

**AEROMEDICAL PARAMEDIC RESCUE  
RESPONSE CONCEPT UTILISING FIXED  
WING AIRCRAFT**

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## **Abstract**

The ambulance service based in Invercargill City has a significantly large response area to cover throughout lower Southland and parts of Upper Southland. Owing to the lack of an available rotary wing air ambulance (helicopter) based in Invercargill to respond to remote accidents, measures have been taken to plan for the provision of a 'Fixed Wing Aeromedical Paramedic Response Service' throughout the Southland province to meet this shortfall.

The Fixed Wing concept is integrated into the road based ambulance fleet, the Fire Service rescue response capability and the operations of the peripheral Southland and Otago rural based helicopters. The concept provides the ability to transport Paramedics, medical supplies and specialist Fire Rescue cutting equipment from Invercargill into country landing strips many that are easily accessible by road. The concept is designed so that rescue helicopters from peripheral Southland and Otago locations can still transport patients to hospital along with road ambulance crews. The Fixed Wing aircraft will not transport patients except in exceptional circumstances. The concept also has an operational emergency management focus that can be applied for emergencies or localised disasters where road access is cut off and communities require help with medical or rescue needs.

To establish whether this project was feasible, physical investigations of landing strips marked on Lands and Survey maps were undertaken. A significant number of airstrips

were seen as prime sites to respond aircraft into in relation to the towns or main roads in the area of these strips.

Present ACC Ambulance contracts and CAA regulations allow the utilisation of fixed wing aircraft for emergency use, but currently planes are used only for inter-hospital transfers. The fixed wing response project is economically feasible within operational budgets. It meets a need in provision of experienced Paramedic Crews and Fire Rescue personnel working in an integrated fashion in the Southland area to deal with an accident scene or larger scale emergency event some 45-60 minutes earlier than if crews had responded with road based vehicles.

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## **Introduction**

All the paid staffed ambulance stations in the St. John Ambulance Southern Region have easy access to rotary wing response aircraft (helicopters) except for Invercargill. Invercargill is the second largest ambulance station in the Southern Region by staffing, medical and equipment resources. The lack of a rescue helicopter has arisen owing to the economics of operating a dedicated helicopter from Invercargill Airport is not financially viable. There are an insufficient number of accident or medical emergencies that occur in any one year to justify a helicopter operation presently. Commercial helicopters that could also assist in this role do not work from Invercargill owing to the lack of available commercial work.

As a result when remote or larger than normal accidents occur the lack of a local helicopter to respond from Invercargill delays the arrival of Paramedical Ambulance staff or specialist Fire Rescue equipment at an accident or emergency site.

This problem has led to the development of the fixed wing project, endeavouring to find a solution in speeding up the access to incidents and integrating the role of the Fire and Ambulance Service in a joint venture in the approach to accidents and emergencies.

The only way to see whether the concept was feasible was to initially discuss the concept with the local air operator (Southern Air) who are contracted to fly the air ambulance flights from Stewart Island to Invercargill Airport on a 'fee for service' basis. Southern

Air would have to be able to provide aeroplanes with the ability of landing on grass airstrips that were not designated as controlled airfields.

A number of grass strips are marked on the New Zealand Topographical Land and Survey maps in Southland. Discussions with Southern Air's chief pilot defined the possible appropriate strips for the ambulance service to use.

A physical investigation of landing strips was carried out utilising the GPS co-ordinates of selected strips. Photographs were taken and an over-flight by a fixed wing aircraft of selected airstrips occurred. A dummy landing was made at some strips with passengers and equipment to evaluate the safety margin for landing and taking off.

Measurements of airfield dimensions, landmarks and liaison with local farmers occurred for contact details by visiting airstrips by car.

## **Background and Significance**

### **Southern Region Operations**

The St John Ambulance Southern Region extends from Makarora in the west to the Waitaki River in the east of the South Island. It comprises seven ambulance districts of which the Coastal Southland Ambulance District is one of the largest centred on Invercargill City. The largest permanent staffed stations are in Dunedin and Invercargill. There is an additional six smaller ambulance stations with paid staff at Queenstown, Alexandra, Oamaru, Mosgiel, Balclutha and Gore. Additionally there are 18 volunteer

ambulance stations and eight First Response groups. The Southern Region has a total staff complement of about 470 paid and volunteer personnel and 53 ambulances.

The paramedic complement is predominately based in Dunedin with 19 personnel available. The next largest area with paid paramedics available is in Invercargill City with six staff available for response work in Southland.

