**MOTUEKA**

NZMK

**OPERATIONAL DATA**

**RWY**

RWY	SFC	Strength	Gp	Slope	ASDA	Take-off distance			LDG DIST
						1:20	1:30	1:40	
02 <sup>1</sup> 20	B	ESWL 1020	5	0.22D 0.22U	811 781	719 743			743 689
02 20	Gr	TBA	5	0.22D 0.22U	733	694 695			695 694

<sup>1</sup> RWY 02 ASDA/TODA figures include 30 m starter extension.

**LIGHTING**

Nil

**FACILITIES**

Fuel: Z Energy Jet A1, Avgas 100, access via Z card opposite Aero Club

Permanent tie-downs available.

**SUPPLEMENTARY**

Operator: Tasman District Council, Private Bag 4, Richmond 7020  
Tel (03) 543 8400 Fax (03) 543 9524

Available for general use.

Landing fees payable online or via honesty boxes located next to Motueka aero club and next to AVGAS fuel facility.

An automatic recording system for monitoring landings is installed.

Aircraft visitor parking between AVGAS fuel facility and Aero Club.

Helicopter visitor parking between northern boundary and runway.

Please do not land helicopters close to hangars and other aircraft.

# Appendix B – CAANZ Declared Distances

