

# HUT PROCUREMENT MANUAL

## PART A

FOR 2 BUNK BACKCOUNTRY HUTS

QD code VC1414

March 2009 Version 4.0

---



Department of Conservation  
*Te Papa Atawhai*

## CONTENTS

	PAGE
<b>Section A1: The Process</b>	<b>1</b>
1.1 Purpose	1
1.2 Pre- Process decisions and information gathering	1
1.3 Briefing decisions and information gathering	2
1.4 Site Visit	4
1.5 Resource Consent	5
1.6 Tender and Building Consent Documents	5
1.7 Building Consent and Options to Order Hut:	6
1.8 Tender and Contract	8
1.9 Construction observation and Contract administration	9
1.10 Feedback	10
<b>Section A2: Technical Information</b>	<b>11</b>
2.1 Purpose	11
2.2 Document Sets	11
2.3 Tender and Building Consent documents	11
2.4 Format and content	15

## APPENDICES

### Appendix A1: Drawings

Standard 2 bunk hut drawings

### Appendix A2: Specification

Appendix A2.1: Standard 2 bunk visitor hut with water supply and tie-downs

Appendix A2.2: Standard 2 bunk visitor hut with water supply

Appendix A2.3: Standard 2 bunk visitor hut with tie-downs

Appendix A2.4: Standard 2 bunk visitor hut without water supply or tie-downs

### Appendix A3: Structural calculations

Appendix A3.1: Lightweight Steel Framing Calculations

Appendix A3.2: Lapish Enterprises PS1 and Calculations

## Section A1: The Process

### 1.1 Purpose

To provide a consistent national process by which the department procures a completed two bunk backcountry hut, including outbuildings and departmental supplied items, in an efficient and effective manner. This process is mandatory for all such huts.

In order to achieve this purpose, the necessary stages and actions are noted, and the appropriate parties that are responsible for carrying out those actions identified.

### 1.2 Pre- Process decisions and information gathering

#### Responsibility:

DOC Project Manager:

- To follow the procedures as identified in other manuals or documents.
- To compile the necessary information.
- To make the required decisions in order to commence the Process as identified in this manual.

#### Actions:

##### 1.2.1: Strategic planning and site suitability

By reference to CMS and other DOC strategic planning documents, public consultation and the like, confirm the long-term need for the new hut and its most desirable location. Carry out the assessment of geological and other hazards for the preferred site and determine the suitability of the preferred site.

##### 1.2.2: Identify name:

Determine hut name and asset numbers for consistency in all project documents and departmental files.

##### 1.2.3: Assessment of Environmental Effects:

Prepare a full Assessment of Environmental Effects, using wgnco-28273, for huts that will be built on a new site and a checklist (using the headings in that document) for huts that will be replaced on the same site.

Note there is no external requirement to prepare an AEE. The reason for requiring an AEE for this work is to ensure that the effects of the hut building proposal are acceptable within the department and to interested outside parties. It will also compile in one place the information you may have to provide to a local authority for resource consent. The AEE or checklist is filed and made available internally or outside DOC as required.

### **1.2.4: Financial control**

Set up and follow the financial control procedures for capital projects.  
Obtain financial approval in principle.

## **1.3 Briefing decisions and information gathering**

### **Responsibility:**

DOC Project Manager:

- To contact the DOC engineer.
- To compile and provide the necessary brief (or information and requirements) for the Construction documentation

### **Actions:**

#### **1.3.1: Contact DOC Engineer.**

The DOC Engineer who provides services to the Area shall be the Engineer for the hut project, responsible for advice on site selection and site assessment, review wind and snow loads and determine foundation requirements.

#### **1.3.2 Scope of Project:**

Identify the scope of the total project that will be included in the contract involving the construction of the hut. Identify which, if any, of the following work is to be included in the scope of work and whether DOC or the Contractor is expected to undertake it:

- vegetation clearance and tree cutting,
- hut platform excavation,
- Toilet supply and installation (refer also Part F1 of this manual)
- Track work
- Existing features to be retained, removed or reused, such as a biv, track, accessory buildings, and the like.

#### **1.3.3: Resource Consents:**

Identify for what aspects of the project a Resource Consent may be required and the governing Territorial Authority.

#### **1.3.4: General Site Location and Topography**

Obtain 1:50,000 map number, grid reference and 5km x 5km extract from NZMS 260 series.

Where an existing biv or hut is to be replaced on the same site, and a baseline inspection exists with site plan and aerial/ground photographs, extract this information from AMIS.

If there is no site plan and/or aerial/ground photos of the site, then prepare a site plan and/or obtain aerial/ground photos. The site plan should be to scale (no smaller than 1:200) and include information on contours and ground slopes/falls, water courses, waterbodies, limitations (such as minimum distance from bluffs or levels above rivers/lakes, etc), vegetation, tracks, and any existing buildings. If required, the engineer can be engaged to carry out the site visit and produce both the site plan and the photographs.

Assess site wind and snow loads to confirm they are within design loads set by section 1.7.3. If design loads are exceeded, review site selection to ascertain if a site can be found that meets design loads. If not, specific structural design shall be required.

### **1.3.5: Ground material/condition**

Provide copy of any geological baseline inspection, describe soils on site including known conditions such as soft or fragile ground.

### **1.3.6 Water supply requirements**

Identify if a water tank is required. The Hut Service Standards require a water tank to be provided at a Basic hut when there are no natural water supplies within 200m of the hut.

### **1.3.7 Toilet**

Identify if a toilet will be required. The toilet must be within 100 m of the hut. When required, a toilet shall be provided in accordance with Part F1 of this manual.

### **1.3.8 Other site specific issues or hazards**

Record anything else that is relevant.

### **1.3.9: AMIS:**

Where an existing biv is to be replaced, obtain a copy of all AMIS information on the site, including baseline inspections, geotechnical reports, construction documents, toilet/waste disposal systems and the like.

For a new hut set up proposed asset in AMIS.

### **1.3.10: Forward information:**

Compile the above information and forward it to the DOC Engineer.

If you wish to discuss any of the necessary detail while compiling the information contact the DOC engineer.

## 1.4 Site Visit

### Responsibility & Purpose:

DOC engineer:

- To assess the structural design parameters of the site to enable selection of the appropriate foundation system.
- To collect accurate site information, and, with the DOC project manager, confirm extent of vegetation clearance, track work and the like.
- To peg out on site the location of the hut and toilet (if required).

### Actions:

#### 1.4.1: Review information:

Receive above information from DOC Project Manager and review for completeness. Follow up on any errors or omissions; seek clarification as required from DOC Project Manager before proceeding.

#### 1.4.3: Personnel, transport and equipment:

Co-ordinate timing of site visit with Project Manager. Ensure the DOC project manager has all necessary equipment (e.g. shovels, heavy bar, sledge hammer, and sufficient pegs) to carry out site investigations and to peg out buildings.

#### 1.4.4: Resource Consent (if required):

Confirm, with the DOC project manager, the aspects of the project for which a Resource Consent may be required with the relevant Territorial Authorities. Assist the DOC project manager in identifying complying parameters or requirements and extent of site information required if an application is necessary. Determine what on-site investigation is required to confirm the need or otherwise for a Resource Consent and organise the necessary equipment.

#### 1.4.5: Site Visit:

Visit the site with the DOC project manager and carry out the following actions:

- i) Agree on and peg out hut and toilet locations (refer to Part F1 of this manual for requirements for the toilet location),
- ii) Survey site to provide accurate site plan, datum level, site features, levels and orientation,
- iii) Assess and confirm soil condition/profiles for foundation design,
- iv) Assess and confirm soil profiles for toilet waste disposal design (refer to Part F1 of this manual for soil requirements),
- v) Confirm extent of site works, especially vegetation clearance and excavation,
- vii) Investigate Resource Consent parameters and information,

- viii) Obtain any other information identified as being required to complete design and construction documents.

## 1.5 Resource Consent

### Responsibility:

DOC Project Manager:

- To apply for and obtain Resource Consents, when required.

### Actions:

#### 1.5.1: Tender and Building Consent documents:

If Resource Consent is not required, or if it is required but approval is certain, proceed with tender and building consent documentation.

If Resource Consent is required and approval is not reasonably certain, wait until consent has been granted before proceeding with tender and building consent documentation.

#### 1.5.2: Application documents:

Determine what, if any, of the Site Visit information and Tender and Building Consent documents are required for the Resource Consent application. Compile or obtain further documentation as required. Compile and complete Resource Consent application documents.

#### 1.5.3: Application:

Apply for and obtain Resource Consent.

## 1.6 Tender and Building Consent Documents

### Responsibility:

DOC Engineer:

- To produce a complete and coherent set of tender and building consent documents.

DOC Project Manager:

- To obtain area and service standards sign-off.

### Actions:

#### 1.6.1: Documents:

Prepare a set of project specific tender and building consent drawings and specification, as outlined in Section A2.

Where specific structural design by the DOC Engineer is required for any aspect of the hut, including tie-downs, prepare full sets of calculations and Producer Statement PS1 Design.

### **1.6.2: Area sign-off:**

Provide one hard copy set of the complete tender and building consent documents, including a full set of the DOC engineer's calculations and Producer Statement PS1 Design form for any specific structural design to the DOC Project Manager.

DOC Project Manager to review to confirm that intentions as noted in brief and discussed during site visit have been met. Sign-off of Area Manager responsible for the project to be obtained.

### **1.6.3: Service Standards sign-off:**

Forward one hard copy set of the complete tender and building consent documents, including a full set of the DOC engineer's calculations and Producer Statement PS1 Design form for any specific structural design to General Manager Research and Development (Attention Brian Dobbie) for the scope of work to be checked against the Service Standards.

Sign-off is contingent upon approval of the final scope of work (i.e. confirming that the project hasn't deviated from the service standards.)

### **1.6.4: NO CHANGES:**

**UPON RECEIPT OF SIGN-OFF NO FURTHER CHANGES TO DESIGN OR SCOPE OF WORK SHALL OCCUR DURING SUBSEQUENT STAGES.**

## **1.7 Building Consent and Options to Order Hut:**

### **Responsibility:**

DOC Project Manager:

- To manage the obtaining of a building consent.
- To order the hut, if this option is chosen

### **Actions:**

#### **1.7.1: Building Consent:**

Complete all necessary forms, compile all required documentation and make the building consent application. If there are any technical queries or concerns from the Territorial Authority regarding building code compliance respond as necessary. For any queries regarding the base drawings prepared by Pynenburg and Collins Architects Ltd, forward query to Ron Pynenburg ([ron@pc-architects.co.nz](mailto:ron@pc-architects.co.nz), ph 04 9162201).



Forward any queries received, answers provided to the Territorial Authority, and any conditions attached to the building consent to General Manager Research and Development (Attention Brian Dobbie) (This is necessary to ensure national consistency in what is required for code compliance in two bunk huts and related work.

Note that the obtaining of a building consent can and shall run concurrently with the calling of tenders, but that choosing a contractor must not proceed until building consent has been obtained.

### **1.7.2: Order Hut:**

If a number of two person huts are to be constructed then it may save time and be more efficient for the hut to be ordered by the DOC project manager at this point in the process. In this case the construction tender for construction will not include building the hut frame or the complete hut as this will be a client supplied item. To order, contact the lightweight steel frame supplier and either:

- i) order the steel frame, to be delivered to the area office or specified location; or
- ii) order the complete hut (steel frame, linings, windows, door, floor, fittings - all constructed) to be delivered to the area office or specified location

Send the project specific tender and building consent drawings and specification prepared as per section 1.6.1 to the manufacturer nominated by the lightweight steel frame supplier.

The order shall specify colour of roof and wall cladding and colour of door and window frames.

The documents in this part call up the lightweight steel frame sections of Harris Foster Ltd (contact Maurice Harris – phone number as at July 2006 – 09 367 1070). However, in accordance with section 1.4 Equivalent Substitution in the Introduction to this manual, lightweight steel frame sections from other suppliers may be used and are deemed to be included in this manual, provided that structural calculations are produced to demonstrate compliance with the design loads.

### **1.7.3: Structural design loads:**

The standard design loads for a 2 bunk backcountry hut shall be:

- Floor load: 1.5kPa
- Wind load: 3.0kPa
- Snow Load: 3.0kPa

The structural calculations from Harris Foster Consultants are included in Appendix A3.1.

## 1.8 Tender and Contract

### Responsibility:

DOC Project Manager:

- To call tenders and to complete a Contract between DOC and the Contractor for the project.

### Actions:

#### 1.8.1: Calling tenders:

In accordance with DOC's 'General Conditions of Construction Works Contract' (wgnho-121411) call tenders. For guidance on the tendering process follow "Instructions for preparing and tendering contracts" (docdm-304896). In consultation with DOC Area staff, determine a short list of likely tenderers and any specific local issues or requirements that need to be addressed within the tender process or noted as special conditions of Contract.

Note that the calling of tenders shall run concurrently with the obtaining of a building consent.

To ensure transparency and ease of evaluation of tenders received, and to enable DOC to build up a nation-wide data base of costs, all tenderers shall be required to provide a breakdown of their bid using the following sections:

1. Preliminary & General, and margins
2. Hut material and labour (if this is not a client supplied item)
3. Site works (clearance, excavation, track work, etc)
4. Toilet
5. Transportation

To ensure that the public can be adequately notified of the impact of this work on recreational activities and to enable better management of the building programme request earliest possible start date and planned duration of Contract.

Review tenders received (in particular any tags), and make a recommendation on the most appropriate Contractor for the project.

#### 1.8.2: Contract:

When a decision is made on the successful Contractor, complete Contract and arrange signing by both parties.

## 1.9 Construction observation and Contract administration

### Responsibility:

DOC Project Manager.

- To carry out Contract administration and construction observation tasks as required by the Contract and contract documents, and to ensure that the design intent of the architect is achieved.

### Actions:

#### 1.9.1: Observation:

Determine extent and manner of construction observation. Carry out site visits and observation as necessary to be satisfied that the Contractor constructs the hut in accordance with the contract documents.

For any technical queries or issues, which may result in a change of material or detail, refer back to the architect for advice before instructing the Contractor. Do not instruct any changes, nor accept any errors or omissions by the Contractor without prior discussion with the architect to ensure that the design intent is not compromised to the detriment of DOC and/or hut users. Advise Engineer of intended instructions prior to issuing them to the Contractor.

#### 1.9.2: Contract:

Administer the Contract in accordance with DOC's General Conditions of Contract Works Contract. Ensure that all Instructions and Variations are in writing and copied. Ensure that after Practical Completion is achieved, that all of the Maintenance provisions are followed.

#### 1.9.3: Code Compliance Certificate:

Apply for and obtain code compliance certificate.

#### 1.9.4: Completion records:

At the time of the last inspection, after which the Maintenance Certificate can be signed off, obtain the following photographic record:

- aerial view of hut and the site,
- ground perspective view of front of hut,
- each elevation,
- internal view of the hut,
- where toilet, an external photo.

Collect together the following documents:

- Building consent
- Code compliance certificate
- Construction Issue set of documents, including all Instructions and Variations

- Copies of Practical Completion and Maintenance Certificates
- Contractor guarantees and Producer Statement (refer 10.5 of the General Conditions of Construction Works Contract)
- Completion photographic record in electronic (.jpg) format

## 1.10 Feedback

### **Responsibility:**

DOC Project Manager. To monitor, receive and record information and feedback on improvements to the process and hut designs.

### **Actions:**

#### **1.10.1: AMIS:**

Place information in 1.9.4 above in AMIS under the new hut asset.

#### **1.10.2: Hut Manual:**

Obtain and compile comments and feedback from the Contractor, DOC Engineer, DOC staff, public, and log book. Send the first compilation to General Manager Research and Development (Attention Brian Dobbie) within one month of receiving the Maintenance Certificate. Send further compilations as and when new comments or feedback are received.

## Section A2: Technical Information

### 2.1 Purpose

To record and provide current best practice for the design and construction of DOC's backcountry huts as required by the Process in Section A1; to optimise the time and reduce the cost involved in the design and documentation of each hut; to enable the design and documentation to be relevant and specific to each hut; and to enable nation-wide consistency in statutory compliance (ie building, fire safety, and health and safety).

In order to achieve this Purpose, this section is structured for the use of the engineer in preparing the documents required by the Process. It is not intended that other parties involved in the Process use this section. The information recorded in this section forms the base information from which the engineer completes the documents required at different stages of the Process.

### 2.2 Document Sets

From the Process there are two key document sets

- Base Design

Commencing from the Base Design Documents (drawings and specification), the Tender and Building Consent (TBC) Documents are produced following the site visit. Once signed off, these TBC documents are used for the tender and building consent process. Given the simple nature of these buildings it is not expected that a separate 'Construction' issue is required, and therefore the TBC documents will also be used for construction purposes.

If amendments are required, it is expected they will be implemented using variation orders in accordance with DOC's General Conditions of Construction Works Contract.

This section outlines how the engineer will produce the TBC document set via hand drawing over the base drawings, by the selection of available pages of other documents, and with the addition of a hut specific cover sheet.

### 2.3 Tender and Building Consent documents

#### 2.3.1: Drawing Procedure:

##### Sheet 1 Site Plan

Base Drawing:

Hut floor plan at 1:200 scale.

TBC Drawing:

- Add hut name, location, Area Office/Conservancy and date to title block. Note that this only occurs on sheet 1.
- Draw to scale the site details, including vegetation, tracks, ground slopes, streams, rivers and other water bodies.

- If a water tank is required draw the tank stand and water tank to scale on the side of the hut that it will be located, and annotate “Water tank and stand – refer sheet W1”.
- If tie-downs are required, draw the location of the deadmen to scale, include angles of orientation, and annotate “Tie-downs – refer sheet T1”.
- If a toilet is required, draw it to scale where it will be located and annotate “Pit toilet – refer separate drawings”. The pit toilet drawing is not part of this document set, and will be provided in accordance with Part F1 of this manual, so the engineer can refer to whichever drawing they are going to use.
- If the site needs to be excavated, draw to scale the extent of the excavation and cut faces.
- If ‘Goldseal’ is not required due to local climatic conditions, cross out the third paragraph of section 3.4 of the specification.
- The documents in this part call up the lightweight steel frame sections of Harris Foster Ltd (contact Maurice Harris – phone number as at July 2006 – 09 367 1070). However, in accordance with section 1.4 Equivalent Substitution in the Introduction to this manual, lightweight steel frame sections from other suppliers may be used and are deemed to be included in this manual. If, as a result of the use of other suppliers, other sections are used amend or annotate the drawings as required to clearly identify the necessary sections, fixings and connections.

### **Sheet 2 Floor Plan**

Base Drawing:

Hut floor plan at 1:20 scale.

TBC Drawing:

No amendments should be required.

### **Sheet 3 Four Elevations, Door and Window Schedule**

Base Drawing:

Four elevations, and a door and window schedule at 1:50 scale, with notes to support the schedule.

TBC Drawing:

No amendments should be required.

### **Sheet 4 Cross Section**

Base Drawing:

Cross section, including standard foundation, at 1:20 scale.

TBC Drawing:

No amendments should be required.

### **Sheet 5 Long Section**

Base Drawing:

Long section, including standard foundation, at 1:20 scale.

TBC Drawing:

No amendments should be required.

### **Sheet 6 Standard Details**

Base Drawing:

Standard construction details, at 1:10 scale.

TBC Drawing:

No amendments should be required.

### **Sheet 7 Standard Details**

Base Drawing:

Standard construction details, at 1:10 scale.

TBC Drawing:

No amendments should be required.

### **Sheet 8 Window and Door installation details**

Base Drawing:

Window and door standard construction details, at 1:10 scale.

TBC Drawing:

No amendments should be required.

### **Sheet W1 Water supply**

Base Drawing:

Water tank and stand construction details, at 1:20 and 1:50 scale.