Paramedics presently respond to calls in standard Leyland DAF ambulances that are suited only for operations on sealed or gravel road surfaces. A paramedic on call availability is also provided by a Ford Falcon car that doubles as the District Control/ Communications vehicle for standard emergencies e.g. motor accidents. A four-wheel drive Toyota was added to the Invercargill Ambulance fleet last year. This vehicle allows staff to access farm accidents as long as the terrain is reasonable and ground conditions are relatively firm.

Typical larger scale incidents the ambulance service attends are multi vehicle car accidents, truck, bus, rail and aircraft accidents. Occasionally technological accidents at the various industrial sites around Southland occur that will involve local ambulance services. Atypical incidents the ambulance service deals with, are; environmental, weather related or natural hazard emergencies e.g. floods, earthquakes, windstorms etc. These events fortunately are rare.

Beyond Invercargill, ambulance resources to respond to local calls are based at Bluff, Tokanui, Riverton, Tuatapere Otautau, Winton and Fire Service Co-Responders at Ohai in the Coastal Southland Ambulance District. The Upper Southland area has ambulances at Gore and additional ambulances at Tapanui, Lumsden and Te Anau with Fire Service Co-Responders at Edendale and an ambulance First Response group at Riversdale.

Staffing levels at Volunteer stations beyond Invercargill do not exceed The National Certificate in Ambulance level. The only ambulance paramedical staff available for incidents in Southland are based in Invercargill.

### **Helicopter Trials**

The Health Funding Authority (HFA) and the Accident Compensation Corporation (ACC) will only fund the response and transport of a patient to a medical facility, whether by road or air. The additional money required purchasing and maintaining a helicopter, pilot, crew salaries and operational base is prohibitive without adequate funding and is met from financial resources other than the HFA and the ACC. Four years ago a trial with a rescue helicopter based at Invercargill Airport occurred. This was terminated after three weeks owing to the small number of incidents available for the helicopter to respond to. The operational need and use of a helicopter was equating to only 10 accident and medical cases in Lower Southland a month in any one-year from an analysis of ambulance cases in 1997 and 1998. This was where criteria of life was at risk or potentially at risk and the response time is greater than 20 minutes for accident and medical cases and the road transport time is greater than 30 minutes.

In most cases a helicopter is used for accident cases and not medical cases owing to the way the Health Funding Authority funds ambulance services. This limits the number of aeromedical helicopter responses that can be paid for unless other mechanisms are used e.g. trust fund arrangement.

During 1998 there were 40 accident cases in Southland where a helicopter could have been used to attend and transport a patient to the Southland Hospital at Invercargill if one had been available or about 3.3 times a month.

Requirements for an aero-medical response are necessary, but the frequency appears low in the Southland area. A ready resource was sought after to reflect the low requirements for the ambulance service but still provides a contingency capability of staff and resources that is able to meet unexpected events anywhere in Southland

### **Current Southland Logistics**

Southern Air (1997) Ltd already provides a service to St John Ambulance in supplying a 'fee for service' for transfers from Stewart Island only. The ability to use a fixed wing plane elsewhere in Southland to shift Paramedics is available similar to the Wellington Free Ambulance ACC trial of sending cars to accidents as mobile Rapid Response Units (RRU's). The planes could be used when large numbers of people are injured and urgent triaging or sorting of casualties is needed. This allows Southern Health –Kew Hospital to appropriately recall staff to meet incoming ambulances and rescue helicopters. It also has

the advantage of receipt of accurate and timely information from the accident scene. This process allows a more efficient utilisation of resources from the roadside to the bedside inside the hospital environment.

There has been significant discussion in medical circles about the “Golden Hour” where patients from accidents benefit by early triaging and evacuation to a base hospital in the first hour after injury will significantly increase survival rates. Invercargill is about 80-160 kilometres away from the peripheral areas of the ambulance district and it is often in these areas accidents occur in remote locations.

Typically in recent years the Southern Scenic Highway has been advertised as a tourist route. The road through the Catlins from Owaka to Tokanui through to Te Anau via Blackmount, all part of the Coastal Southland Ambulance catchment has a high number of buses and campervans travelling through every day. Accidents have occurred and will continue to occur as tourists unfamiliar with the difficult road conditions crash their vehicles off the road. These accidents are occurring in remote parts of Southland far away from paramedical or medical assistance. Often the only available medical help is from local volunteer ambulance services that have to travel 40-50 kilometres, with personnel qualified with the lowest level of ambulance qualification. These ambulance personnel can maintain and manage scenes for a period of time but need expertise to sort and provide ongoing management of patients prior to removal to hospital.

It is in these remote areas the airstrips have been located, physically investigated and the response concept developed with the local air operator who works currently with St John Ambulance Coastal Southland District.

In normal circumstances locally based helicopters have been used to deal with most accidents in Southland. When incidents escalate to the point the patient numbers tax the local medical resources at an incident, extra paramedical resources are dispatched by the Dunedin Ambulance Regional Communications Centre from the closest paramedic resource base in Invercargill. By road a paramedic ambulance takes about 60-90 minutes to travel to the remote parts of the ambulance response area. This is well outside the “golden hour”. A scene is sorted with casualties loaded into vehicles. This process can take 20-30 minutes and the return trip if made by road can take 1.5 to 2 hours of travel.

Thus the round trip for a call to a remote part of the Coastal Southland Ambulance District can be at least three hours in length or longer. The length of time in fact works against the patient(s) in that for some incidents being so far from Invercargill by road, Invercargill paramedics are not sent because of the vast response and transport distances.

### **Operations Management Planning**

The Fixed Wing Concept allows the ambulance service to provide an appropriate tiered response into events utilising an Operational Management Triage system, “where emergency managers can improve response times and operational performance by undertaking an Operational Management Triage (OMT) at overall area and district level.

OMT procedures require co-ordinated and integrated control over current and future resource dispositions and deployment". (Heath 1995). Thus the OMT model allows a more effective utilisation of limited key resources that can be applied to ambulance operations.

As "Response planning must be based on realistic assumptions on what is likely to occur" (Britton 1995) for local or regional ambulance response in emergencies or disasters. The ambulance service must be prepared for a worse case scenario for operational and administrative continuity.

The Coastal Southland Ambulance District uses "a deployment to reserves ratio as an escalatory cut-off"(Heath 1995). The ambulance service thus uses a first and second tiered ambulance response locally before bringing in reserves from out of district if access is possible. So resources are responded in about three waves to an event with the local district, out of district and finally regional response. The vehicles used may be standard ambulances, helicopters and finally fixed wing aircraft(s).

The Fixed Wing Concept has a place in the field of Comprehensive Emergency Management (CEM) in the Emergency Service agencies work in response to a disaster event. Unless there is a clear understanding of the differences between an accident, emergency and disaster, from (Britton & Paton 1998), ' there is

- Over- simplification of disasters and their impacts

- Over- emphasis of the capability to respond to disasters (e.g. disasters are just bigger accidents or emergencies.)

Emergency service organisations must be able to respond to disasters as unique events, which require specialist resources, training and management and not simply, another form of accident. A failure to recognise this has implications for planning, resource allocation and response effectiveness as well as for training.

Accidents and emergencies and disasters can be differentiated in relation to the consequences and level of disruption in relation to

- The number of people involved and their relationships to victims
- Nature and extent of the involvement, of the population within the affected '**social System**'
- Nature and extent of destruction, dislocation and disruption exerted on the social system

Therefore, an **accident**

- Produces short or long term consequences that are restricted to a clearly **defined** geographical area and have a **highly localised** focus.

- Being restricted to small groups of persons involved.
- Involving response demands that fall well within the capability and resources of those responding’.

Most incidents in Southland on a daily basis fulfil this definition. A head on car crash would be deemed an accident as it meets the definition criteria above. From Britton and Paton (1998),

‘ An **emergency** is defined as:

- An event occurring within a localised geographical area (not as focused as an accident) e.g. a rail, plane crash or a tourist bus crash.
- Involves a substantial number of participants (victims and helpers) including emergency service and health services etc.
- Involves more complex remedial action because of the greater area affected and the number of people involved. The greater complexity and response demands results in a noticeable time interval between event occurrence and resolution.

- Although involving demands that are more complex the incident is dealt within operational parameters.
- It temporarily renders a small section of community infrastructure inoperative (e.g. power lines down, railway lines damaged, airport closed).
- It does **not** produce any significant disruption or destruction of the overall social structure or to normal operational processes’.

There have been few events to date in Southland that meet the above criteria, although plans are being prepared for tourist bus crashes on the Milford Road and Southern Scenic Route that would meet the above criteria. Again from Britton and Paton (1998)

‘ A **disaster**

- Results in an overall but **temporary breakdown** in the social processes, routines and interactions of a community.
- Results in a number of victims as a proportion of the total population being affected.
- Suddenly exposes victims and **social systems** they inhabit to demands and experiences outside the normal realm of human experience.