TBC Drawing:

No amendments should be required.

### **Sheet T1 Tie-down details**

Base Drawing:

Tie-down foundation construction details, at 1:50 and 1:5 scale.

TBC Drawing:

No amendments should be required.

### **2.3.2: Specification:**

Base Specification:

Specification, sections, structural frame calculations and foundation calculations.

TBC Specification

- If a water supply and tie-downs are required, then use the Specification with the title "Standard Visitor hut with water supply and tie-downs".
- If a water supply is required, then use the Specification with the title "Standard Visitor hut with water supply".
- If tie-downs are required, then use the Specification with the title "Standard Visitor hut with tie-downs".
- If neither a water supply nor tie-downs are required, then use the Specification with the title "Standard Visitor Hut without water supply and tie-downs".
- If specific structural design by the DOC Engineer was required for any aspect of the hut, including tie-downs, then include these calculations and any drawings and/or details in Appendix A.
- The documents in this part call up the lightweight steel frame sections of Harris Foster Ltd (contact Maurice Harris – phone number as at July 2006 – 09 367 1070). The structural calculations from Harris Foster Consultants are included in Appendix A3.1, and do not need to be included in the specification.
- However, in accordance with section 1.4 Equivalent Substitution in the Introduction to this manual, lightweight steel frame sections from other suppliers may be used and are deemed to be included in this manual. If, as a result of the use of other suppliers, other sections are used structural calculations to demonstrate compliance with the design loads noted in section 1.7.3 above shall be included in Appendix A.

### **2.3.3: Amendments and variations:**

Other than the amendments noted above, it is expected that no other changes are necessary to create a hut specific set of documents. The base information is never changed unless by approval from the General Manager Research and Development (Attention Brian Dobbie). Such amendments are recorded on the hut specific documents only and do not become part of the Hut Manual or base information.



Where the design criteria exceed the parameters for the base building, approval shall be obtained to retain the site rather than seek another that fits within the design parameters. If so, alterations to the drawings and specification as necessary are carried out in response to specific structural design. Such amendments are recorded on the hut specific documents only and do not become part of the Hut Manual or base information.

## **2.4 Format and content**

All drawings shall be on A3 size paper in landscape format to enable easy reproduction at full scale. All specifications and other written documentation shall be on A4 size paper in portrait format.

**APPENDIX A1: DRAWINGS**

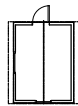
**STANDARD 2 BUNK HUT DRAWINGS**

**CURRENT DRAWING REGISTER**

Sheet	Title	Version	Date issued
01	2 bunk hut base drawing Site plan	4.0	March 2009
02	2 bunk hut base drawing Floor plan	4.0	March 2009
03	2 bunk hut base drawing Elevations Window & door schedule	4.0	March 2009
04	2 bunk hut base drawing Section A	4.0	March 2009
05	2 bunk hut base drawing Section B	4.0	March 2009
06	2 bunk hut base drawing Standard details	4.0	March 2009
07	2 bunk hut base drawing Standard details	4.0	March 2009
08	2 bunk hut base drawing Window & door installation details	4.0	March 2009
W1	2 bunk hut base drawing Water supply	4.0	March 2009
T1	2 bunk hut base drawing Tie down plan and details	4.0	March 2009

**AMENDMENT REGISTER**

Amendment date	Amendment details (section, page number, block)	Version	Signature of copyholder and date



# site plan

1:200

REV	NO	DESCRIPTION	DATE	DWN	CKD
4.0		First Issue	Mar 09	-	-

Drawing Issue and Amendments  
V4.0 Standard Visitor 2 Bunk Hut - Appendix A1



Cappell House  
111 Dixon St  
P.O.Box 2115  
Wellington 6140  
Phone: 04 - 473 7577  
Fax: 04 - 384 5177  
www.pac-architects.co.nz

**PYNENBURG  
& COLLINS**  
ARCHITECTS LTD

Contractor shall check all Dimensions on site prior to construction



PROJECT

Standard Visitor 2 Bunk Hut

LOCATION

AREA OFFICE

SHEET COMMENTS

site plan

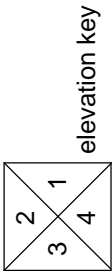
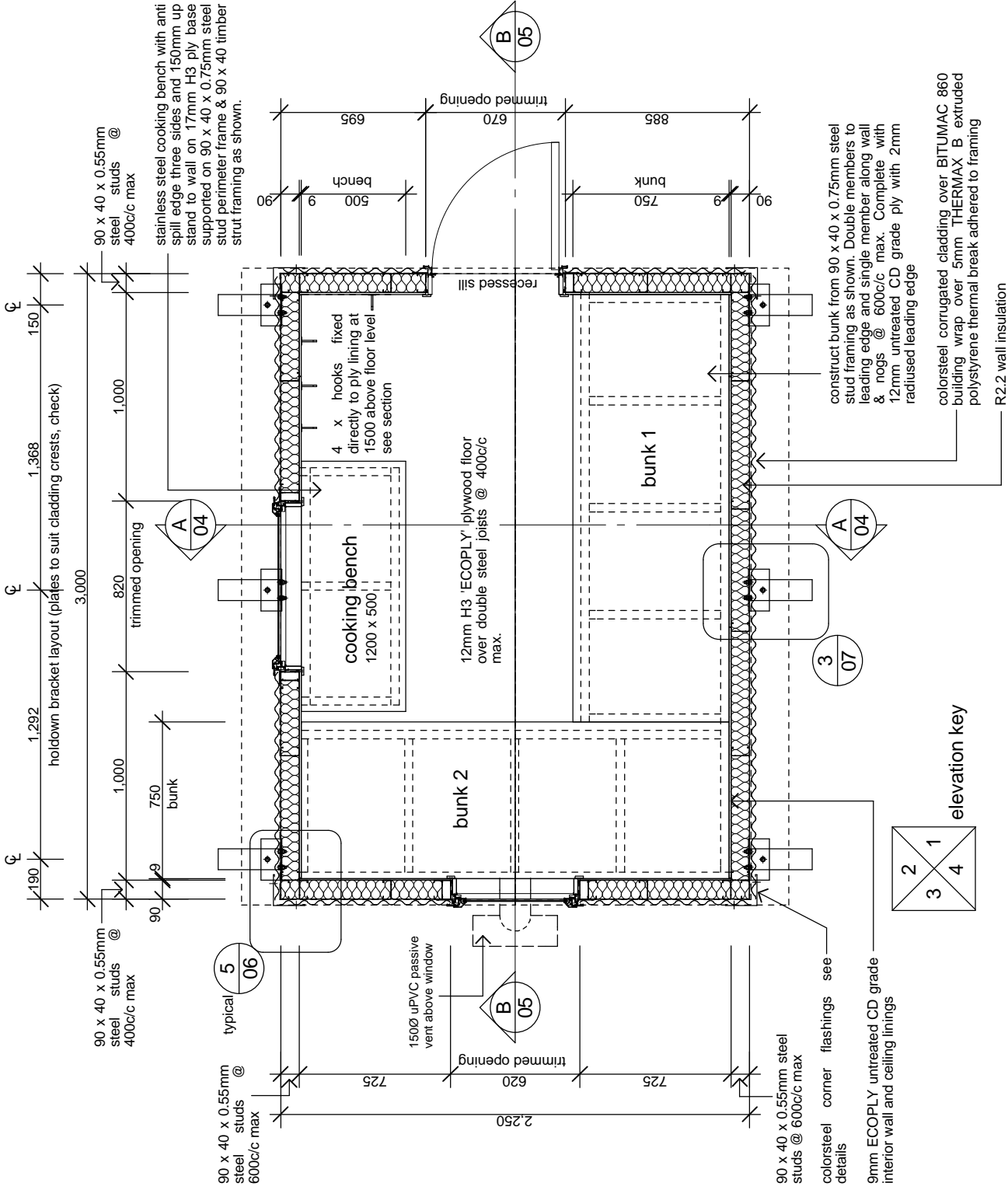
SCALES  
1:200

DESIGN	DRAWN	CHECKED	PROJECT NO.	DATE

@ A3 SHEET SIZE  
SHEET NO. **01**  
REV. NO.

**note:**  
 the following, if required are not shown  
 on this drawing.  
 - excavation  
 - water tank & stand  
 - tie-downs

Refer to sheet 01 for further information



elevation key

# floor plan

1:20

4.0	First Issue	Mar 09	-
	REV NO	DESCRIPTION	DATE
		Drawing Issue and Amendments	DWN CKO
V4.0 Standard Visitor 2 Bunk Hut - Appendix A1			

Capitche House  
 111 Dixon St  
 P.O.Box 2115  
 Wellington 6140  
 Phone: 04-473 7577  
 Fax: 04-384 5177  
 www.pj-architects.co.nz

**PYNEBURG & COLLINS**  
 ARCHITECTS LTD

Contractor shall check all Dimensions on site prior to construction



PROJECT Standard Visitor 2 Bunk Hut

LOCATION New Zealand

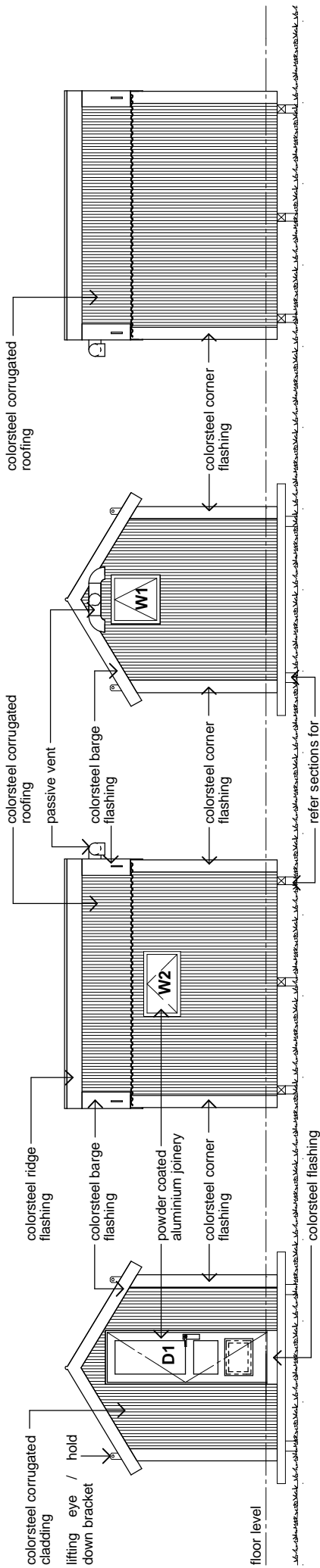
AREA OFFICE All Area Offices

SHEET CONTENTS

floor plan

SCALES 1:20

DESIGN	DRAWN	CHECKED	PROJECT NO.	0819
RP	GR	RP	REV NO.	02
DATE			March 2009	

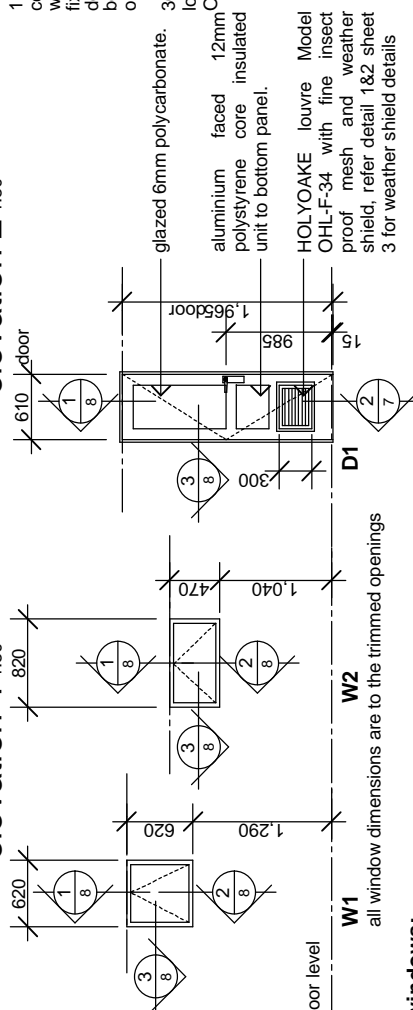


elevation 1 1:50

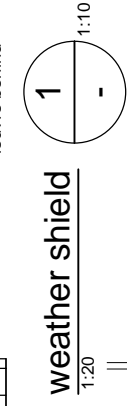
elevation 2 1:50

elevation 3 1:50

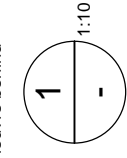
elevation 4 1:50



- windows:**
- All windows to be FIRST ALUMINIUM 40mm COMMERCIAL SERIES powder coated aluminium, glazed with 6mm polycarbonate.
  - Aluminium frames to be supplied complete with condensation channels all round with drainage path from the sill channel to the exterior of the building.
  - Aluminium frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame.
  - Awning sashes are to be fitted with stainless steel SAFETY STAYS to restrict sash projection.
  - Hardware to be "double tongue handles" cam type fitted to the sash with separate wedges applied to the frame. Colour black.
- door:**
- Door to be FIRST ALUMINIUM MAGNUM 50 COMMERCIAL SERIES powder coated aluminium, double bottom rail, glazed with 6mm polycarbonate.
  - Aluminium frames to be supplied complete with condensation channels all round with drainage path from the threshold to all non-visible surfaces prior to fixing to the aluminium frame. **No sill section is required for the frame** refer to detail 2 sheet 7
  - Hinges to be hung on broad leaf butt hinges.
  - Powder coated aluminium faced 12mm polystyrene core insulated unit to bottom panel.
  - Door shall come complete with HOLYOAKE powdercoated aluminium louvre Model OHL-F-34 fitted into the bottom panel of the door with fine insect proof mesh and weather shield as detailed.
  - Provide cabin hook as hold back device
  - Latch set to be LOCKWOOD passage latch LW3574SC LATCH.



weather shield 1:20



weather shield 1:10

4.0	First Issue	Mer 09	-
	REV NO DESCRIPTION	DATE	DWN CKD
Drawing Issue and Amendments			
VALO Standard Visitor 2 Bunk Hut - Appendix A1			
Capital House 111 Dixon St P.O.Box 2115 Wellington 6140 Phone: 04 - 473 7577 Fax: 04 - 384 5177 www.pjc-architects.co.nz			
Contractor shall check all Dimensions on site prior to construction			
Department of Conservation <i>Te Papa Ataturu</i>			
PROJECT		Standard Visitor 2 Bunk Hut	
LOCATION		New Zealand	
AREA OFFICE		All Area Offices	
SHEET COMMENTS			
elevations			
window & door schedule			
DESIGN	DRAWN	CHECKED	PROJECT NO.
RP	GR	RP	0819
DATE	March 2009		REV NO.
			03

**note:**  
the following, if required are not shown on this drawing.

- excavation
- water tank & stand
- tie-downs

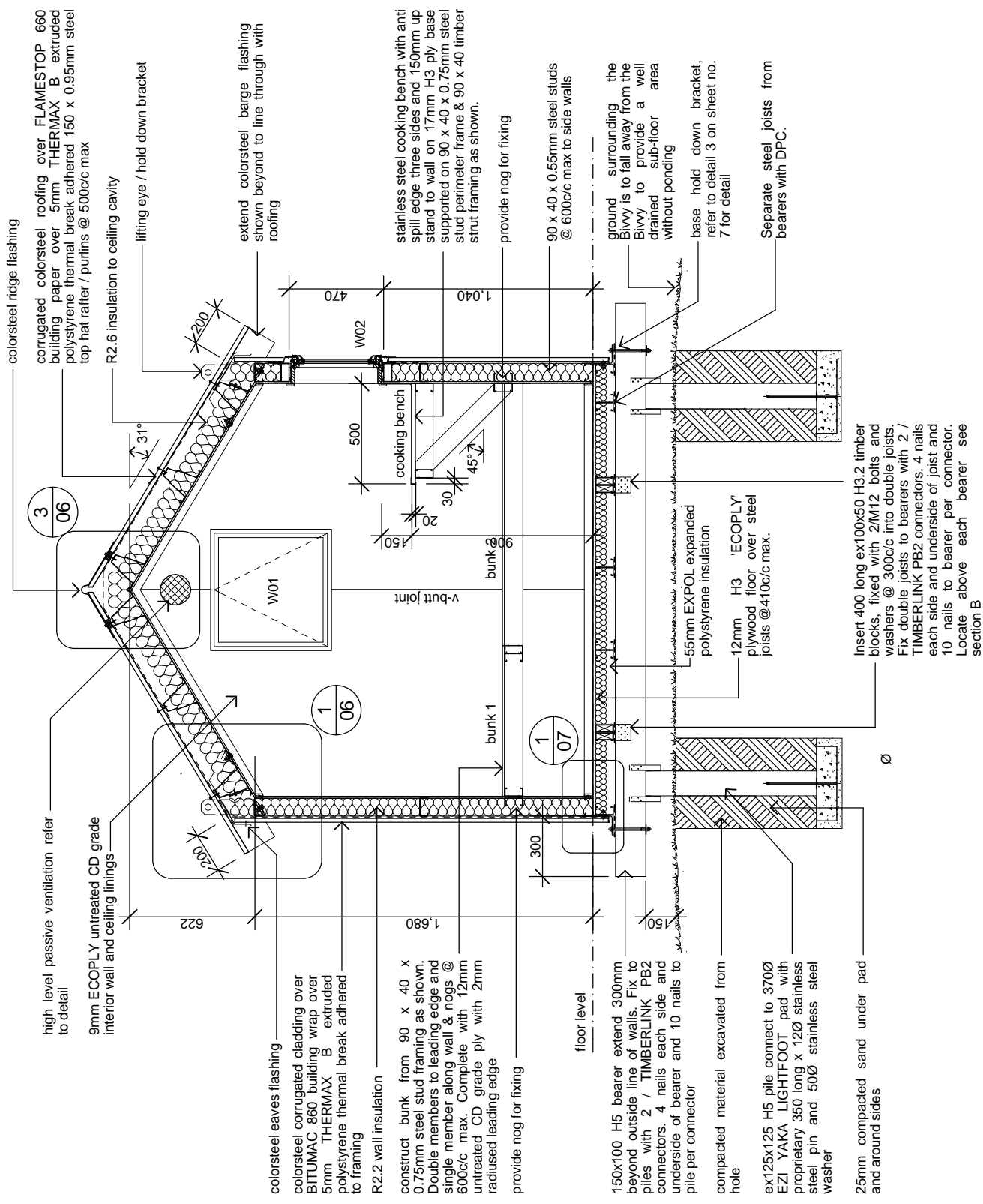
Refer to sheet 01 for further information

# 2 bunk window & door schedule

1:50

**note:**  
 the following, if required are not shown on this drawing.  
 - excavation  
 - water tank & stand  
 - tie-downs

Refer to sheet 01 for further information



**A** Section

1:20

4.0	First Issue	Mar 09	-
	REV No	DESCRIPTION	DATE
		Drawing Issue and Amendments	DWN CKD
VALO Standard Visitor 2 Bunk Hut - Appendix A1			
Caplita House 111 Dixon St P.O.Box 2115 Wellington 6140 Phone: 04-473 7577 Fax: 04-384 5177 www.pj-architects.co.nz			
PYNENBURG & COLLINS ARCHITECTS LTD			