- Results in widespread and diffuse destruction of the **functional and administrative infrastructure** to the extent that ongoing routines are no longer possible.
- The demands and complexity of the event **exceeds** normal operational parameters requiring contingency management to deal with non-routine demands relating to the scale of the incident with **ambiguity** and **uncertainty** involved.
- Poses a **significant threat** to the systems of biological survival, order, meaning and motivation.
- Has the potential to **exhaust the emergency management capabilities** of a community, increasing the affected community's reliance on external aid, assistance and resources'.

The closest event to the above definition occurred in 1984 with the Invercargill floods where large portions of the city was under water and many residents were dislocated from their home environment for weeks. Finally from Britton and Paton (1995),

'To summarise under the conditions of disaster, the structures and processes of **social organisation** become disrupted to the extent that human existence within an affected community is **severely** threatened. The disruption to social organisation is **not** found within accident and emergency situations. In accidents and emergency situations it is routines rather than existence that are threatened'.

The Fixed Wing Concept can provide a response to an emergency and disaster as well as a method of transportation away from an incident where roads or sheer patient numbers dictate planes should be used.

## **Procedures**

For this form of project to be operationalised it is necessary to investigate the most appropriate airstrips close to roads and accessways to ensure a local road based vehicle can pick up responding crews from Invercargill and take them to the accident site.

Limitations for the operation of the project are set by the time of the day, weather conditions and state of the airstrip selected for the response mission and availability of the fixed wing response aeroplane. During the evaluation part of this project each airstrip was investigated twice. Firstly in summer when ground conditions were dry and secondly in winter when ground conditions were wet and soft underfoot.



**Figure 1 Jericho airstrip looking north: Blackmount Hill**

Verbal contact was made with the owner of each airstrip where possible, contact details and photographs were taken of each site for typical aircraft approach paths and any associated hazards.



**Figure 2 Centre Hill Airstrip Mossburn – Te Anau highway**

Aircraft for this concept have to be versatile, with the ability to land and takeoff on short runways or grass airstrips. They also need to have the ability to land on hill farm airstrips into the prevailing wind.

A practical training exercise at Invercargill airport was carried out between the ambulance and fire service to test the fixed wing concept where crews were tasked with loading and stowing rescue and medical equipment for carriage on the aircraft. Planes have a limit on equipment they can carry. Each item of medical and rescue equipment was weighed to meet the takeoff capability of the aircraft to meet safety regulations.



**Figure 3 Loading Exercise with Fire & Ambulance personnel**

## **Results**

A number of grass strips are marked on the New Zealand Topographical Land and Survey maps in Southland. From these maps 32 key airstrips have been identified in the Coastal Southland and Upper Southland Ambulance Districts so far. Discussions with Southern Air's chief pilot identified suitable strips for the ambulance service to use. These have been located from the topographical maps and include their GPS co-ordinates (See appendices). Additional secondary sites were also discovered during the investigations and these could be used for atypical farm incidents of an unusual or protracted nature. The strips were numbered Ambo 1-32 by Southern Air and loaded into the navigational equipment for each ambulance response aircraft. The GPS co-ordinates

for each strip were also recorded in a computer database at Invercargill Ambulance Station as a contingency backup.

A physical investigation of landing strips was carried out by car utilising the GPS coordinates of the strips. Photographs were taken and an over-flight by a fixed wing aircraft of selected airstrips also occurred. To test the operational concept landings was made at various strips with passengers and equipment to evaluate the safety margin for landing and taking off.

Measurements of airfield dimensions, landmarks and liaison with local farmers occurred for contact names and telephone numbers by visiting strips by car.



**Figure 4 Te Tua Airstrip Tuatapere**

A suitable plane capable of landing on short airstrips has been identified which is the Britten Norman Islander. These aircraft can land and takeoff with only 450 metres of grass airstrip available.



**Figure 5 Britten Norman Islander**

They can carry four crew: comprising two fire fighters and two Paramedics and the pilot or four Paramedics and the pilot.

Additionally the rear of the passenger compartment and the baggage area has ample room for resuscitation kits, oxygen, Paramedic fluid and drug kits and Fire Service cutting and rescue equipment.



**Figure 6 Paramedic & Rescue Equipment in cargo compartment**

Limitations on this project concept are the ability to shift the ambulance and fire resources from the airstrip to the incident site. Without the assistance from local communities or farming support the Fixed Wing Concept cannot succeed. During the on-site investigations there was obvious support, although some initial scepticism from the Southland farmers that the Ambulance Service was prepared to fly resources into farming or local communities to support the inhabitants if a larger than normal scale event occurs.