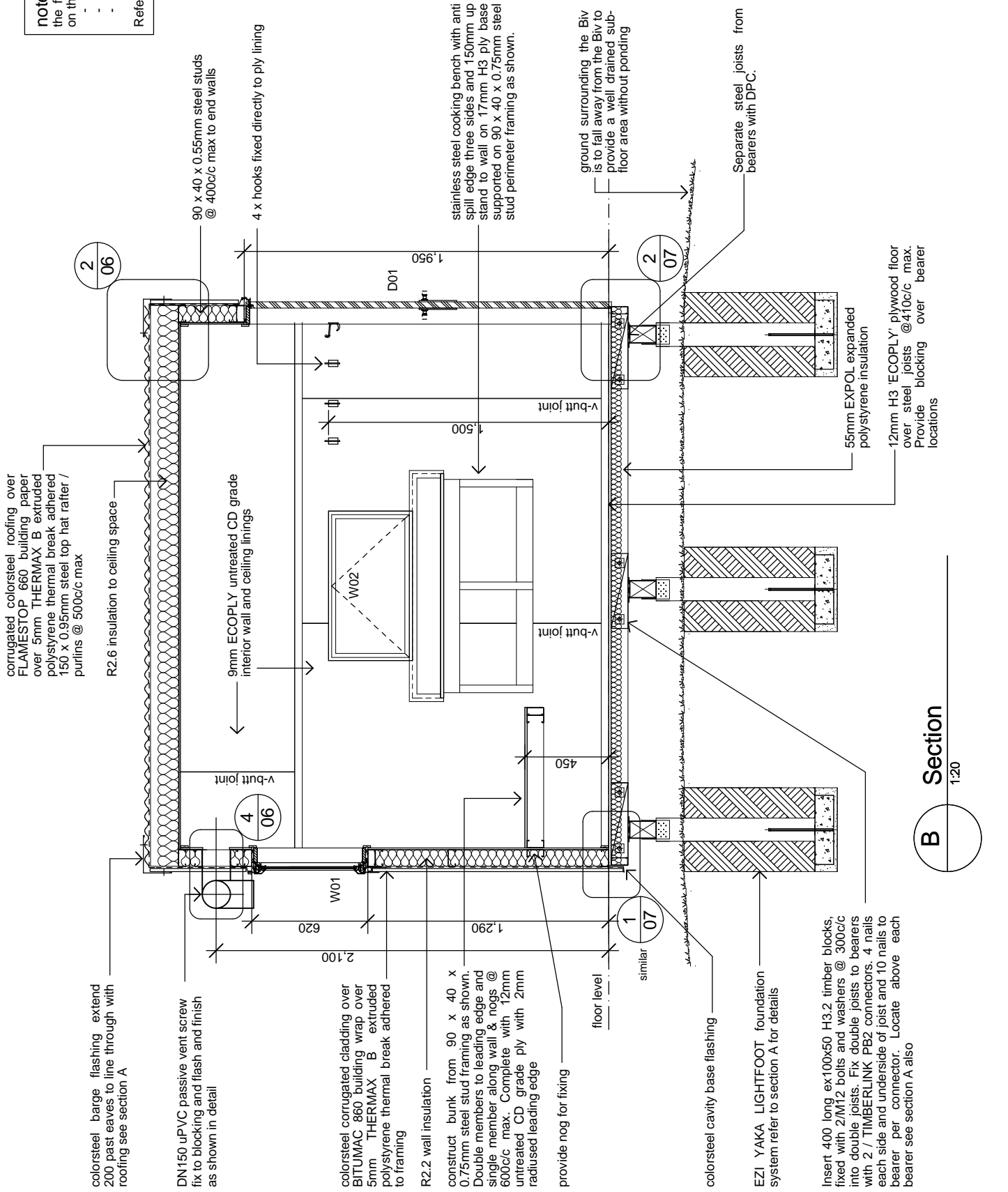
Contractor shall check all Dimensions on site prior to construction

PROJECT Standard Visitor 2 Bunk Hut  
 LOCATION New Zealand  
 AREA OFFICE All Area Offices

SHEET COMMENTS  
 section A  
 SCALES 1:20  
 @ A3 SHEET SIZE  
 DESIGN DRAWN CHECKED PROJECT No. SHEET No. REV No.  
 RP GR RP 0819 04  
 DATE March 2009

**note:**  
 the following, if required are not shown  
 on this drawing.  
 - excavation  
 - water tank & stand  
 - tie-downs

Refer to sheet 01 for further information



**B** Section  
 1:20

4.0	First Issue	Mar 09	-
	REV. NO. DESCRIPTION	DATE	BY/IN. CK/D
	Drawing Issue and Amendments		
VAL0 Standard Visitor 2 Bunk Hut - Appendix A1			

Capitche House  
 111 Dixon St  
 P.O.Box 2115  
 Wellington 6140  
 Phone: 04 - 473 7577  
 Fax: 04 - 384 5177  
 www.pjc-architects.co.nz

**PYENBURG & COLLINS**  
 ARCHITECTS LTD

Contractor shall check all Dimensions on site prior to construction

Department of Conservation  
*Te Papa Atarauhi*

Standard Visitor 2 Bunk Hut

PROJECT  
 LOCATION  
 New Zealand  
 AREA OFFICE  
 All Area Offices

SHEET COMMENTS		section B	SCALES
			1:20
DESIGN	DRAWN	CHECKED	PROJECT NO.
RP	GR	RP	0819
DATE	March 2009		REV. NO.
			<b>05</b>

colorsteel corrugated cladding over Flamestop 660 building paper. Lap building paper over flashing. Refer to specification for sheet fixings

hot dip galvanised steel lifting eye / hold down bracket. Flashed to roof barge flashing with flexible sealant all round - refer to detail 4 sheet 7 for bracket detail

200 x 75 x 0.55mm BMT colorsteel eaves flashing, colour to match wall cladding. Rivet flashing to wall cladding every 2nd crest

colorsteel corrugated cladding over BITUMAC 860 building wrap. Refer to specification for sheet fixings

5mm THERMAX B adhered to framing  
R2.2 wall insulation

### 1 eaves detail

1:10

50 x 50 x 0.75mm folded steel plate at ridge junction  
0.55mm BMT colorsteel purpose made ridge flashing, no soft edge. proprietary foam baffle under bottom edge, with 50mm cover minimum, colour to match roof cladding.

colorsteel corrugated cladding over Flamestop 660 building paper. Turn up sheet ends at ridge

5mm THERMAX B adhered to framing  
R2.6 ceiling insulation

ex40 x 12 untreated single bevel cornice, shape to roof pitch  
9mm ECOPLY untreated CD grade interior ceiling linings fixed to rafters / purlins and 50 x 50 x 0.75mm folded steel plate with 8g Wingtek counter sunk screws.

145Ø hole in ply lining at uPVC passive vent location. Hole trimmed by steel framing and covered with insect proof mesh prior to fixing of wall linings. 2mm radiused edges to ply.

### 3 ridge detail

1:10

R2.6 ceiling insulation  
fix all purlins at each end to top plate with 4 x 12g screws  
ex40 x 12 untreated single bevel cornice, shape to roof pitch  
50 x 50 x 0.75mm folded steel plate at wall / roof junction  
9mm ECOPLY untreated CD grade interior wall linings fixed to studs and 50 x 50 x 0.75mm folded steel plate with 8g Wingtek counter sunk screws @ 150c/c max.

colorsteel corrugated cladding over Flamestop 660 building paper over 5mm THERMAX B adhered rafter/purlin. Lap building paper 150 wall building wrap  
R2.6 ceiling insulation  
50 x 50 x 0.75mm folded steel angle at corner to take linings. Fix to top hat and top plate  
ex40 x 12 untreated single bevel cornice, shape to roof pitch  
9mm ECOPLY untreated CD grade interior wall linings fixed to corner studs and 50 x 50 x 0.75mm folded steel plate with 8g Wingtek counter sunk screws.

### 2 barge detail

1:10

use TASMAN PROTECTO SILL SYSTEM flashing tape at pipe penetration to building wrap, lap flashing tape over building wrap 100mm and pipe 25mm.

flash pipe to cladding with DEKTITE flashing sealed and riveted

150Ø uPVC pipe, solvent weld into T shape, exterior horizontal to be 400mm long, with 90° bends at ends, screw fix to steel framing  
colorsteel corrugated cladding over BITUMAC 860 building wrap over 5mm THERMAX B adhered to framing

### 4 passive vent

1:10

0.55mm BMT continuous colorsteel flashing, colour to match wall cladding. Rivet flashing to wall cladding

0.55mm BMT continuous colorsteel back flashing fixed to framing.  
5mm THERMAX B adhered to framing

colorsteel corrugated cladding over BITUMAC 860 building wrap  
R2.2 wall insulation  
9mm ECOPLY untreated CD grade interior wall linings fixed to corner studs and 50 x 50 x 0.75mm folded steel plate with 8g Wingtek counter sunk screws.

### 5 corner detail

1:10

200 x 150 x 0.55mm BMT colorsteel barge flashing, colour to match roof cladding. Rivet flashing to wall cladding every 2nd crest  
50 x 50 x 0.75mm folded steel plate to end of top hat purlins to take cladding fixings. Fix to top hat and top plate with 8g Wingtek screws

colorsteel corrugated cladding over BITUMAC 860 building wrap over 5mm THERMAX B adhered to framing  
R2.2 wall insulation

colorsteel corrugated cladding over BITUMAC 860 building wrap over 5mm THERMAX B adhered to framing  
R2.2 wall insulation

### 2 barge detail

1:10

REV	NO	DESCRIPTION	DATE	BY	CHKD
4.0		First Issue	Mar 09		
		Drawing Issue and Amendments			

VALO Standard Visitor 2 Bunk Hut - Appendix A1

Capitex House  
111 Dixon St  
P.O.Box 2115  
Wellington 6140  
Phone: 04 - 473 7577  
Fax: 04 - 384 5177  
www.pjc-architects.co.nz

PYNEBURG & COLLINS ARCHITECTS LTD

Contractor shall check all Dimensions on site prior to construction



PROJECT Standard Visitor 2 Bunk Hut

LOCATION New Zealand

AREA OFFICE All Area Offices

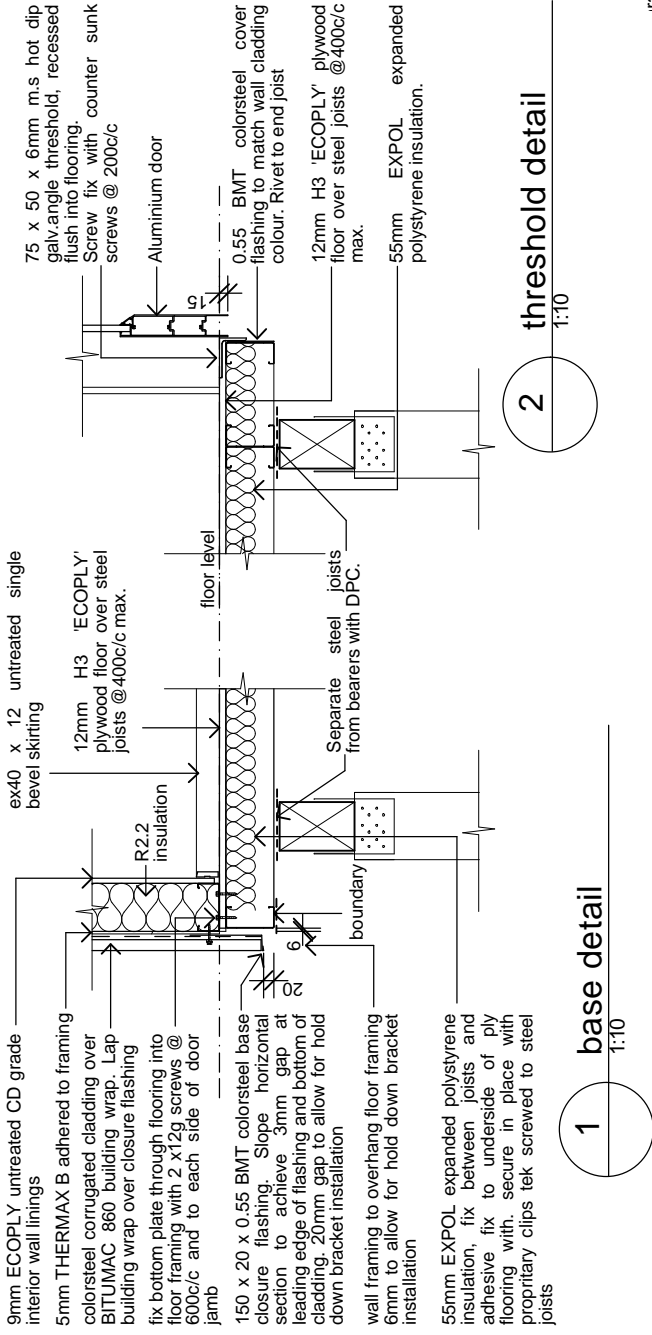
SHEET COMMENTS

standard details

DESIGN	DRAWN	CHECKED	PROJECT NO.	SCALE
RP	GR	RP	0819	1:10
DATE			March 2009	

06





9mm ECOPLY untreated CD grade interior wall linings

5mm THERMAX B adhered to framing

colorsteel corrugated cladding over BITUMAC 860 building wrap. Lap building wrap over closure flashing

fix bottom plate through flooring into floor framing with 2 x 12g screws @ 600c/c and to each side of door jamb

150 x 20 x 0.55 BMT colorsteel base closure flashing. Slope horizontal section to achieve 3mm gap at leading edge of flashing and bottom of cladding. 20mm gap to allow for hold down bracket installation

wall framing to overhang floor framing 6mm to allow for hold down bracket installation

55mm EXPOL expanded polystyrene insulation, fix between joists and adhesive fix to underside of ply flooring with. secure in place with proprietary clips tek screwed to steel joists

ex40 x 12 untreated single bevel skirting

12mm H3 'ECOPLY' plywood floor over steel joists @400c/c max.

R2.2 insulation

boundary

floor level

Separate steel joists from bearers with DPC.

75 x 50 x 6mm m.s hot dip galv. angle threshold, recessed flush into flooring. Screw fix with counter sunk screws @ 200c/c

Aluminium door

0.55 BMT colorsteel cover flashing to match wall cladding colour. Rivet to end joist

12mm H3 'ECOPLY' plywood floor over steel joists @400c/c max.

55mm EXPOL expanded polystyrene insulation.

8mm m.s. flat. Weld 2 / 75x75x8mm cleats, drill bolts for M12 bolts complete with 50x50x3mm washers galv. and fix to top plate.

Fillet weld 75 x 10 x 6mm x 265 long ms flat lifting eye / hold down bracket complete with 300 hole to 8mm flat. All to be hot dip galv.

140 x 60 x 3mm long m.s. flat cleat. Weld to main bracket centrally and fix to side of purlin with 4x12g Tek screws evenly spaced

150 top hat section, fix to top plate with 2 x 12g screws each side. (4 total)

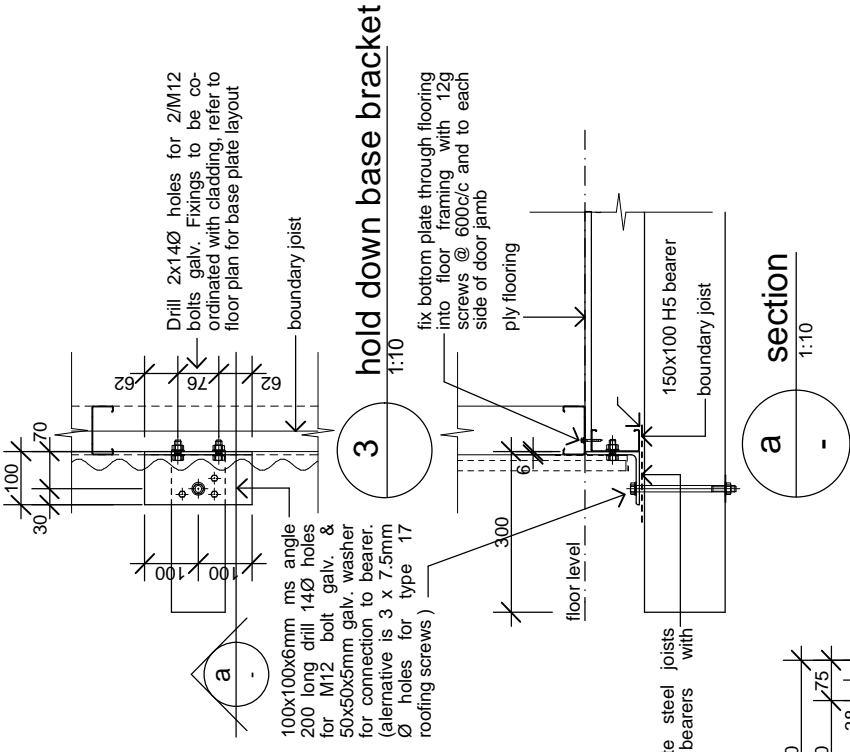
steel end wall studs, double screw fix each side to top plate (8 total)

Fillet weld 75 x 10 x 6mm x 265 long ms flat lifting eye / hold down bracket complete with 300 hole to 8mm flat. All to be hot dip galv.

140 x 60 x 3mm long m.s. flat cleat. Weld to 8mm m.s. flat main bracket centrally and fix to side of purlin with 4x12g Tek screws evenly spaced

150 top hat section, fix to top plate with 2 x 12g screws each side. (4 total)

75x75x8mm cleat, drill bottom for M12 bolt complete with 50x50x3mm washers galv. and fix to top plate.