Obviously the incident location, the number of casualties and the expected time the incident will take to be cleared of patients will determine the call for the use of the fixed wing aircraft and the resources it will carry. Notification of the incident and decision to fly to an airstrip is about 15 minutes to takeoff from Invercargill airport.



**Figure 7 Blackmount Airstrip to the left of the buildings**

A large scale incident involving 20+ patients will need the combined efforts of road based ambulances, rescue helicopters and a fixed wing air-medical response in Southland to manage an incident scene effectively and efficiently to meet acceptable transport times to base hospitals under present government contract requirements.

### **Discussion**

The Ambulance Services ACC contract agreement presently provides for the shifting of patients by air ambulance providing the planes meet the required legislation as defined or administered by the AIA standard, Air Rescue/Air Ambulance Standards, CAA regulations and Aviation Industry Rules.

According to the ACC contract an air ambulance should only be dispatched where:

- 1. Life or limb is at risk or from information received it cannot exclude the possibility that life or limb is at risk and*

2. *The road transport time is greater than 30 minutes ( and an air ambulance can locate quicker than a road ambulance ) or the retrieval time of the injured person to a suitable medical facility will exceed 60 minutes and an air ambulance will reduce this time significantly and is appropriate and*
3. *A patient's medical condition will not be adversely affected by air transport and:*
4. *A possible improvement to the patient's outcome or rehabilitation can be realistically confirmed.*

Where an air ambulance is required on the basis of the triage information received, St John Ambulance will dispatch the most appropriate air ambulance. The Communications Centre will take into account the local experience of the pilot, level of service required for the transport of the injured person and the closest appropriate medical facility the injured person will be delivered to.

From the Civil Aviation Amendment Acts 1996- Section 13 A: Part 3: Duties of the Pilot in command;

*“ Where an emergency (not being an emergency in flight) necessitates the urgent transportation of persons or medical or other supplies for the protection of life or property, the pilot in command of the aircraft may breach the Provision of the Act or of regulations or rules made under the Act”.*

This means the Fixed Wing Concept is legal in terms of landing aircraft and taking off with patients on rural airstrips as long as the pilot in command is comfortable for the

safety margins for his passengers and their equipment. No attempt at landing at an airstrip will be made unless the local community members who have been contacted prior to the plane landing are able to pick up the ambulance personnel.

The New Zealand Fire Service currently utilises helicopters in Taranaki and the Manawatu to transport fire fighters and ambulance paramedical staff to accident scenes. When the crews arrive at the incident the fire fighters are left behind at the accident and the patient is airlifted out with the paramedical ambulance crew. The Coastal Southland Ambulance District Fixed Wing concept is an extension of the integrated response system that has been in place by St John Ambulance Central Region for some years now. The difference here is that the plane has to land on an airstrip close to the accident or emergency scene and St John Ambulance Coastal Southland is tapping into a resource that is available but not used.

The ACC contracts the ambulance service has must make all reasonable endeavours to achieve service levels that meet the satisfaction of the funding agency. Seriously injured patients have to be shifted into a hospital environment as soon as practicable and the critically injured have to reach the hospital environment within one hour. For Southland currently this is extremely difficult owing to the physically vast area covered by the ambulance service (60 –90 minutes by road). Yet all parts of lower and central Southland can be reached in 20-30 minutes by air. Turnaround times are significantly lessened and with the advent of the Fixed Wing Project patients should be able to reach Southland's Kew Hospital more quickly.

From the Ministry of Health Roadside to Bedside documentation co-ordination of transportation is important in achieving the 'right time' and 'right care' aims.

- 1. There needs to be integration of land and air systems to ensure the most appropriate vehicle is sent.*
- 2. An emergency transport system needs to incorporate a wide range of vehicles ranging from single crewed ambulances to fixed wing aircraft.*
- 3. The air ambulance network needs to have more than one tier to ensure optimal coverage of the country.*

The problem directly affecting this project is cost. Present ACC funding allows reimbursement if a patient is carried in the aircraft. If no patient is carried the responding aircraft or organisation hiring the use of the aircraft bears the cost.

In the "Fixed Wing Concept" this is \$550 an hour. Helicopter costs per hour can be \$1000-\$2000 dependent on the size of the helicopter used. The concept has not migrated to transporting away from incidents at this stage except in exceptional circumstances as it was felt that in most cases the responding helicopters would generally evacuate the patients. This is dependent on the size of the incident and turn around time for helicopters from hospitals they have flown to. St John Ambulance Southern Region currently will have to meet this responding cost unless it can negotiate the Fixed Wing concept into its ACC contract or be funded as part of a contingency response plan.

From the 1996 scoping report for a national air ambulance network it was recommended that fixed wing and helicopters operate in a complimentary fashion being utilised often if retrieval distances are in excess of 100 km or the weather is adverse for helicopters.

Control and co-ordination of the Fixed Wing Concept lies with St John Ambulance Southern Region. Communication between the aircraft and the despatching ambulance communication centre will be via the ambulance service radio network. Present plans are to install ambulance frequency radios into the Britten Norman Islander aircraft so the responding ambulance crews in the aircraft can communicate directly to the ambulance control point or ambulances at an incident scene.

Initiation triggers for the despatch of the aircraft rests with the District Manager of the Coastal Southland Ambulance District service. A District Manager is the only person with the financial authority to release the internal budgeted cost centre funds to pay for the 'fee for service' associated with the Britten Islander. Recognising that only if a patient is removed from the crash site by a fixed wing aircraft back to Invercargill Airport, ACC will fund the reimbursement of monies back to the authorising ambulance service.

Internal funding for this form of response project on an annual basis is to monitor the trigger level for the type of emergencies the planes may respond to. Presently in the last twelve months to September 1999 in the Coastal Southland Ambulance District there have been three occasions where the use of fixed wing aircraft to remote airstrips would

have enhanced the management and operations of a multi casualty incident with the early arrival of ambulance paramedics. Additional funds for testing the concept in a training role from full activation until arrival back at Invercargill airport would have to be funded by budgeting annually at least \$5000 a year. This cost would cover genuine responses, loading training at some of the remote strips, for instance in the Tuatapere area working with the local ambulance crews.

This project is an operational project used to enhance the day to day event operations of an ambulance service. It also integrates into the operations of local fire crews where the combined resources of the Fire Service and Ambulance are brought together to manage an event.

As the Invercargill Fire and Ambulance Services regularly train together within the parameters of their specialised roles, the joint training around the Fixed Wing Aircraft was seen as a team building exercise. Leadership for the combined crews departing on a mission would sit with the senior personnel from both services in the aircraft.



**Figure 8 Ambulance & Fire Crews ready to respond in Britten Norman Islander**

Ambulance crews are already familiar with work around fixed wing aircraft as they regularly fly to Stewart Island almost every day retrieving stretcher bound patients for transfer to Kew Hospital. For operational familiarity the pilots from the Air Company supplying the aircraft must be familiar with the airstrips or country they are flying into.

From a political viewpoint this project cuts across the helicopter operations already available in Upper and Western Southland. It is intended to enhance the general operations of these companies that are already supporting the ambulance service and tap into a resource that is already in existence in Invercargill but not used for a district wide response focus now. Future needs indicate a helicopter may be based in Invercargill and possibly be a viable option, but presently this cost is beyond present financial resources to fund locally.

From a localised disaster framework where the local social and administrative infrastructure is destroyed the options of using fixed wing aircraft to fly in specialist medical resources, paramedics or supplies is viable where roads are destroyed or impassable. Likewise with the relationships being built now with the Emergency Management personnel in Southland room could be made to take a Civil Defence Emergency Manager as part of the reconnaissance team to overview an incident or localised disaster event.

## **Recommendations**

It is recommended the Fixed Wing Concept be implemented in Southland as a practical solution to overcome the unavailability of a locally based rescue helicopter. Invercargill Ambulance staff will continue to work with the local aircraft operators to ensure the annual training requirements for ambulance officers working around fixed wing aircraft remain compliant to AIA standards. Outstation ambulance staff will be involved with aircraft ground training as part of the annual inservice ambulance training schedule that is developed at the end of each year once budgetary funding is agreed.

As part of the ongoing evolution of the project, additional suitable strips will be located and mapped, placed in a database at the Regional Communications Centre in Dunedin and at District Headquarters in Invercargill. An operations implementation plan will evolve through the last quarter of 1999 into 2000. Finally negotiations with funding agencies will need to be pursued to utilise an aeromedical response resource that is available but not currently used.

It became obvious as the airstrips were mapped that the Coastal Southland Ambulance District section of St John Ambulance Southern region could provide a more effective and efficient response to deal with the larger scale accident and emergencies using Fixed Wing aircraft. These incidents typify the “Mass Casualty” situation the organisation periodically faces. As Invercargill Ambulance Station is co-located with the New Zealand Fire Service the concept of joint response with the Fire Service was seen as a logical extension of the joint work being undertaken with local accidents or emergencies.