100x100x6mm ms angle  
200 long drill 140 holes for M12 bolt galv. & 50x50x5mm galv. washer for connection to bearer. (alternative is 3 x 7.5mm Ø holes for type 17 roofing screws)

Drill 2x140 holes for 2M12 bolts galv. Fixings to be coordinated with cladding, refer to floor plan for base plate layout

boundary joist

ply flooring

fix bottom plate through flooring into floor framing with 12g screws @ 600c/c and to each side of door jamb

150x100 H5 bearer

boundary joist

REV NO	DESCRIPTION	DATE	BY	CHKD
4.0	First Issue	Mar 09	-	-

Drawing Issue and Amendments

V4.0 Standard Visitor 2 Bunk Hut - Appendix A1

Capitla House  
111 Dixon St  
P.O.Box 2115  
Wellington 6140  
Phone: 04 - 473 7577  
Fax: 04 - 384 5177  
www.jpcc-architects.co.nz

**PYENBURG & COLLINS**  
ARCHITECTS LTD

Contractor shall check all Dimensions on site prior to construction

**Department of Conservation**  
*Te Papa Atarauhi*

**PROJECT** Standard Visitor 2 Bunk Hut

**LOCATION** New Zealand

**AREA OFFICE** All Area Offices

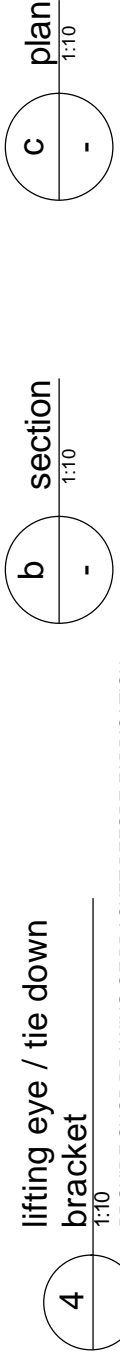
**SHEET COMMENTS**

DESIGN	DRAWN	CHECKED	PROJECT NO.	SHEET NO.	REV. NO.
	GR	RP	0819		07

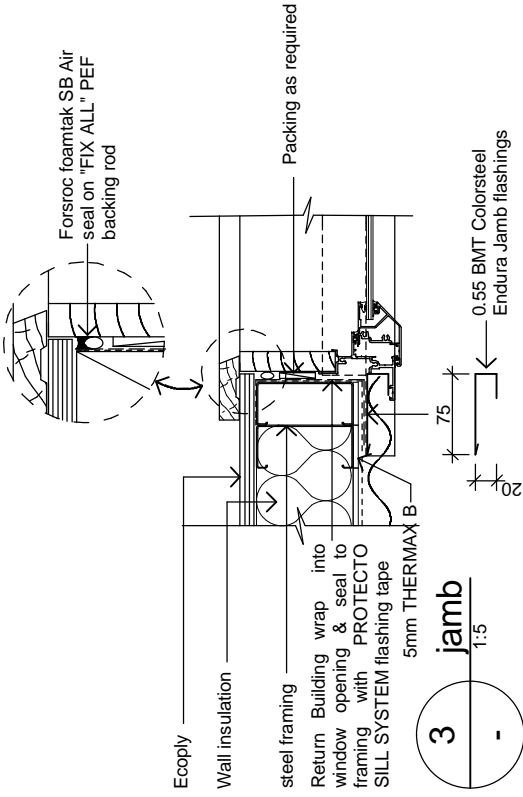
March 2009

**standard details**

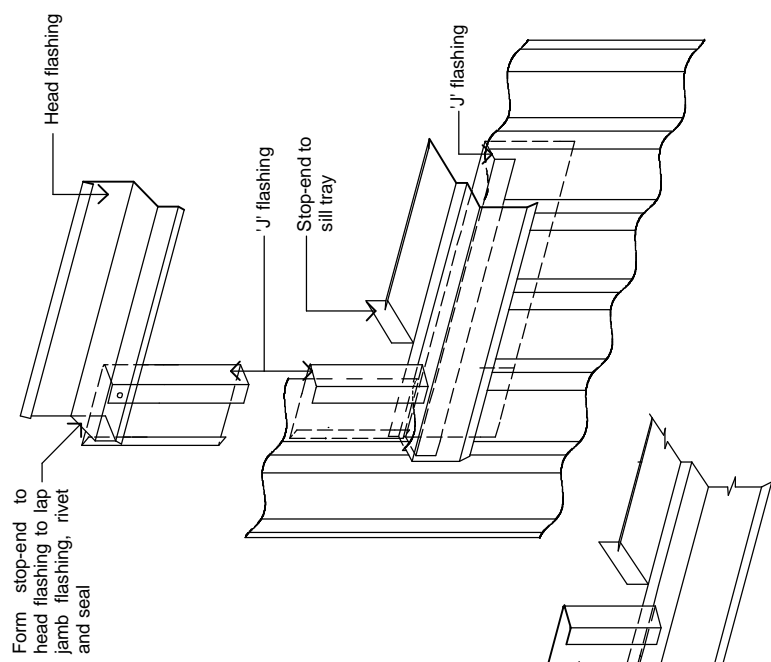
**SCALES** 1:10



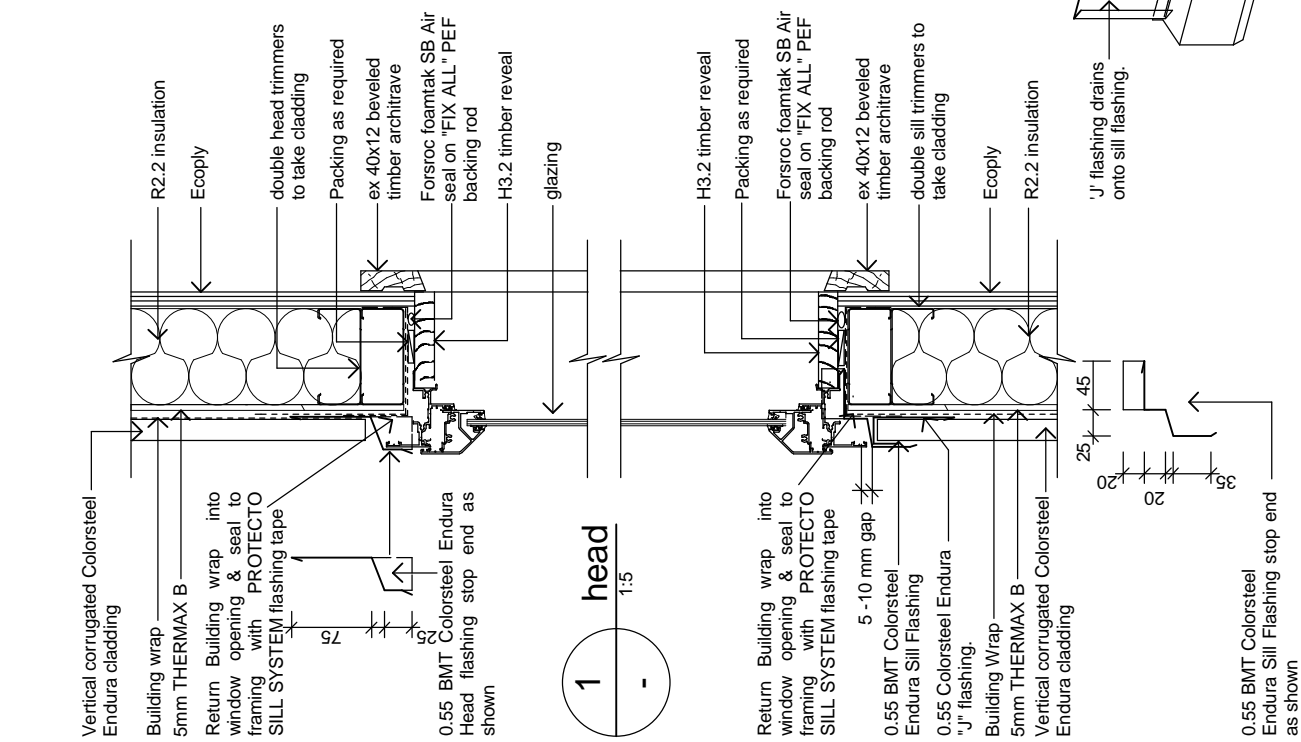
PROVIDE SHOP DRAWING OF BRACKET BEFORE FABRICATION



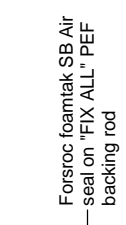
3 jamb  
1:5



1 head  
1:5



2 sill  
1:5



4.0	First Issue	Mar 09	-
	REV NO	DESCRIPTION	DATE
		Drawing Issue and Amendments	DWN CKO
V4.0 Standard Visitor 2 Bunk Hut - Appendix A1			

Capitla House  
111 Dixon St  
P.O.Box 2115  
Wellington 6140  
Phone: 04-473 7577  
Fax: 04-384 5177  
www.pjc-architects.co.nz

**PYENBURG & COLLINS**  
ARCHITECTS LTD

Contractor shall check all Dimensions on site prior to construction



PROJECT Standard Visitor 2 Bunk Hut

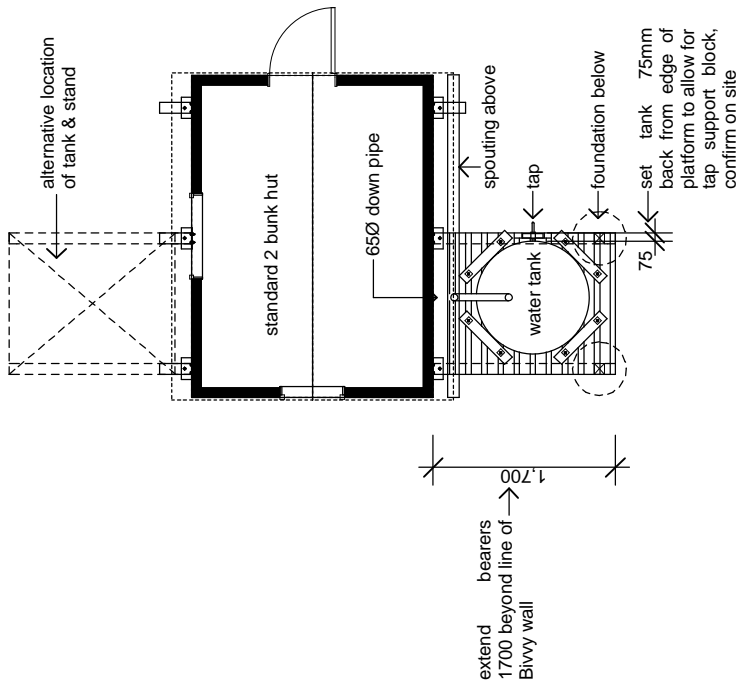
LOCATION New Zealand

AREA OFFICE All Area Offices

SHEET COMMENTS

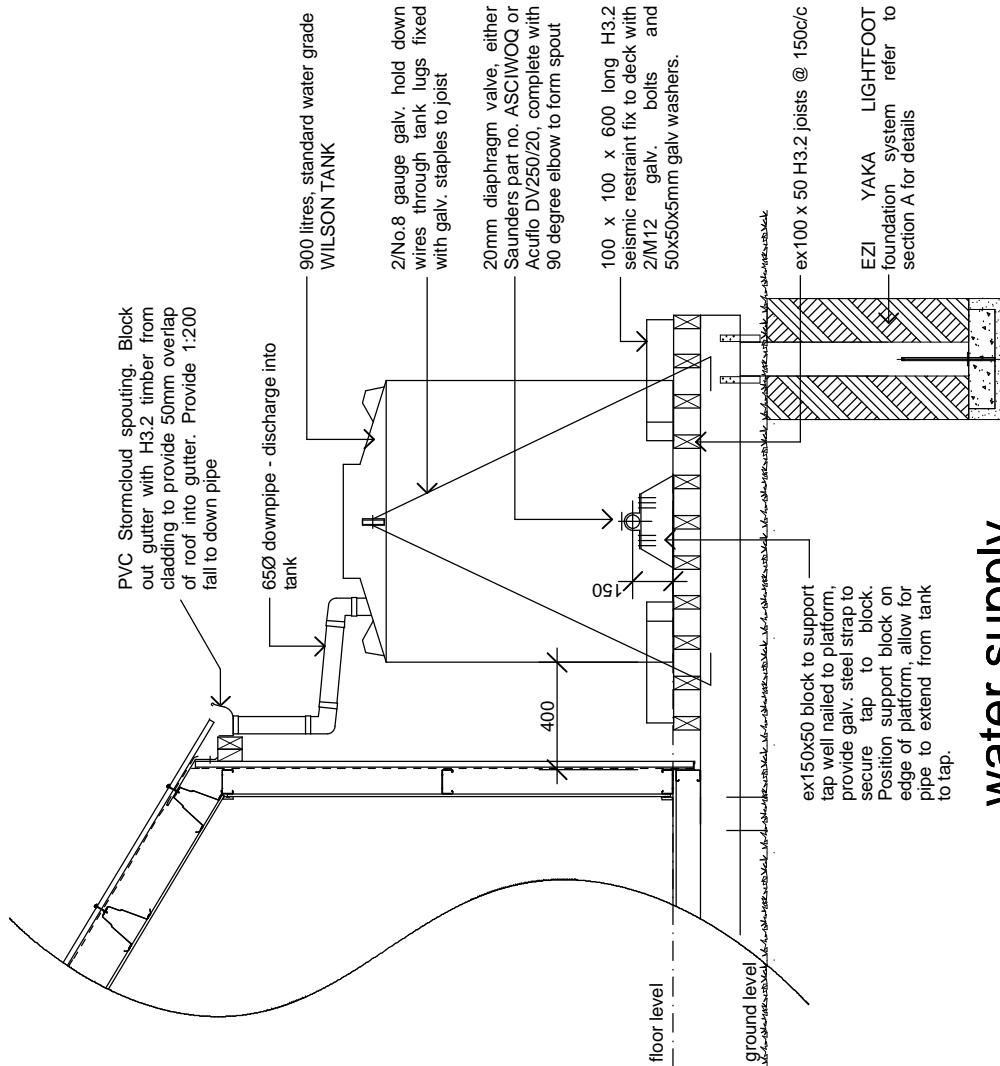
window & door installation details

DESIGN	DRAWN	CHECKED	PROJECT NO.	SHEET NO.	REV. NO.
	GR	RP	0819	08	
DATE March 2009					



## water tank stand

1:50



## water supply

1:20

**note:**  
the water tank and stand can be either side of hut. Refer to sheet 01 for information on location

4.0	First Issue	Mar 09	-
	REV No	DESCRIPTION	DATE
			DWN CKO
Drawing Issue and Amendments			
V4.0 Standard Visitor 2 Bunk Hut - Appendix A1			

Capitol House  
111 Dixon St  
P.O.Box 2115  
Wellington 6140  
Phone: 04 - 473 7577  
Fax: 04 - 384 5177  
www.pj-architects.co.nz

**PYENBURG & COLLINS**  
ARCHITECTS LTD

Contractor shall check all Dimensions on site prior to construction



PROJECT Standard Visitor 2 Bunk Hut

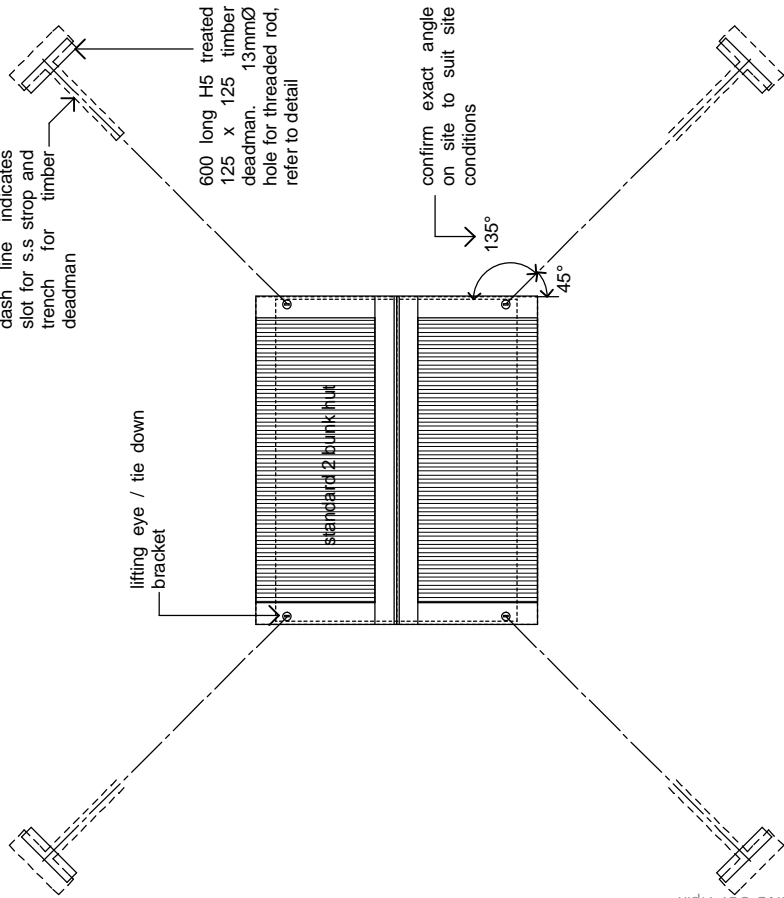
LOCATION New Zealand

AREA OFFICE All Area Offices

SHEET COMMENTS

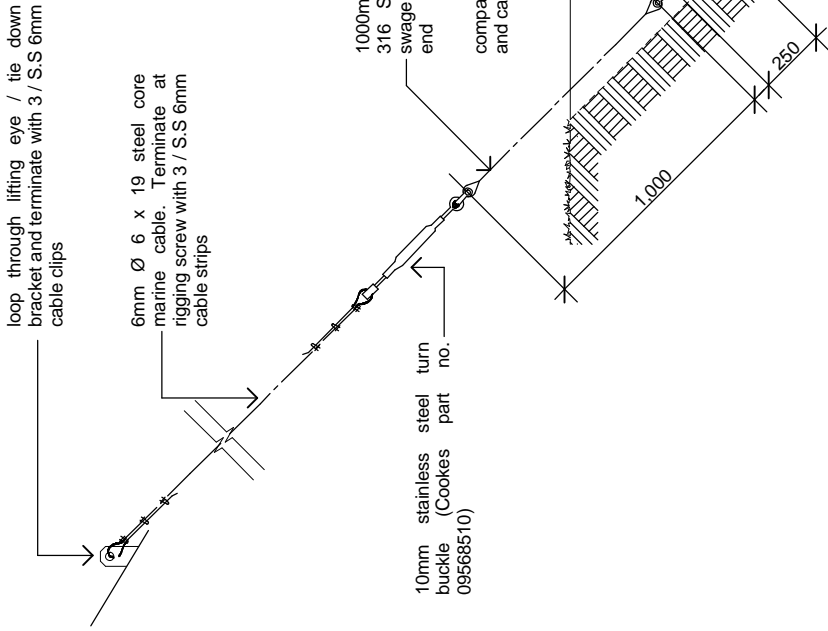
SCALES	1:50,
	1:20
DESIGN	water supply
DRAWN	
CHECKED	
PROJECT No	
SHEET No.	
REV No.	
DATE	0819
	March 2009

DESIGN	W1
DRAWN	
CHECKED	
PROJECT No	
SHEET No.	
REV No.	
DATE	0819
	March 2009



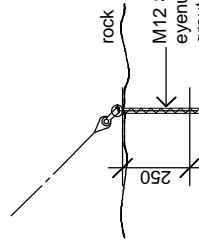
tie down plan

1:50



tie down and ground anchor detail

1:20



ground anchor detail at rock

1:20

note:

1. check tie down assembly for compatibility before flying to site.
2. wire up rigging screw and shackles with 2mm Ø S.S wire following adjustment.
3. install cable grips with saddle on 'live' cable.
4. assemble eye nut, threaded rod and nuts with LOCTITE 243.

REV	NO	DESCRIPTION	DATE	BY	CHK
4.0		First Issue	Mar 09		

Drawing Issue and Amendments

V4.0 Standard Visitor 2 Bunk Hut - Appendix A1

Capitol House  
111 Dixon St  
P.O.Box 2115  
Wellington 6140  
Phone: 04 - 473 7577  
Fax: 04 - 384 5177  
www.pac-architects.co.nz

**PYNEBURG & COLLINS**  
ARCHITECTS LTD

Contractor shall check all Dimensions on site prior to construction

Department of Conservation  
*Te Papa Ataturai*

PROJECT Standard Visitor 2 Bunk Hut

LOCATION New Zealand

AREA OFFICE All Area Offices

SHEET COMMENTS		SCALES	
tie down plan & details		1:50	
		1:20	
DESIGN	DRAWN	CHECKED	PROJECT NO.
RP	GR	RP	0819
DATE	March 2009		REV. NO.
			<b>T1</b>

## APPENDIX A2.1: SPECIFICATION

### STANDARD 2 BUNK VISITOR HUT WITH WATER SUPPLY AND TIE-DOWNS

#### CURRENT SPECIFICATION REGISTER

	<b>Title</b>	<b>Version</b>	<b>Date issued</b>
	Standard 2 bunk visitor hut with water supply and tie-downs	4.0	March 2009

#### AMENDMENT REGISTER

Amendment date	Amendment details (section, page number, block)	Version	Signature of copyholder and date

## SPECIFICATION

of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

# Standard Two Bunk Visitor Hut

With water supply and tie-downs



Capiche House  
111 Dixon Street  
P.O. Box 2115  
Wellington 1  
Phone: (04) 473 7577  
Fax: (04) 384 5177  
[www.pc-architects.co.nz](http://www.pc-architects.co.nz)

Department of Conservation  
New Zealand

Practical  
&  
Innovative  
Design

## Building Consent & Construction

V4.0 Base Specification March 2009



Department of Conservation  
*Te Papa Atawhai*

Directors:

Ron Pynenburg

BBSc BArch (Hons) PPNZIA

Life member FNZIA

Ken Collins

BBSc BArch (Hons) ANZIA

Tim Burns

BBSc BArch (Hons) ANZIA

<b>CONTENTS</b>	<b>page</b>
<b>1.0 PRELIMINARY AND GENERAL .....</b>	<b>1</b>
1.1 Form of Contract	1
1.2 Requirements of Authorities	1
1.3 Inspections	1
1.4 Use of Documents	1
1.5 Contractor's Establishment and Work Area	1
1.6 Completion of Works	2
<b>2.0 SITEWORK AND FOUNDATIONS.....</b>	<b>3</b>
2.1 Building Setout	3
2.2 Site Preparation	3
2.3 Obstructions	3
2.4 Over Excavations	3
2.5 Inspection	3
2.6 Backfilling and Disposal	3
2.7 Foundations	3
2.8 Wind Tie-down System	4
<b>3.0 LIGHTWEIGHT STEEL FRAMING.....</b>	<b>5</b>
3.1 Scope	5
3.2 Standards	5
3.3 Materials and Workmanship	5
3.4 Surface Preparation	6
3.5 Loading and Serviceability Criteria	7
<b>4.0 CARPENTRY AND GENERAL .....</b>	<b>8</b>
4.1 Workmanship	8
4.2 Underfloor Insulation	8
4.3 Plywood Flooring	8
4.4 Plywood Walls and Ceiling	8
4.5 Mouldings	8
4.6 Air Seals	9
4.7 Bunks	9
4.8 Internal Cooking Bench	9
4.9 Hooks	9
4.10 Lifting Eye	9
<b>5.0 ROOFING AND CLADDING.....</b>	<b>10</b>
5.1 Workmanship	10
5.2 Insulation	10
5.3 Building wrap	10
5.4 Profiled Metal Roofing and Cladding	10
5.5 Flashings	11
5.6 thermal break	11
<b>6.0 EXTERIOR JOINERY .....</b>	<b>12</b>
6.1 Materials and Labour	12
6.2 Aluminium Windows	12
6.3 Aluminium Door	12
6.4 Glazing	13
6.5 uPVC Vent	13

<b>7.0 FINISHING AND PAINTING .....</b>	<b>14</b>
<b>7.1 Workmanship and Materials</b>	<b>14</b>
<b>7.2 Preparation</b>	<b>14</b>
<b>7.3 Systems</b>	<b>14</b>
<b>7.4 Completion</b>	<b>15</b>
<b>8.0 WATER SUPPLY.....</b>	<b>16</b>
<b>8.1 Water Tank Stand</b>	<b>16</b>
<b>8.2 Water Tank</b>	<b>16</b>
<b>8.3 Gutters and Downpipes</b>	<b>16</b>

**APPENDIX A: DOC ENGINEER CALCULATIONS/ DETAILS (if required)**

**TWO BUNK HUT INFORMATION:**

**Service Standard:**

- Basic
- 2 visitor bunks
- BCA or RS Visitor Group

**Design Criteria Parameters:**

- Earthquake zone    any
- Wind load            3 kPa maximum
- Snow loading         3.1 kPa maximum
- Floor load            1.5 kPa



## **1.0 PRELIMINARY AND GENERAL**

### **1.1 FORM OF CONTRACT**

The form of Contract shall be the Department of Conservation General Conditions of Construction Works Contract together with any Special Conditions and/or Schedules provided.

For the purposes of this project, where this specification refers to the Contract Administrator, the Contract refers to the Supervisor.

### **1.2 REQUIREMENTS OF AUTHORITIES**

The Department of Conservation shall apply for and uplift the Resource Consent (if required), Project Information Memorandum and the Building Consent.

The Contractor shall ascertain and familiarise himself with the requirements of any consents prior to commencing work, and shall employ methods and work practices which comply. The Contractor shall establish which inspections are required by these consents, and shall pay and arrange for the inspections to take place including give all notices and arrange for inspections and the like required by the Building Consent. At the completion of the works the Contractor shall apply for and obtain the Code Compliance Certificate from the Territorial Authority,

These shall be provided to the Contract Administrator.

### **1.3 INSPECTIONS**

Where consultation with or inspection by the Contract Administrator or other consultants is required a minimum of 48 hours notice shall be given by the Contractor.

### **1.4 USE OF DOCUMENTS**

The Contractor shall read the specification, the drawings and the Conditions of Contract together and as referring to each other. What is omitted in one and included in the other shall be read as included in all. Bring any ambiguity or contradiction to the Contract Administrator's notice for an Instruction before carrying out the affected work.

- Figure dimensions on drawings take precedence over drawings to a smaller scale.
- Drawings to a larger scale take precedence over drawings to a smaller scale.
- Drawings take precedence over the specifications

Do not scale dimensions from the drawings. Any ambiguity or conflict in dimensions must be referred to the Contract Administrator for an Instruction.

### **1.5 CONTRACTOR'S ESTABLISHMENT AND WORK AREA**

The Contractor shall liaise with the Local Area Office of the Department of Conservation to determine suitable areas for the Contractor's site sheds/tents and other working areas, and to make arrangements regarding the use of existing toilets, huts, and other facilities.

It shall be the Contractor's responsibility to arrange for any additional accommodation, sanitary facilities, power and communication facilities required, including all permits and approvals from the relevant service authority.

The Contractor shall reinstate all areas affected by the contract, including the establishment and working areas to the reasonable satisfaction of the Contract Administrator.

The Contractor's site areas and sheds/tents shall be made available for use by the Contract Administrator and the Principal and free access to the Contractor's records and documents shall be allowed.

## **1.6 COMPLETION OF WORKS**

Although it may not be expressly mentioned or shown on each and every item, or detailed in the Specification, all equipment, joinery fittings and services shall be left in first class condition and proper working order. All visible work, surfaces, materials and finishes shall be left in first class condition without damage or blemish.

Remove all rubbish arising from this Contract from the Site and Works. Leave all floors swept clean, clean all glass inside and out, remove all paint, concrete and other marks, clean all prefinished or decorated woodwork, fittings, and all items generally to leave the building and site clean and fit for immediate occupation and use by DOC.

The Contractor shall provide to the Contract Administrator a copy of an "as built" plan showing to a suitable scale, the position of all underground services, as relating to the contract works. The "as built" plan shall be forwarded to the Contract Administrator prior to any retention monies being released.

## 2.0 SITEWORK AND FOUNDATIONS

### 2.1 BUILDING SETOUT

Refer to the site plan for building locations, relative levels and areas for excavation (if any). Floor level established from setting out top of shortest pile to be 150mm above ground level.

The location of all buildings and finished levels shall be confirmed on site by the Contract Administrator.

### 2.2 SITE PREPARATION

Remove all leaf-litter or other material from the area to be built upon.

When shown on the drawings, excavate for hut platform and for foundations to be built to the dimensions and details shown allowing for working room as necessary. Batters and cut faces shall be a minimum of 1m clear of the hut outline. Ground surrounding the hut shall fall a minimum of 50mm towards any batter or cut face. Ensure that falls underneath and surrounding hut are formed to provide a well-drained sub-floor area without ponding.

### 2.3 OBSTRUCTIONS

Excavate and remove any obstruction that is encountered that may interfere with the specified ground levels and contours and shape and size of the foundations as detailed.

### 2.4 OVER EXCAVATIONS

The pile depths shown are indicative, based on site investigations, and bearing depth may occur at lower levels. Any additional excavation caused solely by encountering poor ground conditions or other natural weakness shall be treated as a variation provided such work has been authorised by the Contract Administrator.

### 2.5 INSPECTION

The Administrator shall be given 48 hours notice to enable inspection of the foundation excavations. Approval shall be obtained before installation of piles commences.

### 2.6 BACKFILLING AND DISPOSAL

All material removed from the excavation, and which is approved as suitable by the Contract Administrator, shall be used as far as practicable in backfilling foundations in accordance with the directions noted in the Foundation System section of this specification and on the drawings. Surplus or unsuitable excavated material shall be disposed of as directed by the Contract Administrator in a safe and legal manner.

### 2.7 FOUNDATIONS

Conqra Lightfoot foundations comprising Ezi-Yaka lightfoot pad set at base of pile with 125 x 125 H5 sawn piles installed and with connections to sub-floor framing as per the details. Piles to be accurately positioned and set plumb and vertical, 150mm minimum out of ground.

The pile depths shown are indicative, based on site investigations, and bearing depth may occur at lower levels. Any additional excavation caused solely by encountering poor ground conditions or other natural weakness shall be treated as a variation provided such work has been authorised by the Contract Administrator.

Provide all temporary bracing necessary to the piles until such time as the piles can support the structure without distress to either element. All piles to be accurately cut to levels for floor framing.

Provide bracing as noted in the foundation plan on the drawings.

## **2.8 WIND TIE-DOWN SYSTEM**

Wind tie-down system provided to the details as shown on the drawings.

Prior to Anchor blocks being buried and hut connection brackets being enclosed, these items shall be inspected by DOC's engineer. Provide at least five working days notice of when the inspection is to be required.

## 3.0 LIGHTWEIGHT STEEL FRAMING

### 3.1 SCOPE

This section covers all cold rolled galvanised steel wall and roof framing and specifically includes the light weight steel wall frames and their fixings.

### 3.2 STANDARDS

Work and materials shall comply with the following relevant standards:

NZS 3441:1978	Hot Dipped Zinc Coated Steel Coil and Cut Lengths
AS 1397:1984	Hot Dipped Zinc Coated Steel Coil and Cut Lengths
AS 1594:	Hot Rolled Unalloyed Low Carbon Steel Sheet and Strips

### 3.3 MATERIALS AND WORKMANSHIP

#### Steelwork:

All steelwork shall be of the size and weights figured on the drawings. The following Standards Sections shall be used:

Wall frames	Steelite framing 90 x 40 x 0.55
Floor frame	Steelite framing double 90 x 40 x 0.55
Roof frame	150 x 0.95 top hat
Bunks and bench frame	Steelite framing 90 x 40 x 0.75

Contact Harris Foster Ltd (Maurice Harris ph 09 367 1070, email [Maurice@hfc.co.nz](mailto:Maurice@hfc.co.nz)) for supply of steel framing. All necessary cleats brackets angles etc shall be prepared as above. Should the lightweight steel frame supplier wish to make alterations to the details and sizes given, he shall submit the altered details on shop drawings to the engineer.

All pre-made frames shall be provided with shop drawings indicating sizes, weights and dimensions. All openings, including lintels, jambs and sills shall be detailed. All lightweight steel framing and fixings shall be designed to the loading criteria given in Section 3.5.

#### Dimensions:

The contractor and steel framing supplier shall check all dimensions prior to fabrication of wall frames and other frames and other framing components.

Should any discrepancy be found, the engineer shall be notified at once.

#### Fabrication:

Frame and lintel components shall be accurately cut to length so that they fit firmly against abutting members and shall be held firmly in place until properly fastened.

The following shall apply:

- Studs shall be seated squarely in bottom plates with webs at 90° to the face of the wall.
- Studs shall be accurately located, plumbed and securely fastened to the flanges of top and bottom plates.
- Multiple studs shall be used as required at all points of concentrated load e.g. opening jambs.

- Plates shall be provided in lengths to maintain continuity.
- Splices in studs shall not be permitted.
- In order to maintain structural integrity and to support linings, short studs shall be provided between bottom plates and windowsills, between top plates and window heads, and between top plates and door heads or in other areas around openings where appropriate.
- All frames shall be adequately braced until linings are fixed.
- The preferred method of fastening is self-drilling self-tapping screws, or approved blind rivets.
- All frames shall be supplied with noggin, folded plates and support points for the linings and intersecting walls shown on the architect's drawings.

#### Erection:

Provision shall be made to clamp all framing firmly together while on site TEK screwed joints are being completed. All frames shall be true to line and plumb prior to fixing. The following shall apply:

- The frames are to be fabricated in a factory and fixed together to form the frame for a transportable building.
- Lifting, loading and transportation of prefabricated frames shall be accomplished with sufficient care to prevent local damage to frames.
- Site connections shall be as specified.
- The bottom plate shall be securely anchored to floors using 2/12g TEK screws at 600mm max. c-c and at door jambs. These screws must go through the bottom plate, the ply flooring and fix into the floor frame trimming member.
- **All bottom plates and other lightweight steel sections shall be separated from the treated bearers using a malthoid membrane.**

#### Fixings:

Generally TEK screws, self-drilling of minimum 10 gauge shall be used to fix frames to frames. 12gauge screws shall be used to fix the bottom plate to the floor frame and to fix the purlins to the top plates. 4.5mm blind steel rivets shall be used to fabricate the frames. The lightweight steel-framing contractor shall supply all fixing details necessary to comply with the loadings. All the screws fixings steel components shall be electroplated (zinc plated with a gold chromate finish).

#### Finishing:

Leave all this work in first class condition for the following trades. On completion of framing all debris shall be removed from cavities in bottom plates. This includes all metal fillings etc.

#### General:

Handle and store channels, studs and accessories to avoid damage. Keep dry in transit, store clear of the ground on timber pallets and under cover. If they become wet, separate out, wipe dry with a cloth and restack allowing full air circulation.

### **3.4 SURFACE PREPARATION**

All cold rolled steel sections used for roof and wall framing and not specifically listed for special treatment shall be galvanised with a zinc coating of not less than 275 g/m<sup>2</sup> in accordance with the relevant standards in Section 3.2.

Any areas of galvanising which are damaged during erection shall be cleaned and touched up with zinc rich primer.

Floor Joists and other external exposed surfaces shall be sprayed with “Goldseal” prior to fabricating the frame. This specifically applies to the floor frame.

### 3.5 LOADING AND SERVICEABILITY CRITERIA

All lightweight steel internal framing including lintels, trimmers and openings, and connections to roof framing and other wall framing or structure shall be designed to comply with the New Zealand Building Code and adequate to support the loads specified in the New Zealand Loading Code NZS 4203:1992, and in particular the loads and serviceability criteria set out below.

All lightweight steel supplied, shall be designed in accordance with AS 1538:1988 or AISI-LRFD cold-formed steel design.

Item	Design Loads	Serviceability limits for deflection
Wall Framing	Wind loads	Face Loading (Wind)
	q ult = 3.0 KPa	Ply lined walls – H/200
	q serv = 1.95 KPa	Impact (0.7kN mid span)
Roof Framing	Snow load = 3.1 KPa	

## 4.0 CARPENTRY AND GENERAL

### 4.1 WORKMANSHIP

Set out, erect and fix all material and work accurately, level, square and plumb to produce an even finish, flush across joints and suitable for any subsequent work. Execute all cuts, mitres and scribes true to line to produce a first class job and tight junctions. Make all joints in the strongest possible manner, tight and secure. Stagger laps and joints where possible. All exposed surfaces shall have all machine marks removed and left fit for specified finishes.

Adequate protection must be given to all materials to keep them in first class condition and suitable for their intended use and finish. All timber for exposed work shall be free from defects that would prevent a good dressed surface and satisfactory finishing.

### 4.2 UNDERFLOOR INSULATION

Underfloor insulation shall be 55mm "EXPOL" expanded polystyrene under floor insulation laid tight fit between floor joists and adhered to underside of ply flooring with "EXPOL" adhesive along top of spacer ribs.

### 4.3 PLYWOOD FLOORING

Lay 12mm H3 treated Ecoply 'Plyfloor' (CD grade) sheets in stretcher bond pattern, ensuring all end joints land on joists. Butt join all edges.

Fix sheets with 45mm x 10 gauge grade 304 stainless steel self drilling, self tapping screws, driven flush with sheet surface. Fixings 7 - 15mm behind tongues or from sheet edges, spaced at 150mm centres on all edges, and 300mm centres in the body of the sheet.

### 4.4 PLYWOOD WALLS AND CEILING

9mm CD grade untreated Ecoply, with sheets square, horizontal and parallel fixed to wall and ceiling framing. Butt joint sheets together, arris all visible edges. Provide solid fixing for all sheet edges. Where ceiling sheets are not full length, provide a 100mm strip of ply as a backing for full length of joint and fix as noted for edges below.

Fix all sheets with 45mm x 8 gauge hot dip galvanised Wingtek countersunk head screws at spacings as noted below:

Area	Edge fixing	Intermediate fixing
Wall	150mm c/c	300mm c/c
Ceiling	150mm c/c	200mm c/c

### 4.5 MOULDINGS

Joints in lengths of runs shall be neatly and accurately mitred. External corners to be mitred and internal corners scribed. In dressed timber counter sink screws below surface. If necessary, drill screw holes prior to fixing as no split timbers will be accepted.

- Skirtings - 40 x 12 single bevel, untreated Radiata
- Cornice - 40 x 12 single bevel, untreated Radiata
- Architraves— 40 x 12 single bevel, untreated Radiata



Allow for other miscellaneous mouldings and finishing work as required to complete the job.

#### **4.6 AIR SEALS**

Apply 12mm deep bead of Fosroc foamtak SB Air seal on "Fix All" PEF backing rod to all four sides of trimmed opening between timber reveals of joinery units (i.e. windows, door, passive ventilation grilles and the like) and steel framing. Sealant to be flush with internal side of framing as shown on the drawings.

#### **4.7 BUNKS**

Construct and fit two single level bunks in the locations and to the details shown in the drawings.

Generally all framing to bunks shall be 90 x 40 x 0.75mm steel framing to dimensions shown on drawings. Complete with 12mm untreated CD grade ply with 2mm radiused leading edge, and sanded with fine sand paper to smooth finish. Fixed to framing with 45mm x 8 gauge hot dip galvanised Wingtek countersunk head screws at 150mm c/c to edges and 300mm c/c to intermediate framing.

#### **4.8 INTERNAL COOKING BENCH**

Construct and fit internal cooking bench in the location and to the details shown in the drawings.

Construct from 90 x 40 x 0.75mm steel framing. Fix 90 x 40mm timber diagonal brace at each end of benchtop and one central. Provide solid fixing in wall framing for cooking bench. Fabricate and install cooking bench at 900mm above floor level.

Benchtop shall be 1200mm long x 500mm wide grade 304 18/10 stainless steel of minimum 0.9mm gauge with anti-spill front and side edges. Substrate shall be one layer of H3 treated 17mm ply CD grade. Bench to have 150mm upstand to back of benchtop. Fix and seal edge of upstand to ply wall lining with 40 x 12 single bevel untreated Radiata moulding.

#### **4.9 HOOKS**

Supply and install 4 No. "DRAKE & WRIGLEY" hat and coat hooks catalogue number 1033. Finish to be natural brass. Screw fix directly to ply lining at 1500mm above floor level in location shown on the drawings.

#### **4.10 LIFTING EYE**

Lifting eye/hold down bracket roof penetration to be ex 75 x 10 m.s. flat installed and welded to frame strictly as per the details. Cut slot in barge flashing for lifting eye, seal with neutral-cure silicone sealant, and leave penetration weathertight.

## 5.0 ROOFING AND CLADDING

### 5.1 WORKMANSHIP

All work shall be carried out by experienced competent Tradesmen familiar with the products being used, in accordance with the best trade practice and current manufacturers installation specifications. The whole of the cladding shall be installed and left sound and weathertight.

### 5.2 INSULATION

Walls:

Walls are to be insulated with Tasman Insulation "R2.2 WALL PINK BATTS – RESIDENTIAL INSULATION", neatly cut, friction fitting between studs and dwangs. No uninsulated spaces shall be left and all obstructions etc shall have insulation behind them. Batts shall be fitted with inside face flush with inside surface of studs.

Ceiling:

Ceilings are to be insulated with Tasman Insulation "R2.6 CEILING PINK BATTS – RESIDENTIAL INSULATION" neatly cut between all ceiling framing and any blocking. No uninsulated spaces shall be left and all obstructions etc shall have insulation behind them. Batts shall be fitted with inside face flush with inside surface of framing.