After discussions with Southern Health medical and nursing staff about the concept, there was a positive affirmation that an early paramedic response and reporting system from the Fixed Wing Concept could enhance the operational resources Kew Hospital will need to recall to manage a 'mass casualty situation'. The senior Critical Care Intensivist at Kew Hospital is endorsing the Fixed Wing Concept within his own research work in the rural versus urban sector of medical response.

Invercargill Emergency Management personnel have supported the Fixed Wing Concept and recognise it can be a vehicle for joint operational reconnaissance between responding agencies.

For an effective response and management plan to deal with larger than normal emergencies and the use of a Fixed Wing medical and rescue response it will be necessary to ensure that:

- All parties have input into the concepts of this project
- The objective must be to deliver timely, effective and seamless trauma care from accident site to an appropriate medical care facility

- There is overall leadership, with prior resolution of conflicts, and the co-ordination and integration of emergency response agencies. This can be enhanced by joint operational incident or disaster planning
- Mobilisation of resources on a worse case scenario with progressive scaling down as appropriate
- There are clear well planned lines of communication, personally and technological e.g. radio
- Resources are optimised from available local community resources
- Pre-hospital triage of patients by Paramedical or suitably trained medical officers (PRIME) that are deemed to be “high risk trauma victims” from the forces associated with the mechanism of injury occurs.
- Ongoing education and training for ambulance officers in dealing with the mass casualty situations.

Finally there appears to be strong community support for the concept and community members have indicated they would welcome the early arrival of expertise paramedical and specialist rescue assistance from Invercargill to assist in the care of patients and early management of an incident scene.

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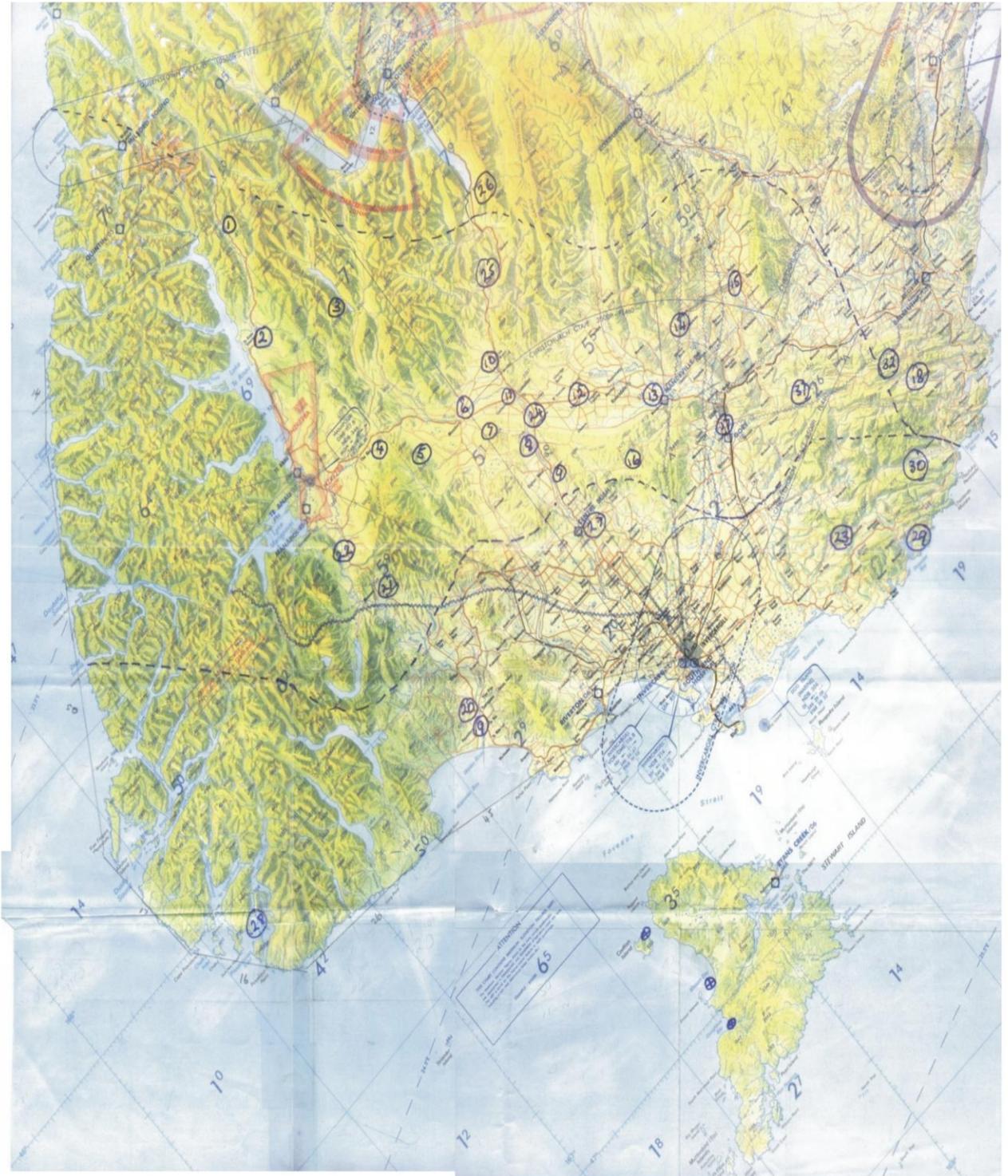
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## Appendices