### 5.3 BUILDING WRAP

Walls:

Tasman Insulation "Bitumac 860" building paper shall be fixed to outside face of the walls. Lay horizontally, with minimum of 150mm laps, starting at lowest point always. Building paper to be secured to THERMAX B at 300mm centres through Danband polypropylene strapping. No rips or tears or damage to paper. Building paper to lap over flashing, etc. as required to allow the removal of moisture, and to prevent moisture getting into the framing. Seal into window and door openings with Tasman Insulation "Protecto Sill System" flashing tape, 150mm wide

Roof:

Roofing underlay shall be Tasman Insulation "FLAMESTOP 660" laid from vertically from eave to eave over ridge and over purlins, with minimum 150mm laps, and laid towards the prevailing weather. No rips or tears or damage to paper. Building paper to lap over flashing, etc. as required to allow the removal of moisture, and to prevent moisture getting into the framing.

### 5.4 PROFILED METAL ROOFING AND CLADDING

Clad roofs and walls in full length sheets of "COLORSTEEL ENDURA" corrugated profile with strippable film, laid towards prevailing weather. Ensure lines remain vertical and parallel across width of building, and tops and bottoms horizontal and parallel.

Handling and fixing of cladding and accessories shall be strictly as per Manufacturer's instructions. Damaged cladding and accessories shall be rejected.

Walls:

Cladding to be laid vertically. Fasteners shall be Class 4 25mm x 12 gauge type 17 screws, complete with metal and sealing washer.. Set out fasteners in straight and parallel lines and do not over tighten or skew. Pan fix with fixing pattern of fix, miss one, fix, miss two, etc (6 fixings per metre).

**Roof:**

Fasteners shall be Class 4 50mm x 12 gauge type 17 screws, complete with metal and sealing washer. Set out fasteners in straight and parallel lines and do not over tighten or skew. Crest fix with fixing pattern of fix, miss one, fix, miss two, etc (6 fixings per metre).

Washers shall be either EPDM or Neoprene containing no more than 15% carbon black filler by volume or 25% by weight.

Stainless steel or monel fasteners shall not be used with Colorsteel Endura products.

## 5.5 FLASHINGS

Allow for all Flashings and accessories, made from 0.55 BMT "COLORSTEEL ENDURA", colour to match cladding, in as long lengths as possible, as required to complete and make the building weathertight. All joints in flashings made with blind aluminium rivets and a neutral cure silicone rubber sealant. Note that flashings around the windows and doors should not be pre-measured and cut as they may need to take into account variation in peaks and troughs in the exterior claddings.

Flashings to be fabricated to the details shown in the drawings complete with Tetral Industries Ltd polyethylene closed cell "ECOFOAM" of the corrugate profile.

Lifting eye/hold down bracket roof penetration and uPVC Vent shall be flashed with Deks Industries Pty Ltd "DEKTITE" flashing.

## 5.6 THERMAL BREAK

A thermal break shall be provided between all steel framing and the steel cladding. The thermal break shall be 5mm THERAMX B extruded polystyrene (XEPS) directly adhered to the steel stud, nog and top hat sections. THERAMX B strips are to be nominally 42mm wide cut to the required length of the steel section to which it is fixed. Adhere to steel sections with 3M Hi Strength 90 spray adhesive.

Care must be taken to not over tighten the screws used to fix the corrugated sheet cladding to the steel framing. **Set drill clutch to avoid over tightening of the screws.**

Store out of the weather.

THERMAX B is available from: A CLASS INDUSTRY SUPPLIES LTD. Ph:06 3298065

## 6.0 EXTERIOR JOINERY

### 6.1 MATERIALS AND LABOUR

First doors and windows by Aluminium Profiles Ltd are specified as the preferred joinery suite. If 'First' doors and windows are not locally available and an alternative supplier is proposed, they are to be nominated at time of tender and sufficient information provided to demonstrate equivalence in performance.

The Contractor shall supply the whole of the materials, plant and labour necessary for the contract. Work shall be carried out according to best trade practice, by skilled and experienced workers to the standards hereinafter specified. Work shall include the supply and fixing of all units and all associated flashings, hardware, furniture and fixings. Include stays, catches, latches, door stops, cabin hooks etc. as required.

All aluminium windows and doors shall be manufactured in an approved workshop using labour skilled in the trade. Mechanically butt joint corners or all frames and assemble with screws into integral screw traces in the sections. Mitre cut sash corners and assemble with screws into aluminium corner angles mechanically crimped within the section, giving a neat tight fitting joint. Caulk all joints with a thin joint sealant. All opening elements shall be complete with weatherstripping to form a continuous seal between them and the frame. All units shall be assembled square and true to line and level. All fixed glass panels shall be bead glazed into frames.

Ensure that all aluminium is separated from contact with incompatible metals.

### 6.2 ALUMINIUM WINDOWS

Supply and fix windows W1 & W2 to the size and shape as shown on the drawings, fabricated from "FIRST ALUMINIUM 40mm COMMERCIAL SERIES" with a selected Duralloy colour powder-coated finish.

Aluminium frames to be supplied complete with condensation channels all round with drainage path from the sill channel to the exterior of the building. Frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame.

The awning sashes are to be fitted with stainless steel "SAFETY STAYS" to restrict sash projection. Window hardware to be black double tongue handles, cam type fitted to the sash with separate wedges applied to the frame.

All windows shall be glazed in the factory with single glazed units using 6mm polycarbonate.

### 6.3 ALUMINIUM DOOR

Supply and fix entry door D1 to the size and shape as shown on the drawings, fabricated from "FIRST ALUMINIUM MAGNUM 50 COMMERCIAL DOOR" in aluminium frame with a selected Duralloy colour powder-coated finish.

Aluminium frames to be supplied complete with condensation channels all round with drainage path from the threshold to the exterior of the building. Frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame. **No sill section is required for the frame** – refer to the drawings for the rebated sill detail. Doors to be hung on broad leaf butt hinges.

All doors shall be glazed in the factory with single glazed 6mm polycarbonate to top panel and aluminium faced 12mm polystyrene core insulated panel to bottom panel.

Door shall come complete with 300mm high Holyoake powdercoated aluminium louvre Model OHL-F34 fitted into the bottom panel of the door, complete with fine insect proof mesh, 1.2mm powdercoated aluminium weather shield, cabin hook as hold back device, and Lockwood passage latch LW3574SC latch set.

#### **6.4 GLAZING**

Refer to the door and window sections above for the glass types required for joinery units. Glazing shall be designed and installed to include all fixings, sealants, weatherstrips, beads and the like to suit timber or aluminium joinery as appropriate and as required to render the completed system secure, draughtproof and waterproof.

In aluminium joinery neoprene gaskets shall be mitre jointed at corners and not bent around corner of frames and beads and no bowing or bubbling shall be permitted in the Neoprene. Allow for the expansion and contraction of the glass.

#### **6.5 UPVC VENT**

Provide and install a passive ventilation opening at high level to gable wall opposite the entry door, fabricated from 150mm diameter uPVC solvent welded into 'T' shape, and with 90 degree bends at end to form inverted 'U'. Screw fix to steel framing in a solid and secure manner. Cover interior end with fine insect proof mesh before lining is applied, and finish ply opening with 2mm radiused edge. Flash to cladding as detailed in the drawings with flashing tape and DEKTITE flashing with the installation left weathertight.

## 7.0 FINISHING AND PAINTING

### 7.1 WORKMANSHIP AND MATERIALS

All work shall be of a first class standard performed by skilled tradesmen in accordance with sound trade practice. In all situations the finish shall be first class, and matching over any one area in terms of appearance, finish and colour.

Ensure that all surfaces including surfaces of all preceding undercoats are in a suitable condition to enable a first class finish to be obtained. Locks, bolts, fittings, etc. will be removed as necessary to prevent damage or marking and be replaced at completion of work.

All materials shall be applied strictly in accordance with the manufacturers instructions for all coating, stopping and other treatment. Varnishes shall be of the best quality of their respective kinds and shall be brought onto the job in their original containers with seals unbroken. Application shall not be by spraying.

Provide all necessary protection, masking, covering, guards, etc. necessary to protect painting work and any persons in the vicinity. Provide warning signs and remove on completion. No painting shall be carried out under unsuitable conditions. Work damaged by weather, dust or the activities of other trades shall be rubbed down and recoated.

Putty shall consist of whiting thoroughly ground in linseed oil to form a smooth readily workable paste, tinted or stained as necessary to suit the finished colour in all materials.

### 7.2 PREPARATION

For interior work neatly fill in and stop all cracks, nail holes, etc. with putty after first coat has been applied. Where varnish finish is required putty to be colour matched to final colour.

Prepare all surfaces, fill, repair and make good imperfections as required for the system to be applied to a first quality finish. Surfaces must be completely dust free, dry and without oil, grease or foreign matter.

### 7.3 SYSTEMS

#### 1. 4 coats Resene Polythane moisture-cured polyurethane

- Ply flooring and bunk top,

#### 2. 4 coats Resene Aquaclear water-based clear finish

- Interior ply walls, ceiling and cornice
- window and door reveals and architraves
- Mouldings and interior finishes generally

**Miscellaneous:**

Any material or element which does not have a specified finish, but obviously needs finishing to complete the Contract, shall be considered a part of the Contract, and in general shall have the same finish as similar elements or materials. Confirm with Contract Administrator prior to doing this work.

**7.4 COMPLETION**

At the completion, make good at own expense any patchy work, incorrect material, and imperfections to work, and shall eliminate all runs, bubbles, etc. Recover complete sections while rectifying work. Leave job clean and tidy to the satisfaction of the Contract Administrator, with all trade debris removed and all surfaces free from varnish splashes and decoration marks.

## 8.0 WATER SUPPLY

### 8.1 WATER TANK STAND

Fabricate and install the water tank stand in the location shown on the site plan and to the details shown on the foundation plan.

Generally framing shall be rough sawn H3.2 CCA Radiata. Foundations shall be Conqra Ezi-Yaka Lightfoot foundation system, with all piles to be accurately cut to levels for platform framing. Bearers to be extensions of hut bearers. Securely fix all bearers, blocking and decking as noted on the drawings. Where bolts or other fixings are not noted, nails shall be used.

### 8.2 WATER TANK

Water tank to be standard water grade Wilson 900 litre available from Wilson plastics. Tank to be supplied and installed complete with the following:

- screw lid,
- leaf strainer,
- 20mm outlet, and
- 50mm overflow outlet
- 32mm wash-out valve to base of water tank

Install tanks on tank stand, ensuring that tap discharges past the edge of the tank stand and that the 32mm wash-out valve to the base of the tank is clear of tank stand framing and is readily accessible. Hold tank in place with seismic restraint blocks and no.8 gauge wire through hold down lugs fixed with galvanised staples to stand joists.

Fit 50mm uPVC pipe to overflow. Set the bottom of the overflow on the base of the tank and cut 50mm high x 20mm wide slots to the base of the pipe to allow for water and settled sediment to be drawn from the base of the tank. Drill a 20mm diameter hole on the top of the horizontal portion of the overflow pipe at the top of the tank, so the hole is within the tank. This will prevent the overflow from emptying the tank by siphoning. Run overflow down leg of tank stand and discharge to ground through 100mm elbow at bottom.

All holes in tanks to be cut to the correct minimum clearances with a hole saw, fittings not to be over tightened and any pipes that are exposed to loads shall be supported.

Fit 20mm diaphragm tap valve, either Saunders part no. ASCIWOQ or Acuflo DV 250/20, complete with 90 degree elbow to form spout, to water tank outlet. Provide support block under tap and strap over the top to securely fix tap in place.

### 8.3 GUTTERS AND DOWNPIPES

Supply and fit Marley PVC Stormcloud spouting to one side only of the hut to collect water draining from the roof. Refer to the site plan for the location of the spouting to suit the location of the water tank. Block gutter out from wall cladding to provide 50mm overlap of roof into gutter. Provide 1:200 fall to down pipe – water shall not lie in the gutters. Fit 65mm uPVC droppers to gutter to take down pipe.

Fit 65mm diameter uPVC downpipe system in the location as shown on the site plan to suit the location of the water tank, seal the connection into water tank. Leave the system with runs and lines straight and true, and leaving no water lying in the system.



## **APPENDIX A: DOC ENGINEER CALCULATIONS/ DETAILS (if required)**

## APPENDIX A2.2: SPECIFICATION

### STANDARD 2 BUNK VISITOR HUT WITH WATER SUPPLY

#### CURRENT SPECIFICATION REGISTER

	<b>Title</b>	<b>Version</b>	<b>Date issued</b>
	Standard 2 bunk visitor hut with water supply	4.0	March 2009

#### AMENDMENT REGISTER

<b>Amendment date</b>	<b>Amendment details (section, page number, block)</b>	<b>Version</b>	<b>Signature of copyholder and date</b>

## SPECIFICATION

of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

# Standard Two Bunk Visitor Hut

With water supply



Capiche House  
111 Dixon Street  
P.O. Box 2115  
Wellington 1  
Phone: (04) 473 7577  
Fax: (04) 384 5177  
[www.pc-architects.co.nz](http://www.pc-architects.co.nz)

Department of Conservation  
New Zealand

Practical  
&  
Innovative  
Design

## Building Consent & Construction

V4.0 Base Specification March 2009



Department of Conservation  
*Te Papa Atawhai*

Directors:

Ron Pynenburg  
BBSc BArch (Hons) PPNZIA  
Life member FNZIA

Ken Collins  
BBSc BArch (Hons) ANZIA

Tim Burns  
BBSc BArch (Hons) ANZIA

<b>CONTENTS</b>	<b>page</b>
<b>1.0 PRELIMINARY AND GENERAL .....</b>	<b>1</b>
1.1 Form of Contract	1
1.2 Requirements of Authorities	1
1.3 Inspections	1
1.4 Use of Documents	1
1.5 Contractor's Establishment and Work Area	1
1.6 Completion of Works	2
<b>2.0 SITEWORK AND FOUNDATIONS.....</b>	<b>3</b>
2.1 Building Setout	3
2.2 Site Preparation	3
2.3 Obstructions	3
2.4 Over Excavations	3
2.5 Inspection	3
2.6 Backfilling and Disposal	3
2.7 Foundations	4
<b>3.0 LIGHTWEIGHT STEEL FRAMING.....</b>	<b>5</b>
3.1 Scope	5
3.2 Standards	5
3.3 Materials and Workmanship	5
3.4 Surface Preparation	6
3.5 Loading and Serviceability Criteria	7
<b>4.0 CARPENTRY AND GENERAL .....</b>	<b>8</b>
4.1 Workmanship	8
4.2 Underfloor Insulation	8
4.3 Plywood Flooring	8
4.4 Plywood Walls and Ceiling	8
4.5 Mouldings	8
4.6 Air Seals	9
4.7 Bunks	9
4.8 Internal Cooking Bench	9
4.9 Hooks	9
4.10 Lifting Eye	9
<b>5.0 ROOFING AND CLADDING.....</b>	<b>10</b>
5.1 Workmanship	10
5.2 Insulation	10
5.3 Building wrap	10
5.4 Profiled Metal Roofing and Cladding	10
5.5 Flashings	11
5.6 thermal break	11
<b>6.0 EXTERIOR JOINERY .....</b>	<b>12</b>
6.1 Materials and Labour	12
6.2 Aluminium Windows	12
6.3 Aluminium Door	12
6.4 Glazing	13
6.5 uPVC Vent	13

<b>7.0 FINISHING AND PAINTING .....</b>	<b>14</b>
<b>7.1 Workmanship and Materials</b>	<b>14</b>
<b>7.2 Preparation</b>	<b>14</b>
<b>7.3 Systems</b>	<b>14</b>
<b>7.4 Completion</b>	<b>15</b>
<b>8.0 WATER SUPPLY.....</b>	<b>16</b>
<b>8.1 Water Tank Stand</b>	<b>16</b>
<b>8.2 Water Tank</b>	<b>16</b>
<b>8.3 Gutters and Downpipes</b>	<b>16</b>

**APPENDIX A: DOC ENGINEER CALCULATIONS/ DETAILS (if required)**

**TWO BUNK HUT INFORMATION:**

**Service Standard:**

- Basic
- 2 visitor bunks
- BCA or RS Visitor Group

**Design Criteria Parameters:**

- Earthquake zone    any
- Wind load            3 kPa maximum
- Snow loading         3.1 kPa maximum
- Floor load            1.5 kPa

## **1.0 PRELIMINARY AND GENERAL**

### **1.1 FORM OF CONTRACT**

The form of Contract shall be the Department of Conservation General Conditions of Construction Works Contract together with any Special Conditions and/or Schedules provided.

For the purposes of this project, where this specification refers to the Contract Administrator, the Contract refers to the Supervisor.

### **1.2 REQUIREMENTS OF AUTHORITIES**

The Department of Conservation shall apply for and uplift the Resource Consent (if required), Project Information Memorandum and the Building Consent.

The Contractor shall ascertain and familiarise himself with the requirements of any consents prior to commencing work, and shall employ methods and work practices which comply. The Contractor shall establish which inspections are required by these consents, and shall pay and arrange for the inspections to take place including give all notices and arrange for inspections and the like required by the Building Consent. At the completion of the works the Contractor shall apply for and obtain the Code Compliance Certificate from the Territorial Authority,

These shall be provided to the Contract Administrator.

### **1.3 INSPECTIONS**

Where consultation with or inspection by the Contract Administrator or other consultants is required a minimum of 48 hours notice shall be given by the Contractor.

### **1.4 USE OF DOCUMENTS**

The Contractor shall read the specification, the drawings and the Conditions of Contract together and as referring to each other. What is omitted in one and included in the other shall be read as included in all. Bring any ambiguity or contradiction to the Contract Administrator's notice for an Instruction before carrying out the affected work.

- Figure dimensions on drawings take precedence over drawings to a smaller scale.
- Drawings to a larger scale take precedence over drawings to a smaller scale.
- Drawings take precedence over the specifications

Do not scale dimensions from the drawings. Any ambiguity or conflict in dimensions must be referred to the Contract Administrator for an Instruction.

### **1.5 CONTRACTOR'S ESTABLISHMENT AND WORK AREA**

The Contractor shall liaise with the Local Area Office of the Department of Conservation to determine suitable areas for the Contractor's site sheds/tents and other working areas, and to make arrangements regarding the use of existing toilets, huts, and other facilities.

It shall be the Contractor's responsibility to arrange for any additional accommodation, sanitary facilities, power and communication facilities required, including all permits and approvals from the relevant service authority.

The Contractor shall reinstate all areas affected by the contract, including the establishment and working areas to the reasonable satisfaction of the Contract Administrator.

The Contractor's site areas and sheds/tents shall be made available for use by the Contract Administrator and the Principal and free access to the Contractor's records and documents shall be allowed.

## **1.6 COMPLETION OF WORKS**

Although it may not be expressly mentioned or shown on each and every item, or detailed in the Specification, all equipment, joinery fittings and services shall be left in first class condition and proper working order. All visible work, surfaces, materials and finishes shall be left in first class condition without damage or blemish.

Remove all rubbish arising from this Contract from the Site and Works. Leave all floors swept clean, clean all glass inside and out, remove all paint, concrete and other marks, clean all prefinished or decorated woodwork, fittings, and all items generally to leave the building and site clean and fit for immediate occupation and use by DOC.

The Contractor shall provide to the Contract Administrator a copy of an "as built" plan showing to a suitable scale, the position of all underground services, as relating to the contract works. The "as built" plan shall be forwarded to the Contract Administrator prior to any retention monies being released.

## **2.0 SITEWORK AND FOUNDATIONS**

### **2.1 BUILDING SETOUT**

Refer to the site plan for building locations, relative levels and areas for excavation (if any). Floor level established from setting out top of shortest pile to be 150mm above ground level.

The location of all buildings and finished levels shall be confirmed on site by the Contract Administrator.

### **2.2 SITE PREPARATION**

Remove all leaf-litter or other material from the area to be built upon.

When shown on the drawings, excavate for hut platform and for foundations to be built to the dimensions and details shown allowing for working room as necessary. Batters and cut faces shall be a minimum of 1m clear of the hut outline. Ground surrounding the hut shall fall a minimum of 50mm towards any batter or cut face. Ensure that falls underneath and surrounding hut are formed to provide a well-drained sub-floor area without ponding.

### **2.3 OBSTRUCTIONS**

Excavate and remove any obstruction that is encountered that may interfere with the specified ground levels and contours and shape and size of the foundations as detailed.

### **2.4 OVER EXCAVATIONS**

The pile depths shown are indicative, based on site investigations, and bearing depth may occur at lower levels. Any additional excavation caused solely by encountering poor ground conditions or other natural weakness shall be treated as a variation provided such work has been authorised by the Contract Administrator.

### **2.5 INSPECTION**

The Administrator shall be given 48 hours notice to enable inspection of the foundation excavations. Approval shall be obtained before installation of piles commences.

### **2.6 BACKFILLING AND DISPOSAL**

All material removed from the excavation, and which is approved as suitable by the Contract Administrator, shall be used as far as practicable in backfilling foundations in accordance with the directions noted in the Foundation System section of this specification and on the drawings. Surplus or unsuitable excavated material shall be disposed of as directed by the Contract Administrator in a safe and legal manner.



## 2.7 FOUNDATIONS

Conqra Lightfoot foundations comprising Ezi-Yaka lightfoot pad set at base of pile with 125 x 125 H5 sawn piles installed and with connections to sub-floor framing as per the details. Piles to be accurately positioned and set plumb and vertical, 150mm minimum out of ground.

The pile depths shown are indicative, based on site investigations, and bearing depth may occur at lower levels. Any additional excavation caused solely by encountering poor ground conditions or other natural weakness shall be treated as a variation provided such work has been authorised by the Contract Administrator.

Provide all temporary bracing necessary to the piles until such time as the piles can support the structure without distress to either element. All piles to be accurately cut to levels for floor framing.

Provide bracing as noted in the foundation plan on the drawings.

## 3.0 LIGHTWEIGHT STEEL FRAMING

### 3.1 SCOPE

This section covers all cold rolled galvanised steel wall and roof framing and specifically includes the light weight steel wall frames and their fixings.

### 3.2 STANDARDS

Work and materials shall comply with the following relevant standards:

NZS 3441:1978	Hot Dipped Zinc Coated Steel Coil and Cut Lengths
AS 1397:1984	Hot Dipped Zinc Coated Steel Coil and Cut Lengths
AS 1594:	Hot Rolled Unalloyed Low Carbon Steel Sheet and Strips

### 3.3 MATERIALS AND WORKMANSHIP

#### Steelwork:

All steelwork shall be of the size and weights figured on the drawings. The following Standards Sections shall be used:

Wall frames	Steelite framing 90 x 40 x 0.55
Floor frame	Steelite framing double 90 x 40 x 0.55
Roof frame	150 x 0.95 top hat
Bunks and bench frame	Steelite framing 90 x 40 x 0.75

Contact Harris Foster Ltd (Maurice Harris ph 09 367 1070, email [Maurice@hfc.co.nz](mailto:Maurice@hfc.co.nz)) for supply of steel framing. All necessary cleats brackets angles etc shall be prepared as above. Should the lightweight steel frame supplier wish to make alterations to the details and sizes given, he shall submit the altered details on shop drawings to the engineer.

All pre-made frames shall be provided with shop drawings indicating sizes, weights and dimensions. All openings, including lintels, jambs and sills shall be detailed. All lightweight steel framing and fixings shall be designed to the loading criteria given in Section 3.5.

#### Dimensions:

The contractor and steel framing supplier shall check all dimensions prior to fabrication of wall frames and other frames and other framing components.

Should any discrepancy be found, the engineer shall be notified at once.

#### Fabrication:

Frame and lintel components shall be accurately cut to length so that they fit firmly against abutting members and shall be held firmly in place until properly fastened.

The following shall apply:

- Studs shall be seated squarely in bottom plates with webs at 90° to the face of the wall.
- Studs shall be accurately located, plumbed and securely fastened to the flanges of top and bottom plates.
- Multiple studs shall be used as required at all points of concentrated load e.g. opening jambs.

- Plates shall be provided in lengths to maintain continuity.
- Splices in studs shall not be permitted.
- In order to maintain structural integrity and to support linings, short studs shall be provided between bottom plates and windowsills, between top plates and window heads, and between top plates and door heads or in other areas around openings where appropriate.
- All frames shall be adequately braced until linings are fixed.
- The preferred method of fastening is self-drilling self-tapping screws, or approved blind rivets.
- All frames shall be supplied with noggin, folded plates and support points for the linings and intersecting walls shown on the architect's drawings.

#### Erection:

Provision shall be made to clamp all framing firmly together while on site TEK screwed joints are being completed. All frames shall be true to line and plumb prior to fixing. The following shall apply:

- The frames are to be fabricated in a factory and fixed together to form the frame for a transportable building.
- Lifting, loading and transportation of prefabricated frames shall be accomplished with sufficient care to prevent local damage to frames.
- Site connections shall be as specified.
- The bottom plate shall be securely anchored to floors using 2/12g TEK screws at 600mm max. c-c and at door jambs. These screws must go through the bottom plate, the ply flooring and fix into the floor frame trimming member.
- **All bottom plates and other lightweight steel sections shall be separated from the treated bearers using a malthoid membrane.**

#### Fixings:

Generally TEK screws, self-drilling of minimum 10 gauge shall be used to fix frames to frames. 12gauge screws shall be used to fix the bottom plate to the floor frame and to fix the purlins to the top plates. 4.5mm blind steel rivets shall be used to fabricate the frames. The lightweight steel-framing contractor shall supply all fixing details necessary to comply with the loadings. All the screws fixings steel components shall be electroplated (zinc plated with a gold chromate finish).

#### Finishing:

Leave all this work in first class condition for the following trades. On completion of framing all debris shall be removed from cavities in bottom plates. This includes all metal fillings etc.

#### General:

Handle and store channels, studs and accessories to avoid damage. Keep dry in transit, store clear of the ground on timber pallets and under cover. If they become wet, separate out, wipe dry with a cloth and restack allowing full air circulation.

### **3.4 SURFACE PREPARATION**

All cold rolled steel sections used for roof and wall framing and not specifically listed for special treatment shall be galvanised with a zinc coating of not less than 275 g/m<sup>2</sup> in accordance with the relevant standards in Section 3.2.

Any areas of galvanising which are damaged during erection shall be cleaned and touched up with zinc rich primer.

Floor Joists and other external exposed surfaces shall be sprayed with “Goldseal” prior to fabricating the frame. This specifically applies to the floor frame.

### 3.5 LOADING AND SERVICEABILITY CRITERIA

All lightweight steel internal framing including lintels, trimmers and openings, and connections to roof framing and other wall framing or structure shall be designed to comply with the New Zealand Building Code and adequate to support the loads specified in the New Zealand Loading Code NZS 4203:1992, and in particular the loads and serviceability criteria set out below.

All lightweight steel supplied, shall be designed in accordance with AS 1538:1988 or AISI-LRFD cold-formed steel design.

Item	Design Loads	Serviceability limits for deflection
Wall Framing	Wind loads	Face Loading (Wind)
	q ult = 3.0 KPa	Ply lined walls – H/200
	q serv = 1.95 KPa	Impact (0.7kN mid span)
Roof Framing	Snow load = 3.1 KPa	

## 4.0 CARPENTRY AND GENERAL

### 4.1 WORKMANSHIP

Set out, erect and fix all material and work accurately, level, square and plumb to produce an even finish, flush across joints and suitable for any subsequent work. Execute all cuts, mitres and scribes true to line to produce a first class job and tight junctions. Make all joints in the strongest possible manner, tight and secure. Stagger laps and joints where possible. All exposed surfaces shall have all machine marks removed and left fit for specified finishes.

Adequate protection must be given to all materials to keep them in first class condition and suitable for their intended use and finish. All timber for exposed work shall be free from defects that would prevent a good dressed surface and satisfactory finishing.

### 4.2 UNDERFLOOR INSULATION

Underfloor insulation shall be 55mm "EXPOL" expanded polystyrene under floor insulation laid tight fit between floor joists and adhered to underside of ply flooring with "EXPOL" adhesive along top of spacer ribs.

### 4.3 PLYWOOD FLOORING

Lay 12mm H3 treated Ecoply 'Plyfloor' (CD grade) sheets in stretcher bond pattern, ensuring all end joints land on joists. Butt join all edges.

Fix sheets with 45mm x 10 gauge grade 304 stainless steel self drilling, self tapping screws, driven flush with sheet surface. Fixings 7 - 15mm behind tongues or from sheet edges, spaced at 150mm centres on all edges, and 300mm centres in the body of the sheet.

### 4.4 PLYWOOD WALLS AND CEILING

9mm CD grade untreated Ecoply, with sheets square, horizontal and parallel fixed to wall and ceiling framing. Butt joint sheets together, arris all visible edges. Provide solid fixing for all sheet edges. Where ceiling sheets are not full length, provide a 100mm strip of ply as a backing for full length of joint and fix as noted for edges below.

Fix all sheets with 45mm x 8 gauge hot dip galvanised Wingtek countersunk head screws at spacings as noted below:

Area	Edge fixing	Intermediate fixing
Wall	150mm c/c	300mm c/c
Ceiling	150mm c/c	200mm c/c

### 4.5 MOULDINGS

Joints in lengths of runs shall be neatly and accurately mitred. External corners to be mitred and internal corners scribed. In dressed timber counter sink screws below surface. If necessary, drill screw holes prior to fixing as no split timbers will be accepted.

- Skirtings - 40 x 12 single bevel, untreated Radiata
- Cornice - 40 x 12 single bevel, untreated Radiata
- Architraves— 40 x 12 single bevel, untreated Radiata

Allow for other miscellaneous mouldings and finishing work as required to complete the job.

#### **4.6 AIR SEALS**

Apply 12mm deep bead of Fosroc foamtak SB Air seal on "Fix All" PEF backing rod to all four sides of trimmed opening between timber reveals of joinery units (i.e. windows, door, passive ventilation grilles and the like) and steel framing. Sealant to be flush with internal side of framing as shown on the drawings.

#### **4.7 BUNKS**

Construct and fit two single level bunks in the locations and to the details shown in the drawings.

Generally all framing to bunks shall be 90 x 40 x 0.75mm steel framing to dimensions shown on drawings. Complete with 12mm untreated CD grade ply with 2mm radiused leading edge, and sanded with fine sand paper to smooth finish. Fixed to framing with 45mm x 8 gauge hot dip galvanised Wingtek countersunk head screws at 150mm c/c to edges and 300mm c/c to intermediate framing.

#### **4.8 INTERNAL COOKING BENCH**

Construct and fit internal cooking bench in the location and to the details shown in the drawings.

Construct from 90 x 40 x 0.75mm steel framing. Fix 90 x 40mm timber diagonal brace at each end of benchtop and one central. Provide solid fixing in wall framing for cooking bench. Fabricate and install cooking bench at 900mm above floor level.

Benchtop shall be 1200mm long x 500mm wide grade 304 18/10 stainless steel of minimum 0.9mm gauge with anti-spill front and side edges. Substrate shall be one layer of H3 treated 17mm ply CD grade. Bench to have 150mm upstand to back of benchtop. Fix and seal edge of upstand to ply wall lining with 40 x 12 single bevel untreated Radiata moulding.

#### **4.9 HOOKS**

Supply and install 4 No. "DRAKE & WRIGLEY" hat and coat hooks catalogue number 1033. Finish to be natural brass. Screw fix directly to ply lining at 1500mm above floor level in location shown on the drawings.

#### **4.10 LIFTING EYE**

Lifting eye/hold down bracket roof penetration to be ex 75 x 10 m.s. flat installed and welded to frame strictly as per the details. Cut slot in barge flashing for lifting eye, seal with neutral-cure silicone sealant, and leave penetration weathertight.

## 5.0 ROOFING AND CLADDING

### 5.1 WORKMANSHIP

All work shall be carried out by experienced competent Tradesmen familiar with the products being used, in accordance with the best trade practice and current manufacturers installation specifications. The whole of the cladding shall be installed and left sound and weathertight.

### 5.2 INSULATION

Walls:

Walls are to be insulated with Tasman Insulation "R2.2 WALL PINK BATTS – RESIDENTIAL INSULATION", neatly cut, friction fitting between studs and dwangs. No uninsulated spaces shall be left and all obstructions etc shall have insulation behind them. Batts shall be fitted with inside face flush with inside surface of studs.

Ceiling:

Ceilings are to be insulated with Tasman Insulation "R2.6 CEILING PINK BATTS – RESIDENTIAL INSULATION" neatly cut between all ceiling framing and any blocking. No uninsulated spaces shall be left and all obstructions etc shall have insulation behind them. Batts shall be fitted with inside face flush with inside surface of framing.

### 5.3 BUILDING WRAP

Walls:

Tasman Insulation "Bitumac 860" building paper shall be fixed to outside face of the walls. Lay horizontally, with minimum of 150mm laps, starting at lowest point always. Building paper to be secured to THERMAX B at 300mm centres through Danband polypropylene strapping. No rips or tears or damage to paper. Building paper to lap over flashing, etc. as required to allow the removal of moisture, and to prevent moisture getting into the framing. Seal into window and door openings with Tasman Insulation "Protecto Sill System" flashing tape, 150mm wide

Roof:

Roofing underlay shall be Tasman Insulation "FLAMESTOP 660" laid from vertically from eave to eave over ridge and over purlins, with minimum 150mm laps, and laid towards the prevailing weather. No rips or tears or damage to paper. Building paper to lap over flashing, etc. as required to allow the removal of moisture, and to prevent moisture getting into the framing.

### 5.4 PROFILED METAL ROOFING AND CLADDING

Clad roofs and walls in full length sheets of "COLORSTEEL ENDURA" corrugated profile with strippable film, laid towards prevailing weather. Ensure lines remain vertical and parallel across width of building, and tops and bottoms horizontal and parallel.

Handling and fixing of cladding and accessories shall be strictly as per Manufacturer's instructions. Damaged cladding and accessories shall be rejected.

Walls:

Cladding to be laid vertically. Fasteners shall be Class 4 25mm x 12 gauge type 17 screws, complete with metal and sealing washer.. Set out fasteners in straight and parallel lines and do not over tighten or skew. Pan fix with fixing pattern of fix, miss one, fix, miss two, etc (6 fixings per metre).

Roof:

Fasteners shall be Class 4 50mm x 12 gauge type 17 screws, complete with metal and sealing washer. Set out fasteners in straight and parallel lines and do not over tighten or skew. Crest fix with fixing pattern of fix, miss one, fix, miss two, etc (6 fixings per metre).

Washers shall be either EPDM or Neoprene containing no more than 15% carbon black filler by volume or 25% by weight.

Stainless steel or monel fasteners shall not be used with Colorsteel Endura products.

## 5.5 FLASHINGS

Allow for all Flashings and accessories, made from 0.55 BMT "COLORSTEEL ENDURA", colour to match cladding, in as long lengths as possible, as required to complete and make the building weathertight. All joints in flashings made with blind aluminium rivets and a neutral cure silicone rubber sealant. Note that flashings around the windows and doors should not be pre-measured and cut as they may need to take into account variation in peaks and troughs in the exterior claddings.

Flashings to be fabricated to the details shown in the drawings complete with Tetral Industries Ltd polyethylene closed cell "ECOFOAM" of the corrugate profile.

Lifting eye/hold down bracket roof penetration and uPVC Vent shall be flashed with Deks Industries Pty Ltd "DEKTITE" flashing.

## 5.6 THERMAL BREAK

A thermal break shall be provided between all steel framing and the steel cladding. The thermal break shall be 5mm THERAMX B extruded polystyrene (XEPS) directly adhered to the steel stud, nog and top hat sections. THERAMX B strips are to be nominally 42mm wide cut to the required length of the steel section to which it is fixed. Adhere to steel sections with 3M Hi Strength 90 spray adhesive.

Care must be taken to not over tighten the screws used to fix the corrugated sheet cladding to the steel framing. **Set drill clutch to avoid over tightening of the screws.**

Store out of the weather.

THERMAX B is available from: A CLASS INDUSTRY SUPPLIES LTD. Ph:06 3298065



## 6.0 EXTERIOR JOINERY

### 6.1 MATERIALS AND LABOUR

First doors and windows by Aluminium Profiles Ltd are specified as the preferred joinery suite. If 'First' doors and windows are not locally available and an alternative supplier is proposed, they are to be nominated at time of tender and sufficient information provided to demonstrate equivalence in performance.

The Contractor shall supply the whole of the materials, plant and labour necessary for the contract. Work shall be carried out according to best trade practice, by skilled and experienced workers to the standards hereinafter specified. Work shall include the supply and fixing of all units and all associated flashings, hardware, furniture and fixings. Include stays, catches, latches, door stops, cabin hooks etc. as required.

All aluminium windows and doors shall be manufactured in an approved workshop using labour skilled in the trade. Mechanically butt joint corners or all frames and assemble with screws into integral screw traces in the sections. Mitre cut sash corners and assemble with screws into aluminium corner angles mechanically crimped within the section, giving a neat tight fitting joint. Caulk all joints with a thin joint sealant. All opening elements shall be complete with weatherstripping to form a continuous seal between them and the frame. All units shall be assembled square and true to line and level. All fixed glass panels shall be bead glazed into frames.

Ensure that all aluminium is separated from contact with incompatible metals.

### 6.2 ALUMINIUM WINDOWS

Supply and fix windows W1 & W2 to the size and shape as shown on the drawings, fabricated from "FIRST ALUMINIUM 40mm COMMERCIAL SERIES" with a selected Duralloy colour powder-coated finish.

Aluminium frames to be supplied complete with condensation channels all round with drainage path from the sill channel to the exterior of the building. Frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame.

The awning sashes are to be fitted with stainless steel "SAFETY STAYS" to restrict sash projection. Window hardware to be black double tongue handles, cam type fitted to the sash with separate wedges applied to the frame.

All windows shall be glazed in the factory with single glazed units using 6mm polycarbonate.

### 6.3 ALUMINIUM DOOR

Supply and fix entry door D1 to the size and shape as shown on the drawings, fabricated from "FIRST ALUMINIUM MAGNUM 50 COMMERCIAL DOOR" in aluminium frame with a selected Duralloy colour powder-coated finish.

Aluminium frames to be supplied complete with condensation channels all round with drainage path from the threshold to the exterior of the building. Frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame. **No sill section is required for the frame** – refer to the drawings for the rebated sill detail. Doors to be hung on broad leaf butt hinges.

All doors shall be glazed in the factory with single glazed 6mm polycarbonate to top panel and aluminium faced 12mm polystyrene core insulated panel to bottom panel.

Door shall come complete with 300mm high Holyoake powdercoated aluminium louvre Model OHL-F34 fitted into the bottom panel of the door, complete with fine insect proof mesh, 1.2mm powdercoated aluminium weather shield, cabin hook as hold back device, and Lockwood passage latch LW3574SC latch set.

#### **6.4 GLAZING**

Refer to the door and window sections above for the glass types required for joinery units. Glazing shall be designed and installed to include all fixings, sealants, weatherstrips, beads and the like to suit timber or aluminium joinery as appropriate and as required to render the completed system secure, draughtproof and waterproof.

In aluminium joinery neoprene gaskets shall be mitre jointed at corners and not bent around corner of frames and beads and no bowing or bubbling shall be permitted in the Neoprene. Allow for the expansion and contraction of the glass.