### Coastal Southland Fixed Wing Response Airstrips.

#### G.P. S. Reference

(1).	Cascade (Knobs Flat)	44/58s x	168/01e.	
(2).	Te Anau Downs. (P Chartes)		45/12s x	167/53e.
(3).	Lake Mavora		45/17s x	168/11e.
(4).	Centre Hill (Burwood Station)		45/34s x	168/02e.
(5).	Mt Hamilton.		45/35s x	168/04e.
(6).	Mossburn Township		45/40s x	168/14e.
(7).	Hamilton Burn (Ryan's)		45/43s x	168/17e.
(8).	Dipton flat (H Ruddenklau)		45/48s x	168/21e.
(9).	Dipton Township		45/56s x	168/26e.
(10).	5 Rivers (Gliding Strip)		45/37s x	168/27e.
(11).	Lumsden		45/42s x	168/25e.
(12).	Balfour		45/50s x	168/34e.
(13).	Mandeville		45/58s x	168/48e.
(14).	Waikaka Township		45/55s x	169/02e.
(15).	Tapanui		45/56s x	169/16e.
(16).	Otapiri Gorge		46/03s x	168/37e.
(17).	Gore Airfield		46/10s x	168/53e.
(18).	Takahopa (Stoots)		46/23s x	169/32e.
(19).	Te Tua (Horrels)		46/10s x	167/45e.
(20).	Happy Valley		46/06s x	167/45e.
(21).	Blackmount School		45/48s x	167/38e.
(22).	Jericho Airstrip		45/40s x	167/40e.
(23).	Fortification		46/30.5sx	169/01e.
(24).	Josephville		45/48s x	168/25e.
(25).	Athol		45/31s x	168/34e.
(26).	Kingston		45/20s x	168/42e.
(27).	Centre Bush		46/03s x	168/19e.
(28).	Spit Island		46/05s x	166/38e.
(29).	Waikawai Valley		46/33s x	169/08e.
(30).	Tahakopa		46/31s x	169/21e.
(31).	Hurst Clinton		46/14s x	169/06e.
(32).	Purakireki (R Landels)		46/17s x	169/25e.



**Figure 9** Map of Southland Airstrip locations



**Figure 10 Five Rivers Airstrip Northern Southland**



**Figure 11 Centre Bush Airstrip Central Southland**



**Figure 12 Castlerock Airstrip Lumsden -Mossburn Highway**



**Figure 13 Lake Monowai Airstrip Western Southland**

## **Glossary of Terms**

ACC	Accident & Rehabilitation and Compensation Insurance Corporation
AIA	Aviation Industry Association
CAA	Civil Aviation Authority
HFA	Health Funding Authority
Golden Hour	A term coined by R Adams Cowley, the “father of trauma surgery” at the Maryland Institute for Emergency Medical Services (MIEMSS) in the early 1970’s to describe the period of time during, which the adverse physiological consequences of shock following injury could be reversed.
GPS	Global Positioning System
Paramedic	An Ambulance Officer who has successfully completed all the requirements of the National Diploma in Ambulance (Paramedic)
PRIME	Primary Response in Medical Emergency. This includes both Medical and Accident Emergencies.
Response time	Response time is the time from full activation to arrival at patient accident/illness scene
RRU	Rapid Response Unit: Normally a car or station wagon crewed by an Ambulance Paramedic carrying a range of ambulance equipment to provide interim treatment prior to ambulance arrival
Triage	A system to prioritise requests for medical or ambulance assistance or patients dependent on the severity of the accident or illness