#### **6.5 UPVC VENT**

Provide and install a passive ventilation opening at high level to gable wall opposite the entry door, fabricated from 150mm diameter uPVC solvent welded into 'T' shape, and with 90 degree bends at end to form inverted 'U'. Screw fix to steel framing in a solid and secure manner. Cover interior end with fine insect proof mesh before lining is applied, and finish ply opening with 2mm radiused edge. Flash to cladding as detailed in the drawings with flashing tape and DEKTITE flashing with the installation left weathertight.

## 7.0 FINISHING AND PAINTING

### 7.1 WORKMANSHIP AND MATERIALS

All work shall be of a first class standard performed by skilled tradesmen in accordance with sound trade practice. In all situations the finish shall be first class, and matching over any one area in terms of appearance, finish and colour.

Ensure that all surfaces including surfaces of all preceding undercoats are in a suitable condition to enable a first class finish to be obtained. Locks, bolts, fittings, etc. will be removed as necessary to prevent damage or marking and be replaced at completion of work.

All materials shall be applied strictly in accordance with the manufacturers instructions for all coating, stopping and other treatment. Varnishes shall be of the best quality of their respective kinds and shall be brought onto the job in their original containers with seals unbroken. Application shall not be by spraying.

Provide all necessary protection, masking, covering, guards, etc. necessary to protect painting work and any persons in the vicinity. Provide warning signs and remove on completion. No painting shall be carried out under unsuitable conditions. Work damaged by weather, dust or the activities of other trades shall be rubbed down and recoated.

Putty shall consist of whiting thoroughly ground in linseed oil to form a smooth readily workable paste, tinted or stained as necessary to suit the finished colour in all materials.

### 7.2 PREPARATION

For interior work neatly fill in and stop all cracks, nail holes, etc. with putty after first coat has been applied. Where varnish finish is required putty to be colour matched to final colour.

Prepare all surfaces, fill, repair and make good imperfections as required for the system to be applied to a first quality finish. Surfaces must be completely dust free, dry and without oil, grease or foreign matter.

### 7.3 SYSTEMS

#### 1. 4 coats Resene Polythane moisture-cured polyurethane

- Ply flooring and bunk top,

#### 2. 4 coats Resene Aquaclear water-based clear finish

- Interior ply walls, ceiling and cornice
- window and door reveals and architraves
- Mouldings and interior finishes generally

**Miscellaneous:**

Any material or element which does not have a specified finish, but obviously needs finishing to complete the Contract, shall be considered a part of the Contract, and in general shall have the same finish as similar elements or materials. Confirm with Contract Administrator prior to doing this work.

**7.4 COMPLETION**

At the completion, make good at own expense any patchy work, incorrect material, and imperfections to work, and shall eliminate all runs, bubbles, etc. Recover complete sections while rectifying work. Leave job clean and tidy to the satisfaction of the Contract Administrator, with all trade debris removed and all surfaces free from varnish splashes and decoration marks.

## 8.0 WATER SUPPLY

### 8.1 WATER TANK STAND

Fabricate and install the water tank stand in the location shown on the site plan and to the details shown on the foundation plan.

Generally framing shall be rough sawn H3.2 CCA Radiata. Foundations shall be Conqra Ezi-Yaka Lightfoot foundation system, with all piles to be accurately cut to levels for platform framing. Bearers to be extensions of hut bearers. Securely fix all bearers, blocking and decking as noted on the drawings. Where bolts or other fixings are not noted, nails shall be used.

### 8.2 WATER TANK

Water tank to be standard water grade Wilson 900 litre available from Wilson plastics. Tank to be supplied and installed complete with the following:

- screw lid,
- leaf strainer,
- 20mm outlet, and
- 50mm overflow outlet
- 32mm wash-out valve to base of water tank

Install tanks on tank stand, ensuring that tap discharges past the edge of the tank stand and that the 32mm wash-out valve to the base of the tank is clear of tank stand framing and is readily accessible. Hold tank in place with seismic restraint blocks and no.8 gauge wire through hold down lugs fixed with galvanised staples to stand joists.

Fit 50mm uPVC pipe to overflow. Set the bottom of the overflow on the base of the tank and cut 50mm high x 20mm wide slots to the base of the pipe to allow for water and settled sediment to be drawn from the base of the tank. Drill a 20mm diameter hole on the top of the horizontal portion of the overflow pipe at the top of the tank, so the hole is within the tank. This will prevent the overflow from emptying the tank by siphoning. Run overflow down leg of tank stand and discharge to ground through 100mm elbow at bottom.

All holes in tanks to be cut to the correct minimum clearances with a hole saw, fittings not to be over tightened and any pipes that are exposed to loads shall be supported.

Fit 20mm diaphragm tap valve, either Saunders part no. ASCIWOQ or Acuflo DV 250/20, complete with 90 degree elbow to form spout, to water tank outlet. Provide support block under tap and strap over the top to securely fix tap in place.

### 8.3 GUTTERS AND DOWNPIPES

Supply and fit Marley PVC Stormcloud spouting to one side only of the hut to collect water draining from the roof. Refer to the site plan for the location of the spouting to suit the location of the water tank. Block gutter out from wall cladding to provide 50mm overlap of roof into gutter. Provide 1:200 fall to down pipe – water shall not lie in the gutters. Fit 65mm uPVC droppers to gutter to take down pipe.

Fit 65mm diameter uPVC downpipe system in the location as shown on the site plan to suit the location of the water tank, seal the connection into water tank. Leave the system with runs and lines straight and true, and leaving no water lying in the system.

## **APPENDIX A: DOC ENGINEER CALCULATIONS/ DETAILS (if required)**

## APPENDIX A2.3: SPECIFICATION

### STANDARD 2 BUNK VISITOR HUT WITH TIE-DOWNS

#### CURRENT SPECIFICATION REGISTER

	<b>Title</b>	<b>Version</b>	<b>Date issued</b>
	Standard 2 bunk visitor hut with tie-downs	4.0	March 2009

#### AMENDMENT REGISTER

<b>Amendment date</b>	<b>Amendment details (section, page number, block)</b>	<b>Version</b>	<b>Signature of copyholder and date</b>

## SPECIFICATION

of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

# Standard Two Bunk Visitor Hut

With tie-downs



Capiche House  
111 Dixon Street  
P.O. Box 2115  
Wellington 1  
Phone: (04) 473 7577  
Fax: (04) 384 5177  
[www.pc-architects.co.nz](http://www.pc-architects.co.nz)

Department of Conservation  
New Zealand

Practical  
&  
Innovative  
Design

## Building Consent & Construction

V4.0 Base Specification March 2009



Department of Conservation  
*Te Papa Atawhai*

Directors:

Ron Pynenburg

BBSc BArch (Hons) PPNZIA

Life member FNZIA

Ken Collins

BBSc BArch (Hons) ANZIA

Tim Burns

BBSc BArch (Hons) ANZIA



<b>CONTENTS</b>	<b>page</b>
<b>1.0 PRELIMINARY AND GENERAL .....</b>	<b>1</b>
1.1 Form of Contract	1
1.2 Requirements of Authorities	1
1.3 Inspections	1
1.4 Use of Documents	1
1.5 Contractor's Establishment and Work Area	1
1.6 Completion of Works	2
<b>2.0 SITEWORK AND FOUNDATIONS.....</b>	<b>3</b>
2.1 Building Setout	3
2.2 Site Preparation	3
2.3 Obstructions	3
2.4 Over Excavations	3
2.5 Inspection	3
2.6 Backfilling and Disposal	3
2.7 Foundations	3
2.8 Wind Tie-down System	4
<b>3.0 LIGHTWEIGHT STEEL FRAMING.....</b>	<b>5</b>
3.1 Scope	5
3.2 Standards	5
3.3 Materials and Workmanship	5
3.4 Surface Preparation	6
3.5 Loading and Serviceability Criteria	7
<b>4.0 CARPENTRY AND GENERAL .....</b>	<b>8</b>
4.1 Workmanship	8
4.2 Underfloor Insulation	8
4.3 Plywood Flooring	8
4.4 Plywood Walls and Ceiling	8
4.5 Mouldings	8
4.6 Air Seals	9
4.7 Bunks	9
4.8 Internal Cooking Bench	9
4.9 Hooks	9
4.10 Lifting Eye	9
<b>5.0 ROOFING AND CLADDING.....</b>	<b>10</b>
5.1 Workmanship	10
5.2 Insulation	10
5.3 Building wrap	10
5.4 Profiled Metal Roofing and Cladding	10
5.5 Flashings	11
5.6 thermal break	11
<b>6.0 EXTERIOR JOINERY .....</b>	<b>12</b>
6.1 Materials and Labour	12
6.2 Aluminium Windows	12
6.3 Aluminium Door	12
6.4 Glazing	13
6.5 uPVC Vent	13

<b>7.0 FINISHING AND PAINTING .....</b>	<b>14</b>
<b>7.1 Workmanship and Materials</b>	<b>14</b>
<b>7.2 Preparation</b>	<b>14</b>
<b>7.3 Systems</b>	<b>14</b>
<b>7.4 Completion</b>	<b>15</b>

**APPENDIX A: DOC ENGINEER CALCULATIONS/ DETAILS (if required)**

**TWO BUNK HUT INFORMATION:**

**Service Standard:**

- Basic
- 2 visitor bunks
- BCA or RS Visitor Group

**Design Criteria Parameters:**

- Earthquake zone    any
- Wind load            3 kPa maximum
- Snow loading        3.1 kPa maximum
- Floor load           1.5 kPa

## **1.0 PRELIMINARY AND GENERAL**

### **1.1 FORM OF CONTRACT**

The form of Contract shall be the Department of Conservation General Conditions of Construction Works Contract together with any Special Conditions and/or Schedules provided.

For the purposes of this project, where this specification refers to the Contract Administrator, the Contract refers to the Supervisor.

### **1.2 REQUIREMENTS OF AUTHORITIES**

The Department of Conservation shall apply for and uplift the Resource Consent (if required), Project Information Memorandum and the Building Consent.

The Contractor shall ascertain and familiarise himself with the requirements of any consents prior to commencing work, and shall employ methods and work practices which comply. The Contractor shall establish which inspections are required by these consents, and shall pay and arrange for the inspections to take place including give all notices and arrange for inspections and the like required by the Building Consent. At the completion of the works the Contractor shall apply for and obtain the Code Compliance Certificate from the Territorial Authority,

These shall be provided to the Contract Administrator.

### **1.3 INSPECTIONS**

Where consultation with or inspection by the Contract Administrator or other consultants is required a minimum of 48 hours notice shall be given by the Contractor.

### **1.4 USE OF DOCUMENTS**

The Contractor shall read the specification, the drawings and the Conditions of Contract together and as referring to each other. What is omitted in one and included in the other shall be read as included in all. Bring any ambiguity or contradiction to the Contract Administrator's notice for an Instruction before carrying out the affected work.

- Figure dimensions on drawings take precedence over drawings to a smaller scale.
- Drawings to a larger scale take precedence over drawings to a smaller scale.
- Drawings take precedence over the specifications

Do not scale dimensions from the drawings. Any ambiguity or conflict in dimensions must be referred to the Contract Administrator for an Instruction.

### **1.5 CONTRACTOR'S ESTABLISHMENT AND WORK AREA**

The Contractor shall liaise with the Local Area Office of the Department of Conservation to determine suitable areas for the Contractor's site sheds/tents and other working areas, and to make arrangements regarding the use of existing toilets, huts, and other facilities.

It shall be the Contractor's responsibility to arrange for any additional accommodation, sanitary facilities, power and communication facilities required, including all permits and approvals from the relevant service authority.

The Contractor shall reinstate all areas affected by the contract, including the establishment and working areas to the reasonable satisfaction of the Contract Administrator.

The Contractor's site areas and sheds/tents shall be made available for use by the Contract Administrator and the Principal and free access to the Contractor's records and documents shall be allowed.

## **1.6 COMPLETION OF WORKS**

Although it may not be expressly mentioned or shown on each and every item, or detailed in the Specification, all equipment, joinery fittings and services shall be left in first class condition and proper working order. All visible work, surfaces, materials and finishes shall be left in first class condition without damage or blemish.

Remove all rubbish arising from this Contract from the Site and Works. Leave all floors swept clean, clean all glass inside and out, remove all paint, concrete and other marks, clean all prefinished or decorated woodwork, fittings, and all items generally to leave the building and site clean and fit for immediate occupation and use by DOC.

The Contractor shall provide to the Contract Administrator a copy of an "as built" plan showing to a suitable scale, the position of all underground services, as relating to the contract works. The "as built" plan shall be forwarded to the Contract Administrator prior to any retention monies being released.

## 2.0 SITEWORK AND FOUNDATIONS

### 2.1 BUILDING SETOUT

Refer to the site plan for building locations, relative levels and areas for excavation (if any). Floor level established from setting out top of shortest pile to be 150mm above ground level.

The location of all buildings and finished levels shall be confirmed on site by the Contract Administrator.

### 2.2 SITE PREPARATION

Remove all leaf-litter or other material from the area to be built upon.

When shown on the drawings, excavate for hut platform and for foundations to be built to the dimensions and details shown allowing for working room as necessary. Batters and cut faces shall be a minimum of 1m clear of the hut outline. Ground surrounding the hut shall fall a minimum of 50mm towards any batter or cut face. Ensure that falls underneath and surrounding hut are formed to provide a well-drained sub-floor area without ponding.

### 2.3 OBSTRUCTIONS

Excavate and remove any obstruction that is encountered that may interfere with the specified ground levels and contours and shape and size of the foundations as detailed.

### 2.4 OVER EXCAVATIONS

The pile depths shown are indicative, based on site investigations, and bearing depth may occur at lower levels. Any additional excavation caused solely by encountering poor ground conditions or other natural weakness shall be treated as a variation provided such work has been authorised by the Contract Administrator.

### 2.5 INSPECTION

The Administrator shall be given 48 hours notice to enable inspection of the foundation excavations. Approval shall be obtained before installation of piles commences.

### 2.6 BACKFILLING AND DISPOSAL

All material removed from the excavation, and which is approved as suitable by the Contract Administrator, shall be used as far as practicable in backfilling foundations in accordance with the directions noted in the Foundation System section of this specification and on the drawings. Surplus or unsuitable excavated material shall be disposed of as directed by the Contract Administrator in a safe and legal manner.

### 2.7 FOUNDATIONS

Conqra Lightfoot foundations comprising Ezi-Yaka lightfoot pad set at base of pile with 125 x 125 H5 sawn piles installed and with connections to sub-floor framing as per the details. Piles to be accurately positioned and set plumb and vertical, 150mm minimum out of ground.

The pile depths shown are indicative, based on site investigations, and bearing depth may occur at lower levels. Any additional excavation caused solely by encountering poor ground conditions or other natural weakness shall be treated as a variation provided such work has been authorised by the Contract Administrator.

Provide all temporary bracing necessary to the piles until such time as the piles can support the structure without distress to either element. All piles to be accurately cut to levels for floor framing.

Provide bracing as noted in the foundation plan on the drawings.

## **2.8 WIND TIE-DOWN SYSTEM**

Wind tie-down system provided to the details as shown on the drawings.

Prior to Anchor blocks being buried and hut connection brackets being enclosed, these items shall be inspected by DOC's engineer. Provide at least five working days notice of when the inspection is to be required.

## 3.0 LIGHTWEIGHT STEEL FRAMING

### 3.1 SCOPE

This section covers all cold rolled galvanised steel wall and roof framing and specifically includes the light weight steel wall frames and their fixings.

### 3.2 STANDARDS

Work and materials shall comply with the following relevant standards:

NZS 3441:1978	Hot Dipped Zinc Coated Steel Coil and Cut Lengths
AS 1397:1984	Hot Dipped Zinc Coated Steel Coil and Cut Lengths
AS 1594:	Hot Rolled Unalloyed Low Carbon Steel Sheet and Strips

### 3.3 MATERIALS AND WORKMANSHIP

#### Steelwork:

All steelwork shall be of the size and weights figured on the drawings. The following Standards Sections shall be used:

Wall frames	Steelite framing 90 x 40 x 0.55
Floor frame	Steelite framing double 90 x 40 x 0.55
Roof frame	150 x 0.95 top hat
Bunks and bench frame	Steelite framing 90 x 40 x 0.75

Contact Harris Foster Ltd (Maurice Harris ph 09 367 1070, email [Maurice@hfc.co.nz](mailto:Maurice@hfc.co.nz)) for supply of steel framing. All necessary cleats brackets angles etc shall be prepared as above. Should the lightweight steel frame supplier wish to make alterations to the details and sizes given, he shall submit the altered details on shop drawings to the engineer.

All pre-made frames shall be provided with shop drawings indicating sizes, weights and dimensions. All openings, including lintels, jambs and sills shall be detailed. All lightweight steel framing and fixings shall be designed to the loading criteria given in Section 3.5.

#### Dimensions:

The contractor and steel framing supplier shall check all dimensions prior to fabrication of wall frames and other frames and other framing components.

Should any discrepancy be found, the engineer shall be notified at once.

#### Fabrication:

Frame and lintel components shall be accurately cut to length so that they fit firmly against abutting members and shall be held firmly in place until properly fastened.

The following shall apply:

- Studs shall be seated squarely in bottom plates with webs at 90° to the face of the wall.
- Studs shall be accurately located, plumbed and securely fastened to the flanges of top and bottom plates.
- Multiple studs shall be used as required at all points of concentrated load e.g. opening jambs.

- Plates shall be provided in lengths to maintain continuity.
- Splices in studs shall not be permitted.
- In order to maintain structural integrity and to support linings, short studs shall be provided between bottom plates and windowsills, between top plates and window heads, and between top plates and door heads or in other areas around openings where appropriate.
- All frames shall be adequately braced until linings are fixed.
- The preferred method of fastening is self-drilling self-tapping screws, or approved blind rivets.
- All frames shall be supplied with noggin, folded plates and support points for the linings and intersecting walls shown on the architect's drawings.

#### Erection:

Provision shall be made to clamp all framing firmly together while on site TEK screwed joints are being completed. All frames shall be true to line and plumb prior to fixing. The following shall apply:

- The frames are to be fabricated in a factory and fixed together to form the frame for a transportable building.
- Lifting, loading and transportation of prefabricated frames shall be accomplished with sufficient care to prevent local damage to frames.
- Site connections shall be as specified.
- The bottom plate shall be securely anchored to floors using 2/12g TEK screws at 600mm max. c-c and at door jambs. These screws must go through the bottom plate, the ply flooring and fix into the floor frame trimming member.
- **All bottom plates and other lightweight steel sections shall be separated from the treated bearers using a malthoid membrane.**

#### Fixings:

Generally TEK screws, self-drilling of minimum 10 gauge shall be used to fix frames to frames. 12gauge screws shall be used to fix the bottom plate to the floor frame and to fix the purlins to the top plates. 4.5mm blind steel rivets shall be used to fabricate the frames. The lightweight steel-framing contractor shall supply all fixing details necessary to comply with the loadings. All the screws fixings steel components shall be electroplated (zinc plated with a gold chromate finish).

#### Finishing:

Leave all this work in first class condition for the following trades. On completion of framing all debris shall be removed from cavities in bottom plates. This includes all metal fillings etc.

#### General:

Handle and store channels, studs and accessories to avoid damage. Keep dry in transit, store clear of the ground on timber pallets and under cover. If they become wet, separate out, wipe dry with a cloth and restack allowing full air circulation.

### **3.4 SURFACE PREPARATION**

All cold rolled steel sections used for roof and wall framing and not specifically listed for special treatment shall be galvanised with a zinc coating of not less than 275 g/m<sup>2</sup> in accordance with the relevant standards in Section 3.2.

Any areas of galvanising which are damaged during erection shall be cleaned and touched up with zinc rich primer.



Floor Joists and other external exposed surfaces shall be sprayed with “Goldseal” prior to fabricating the frame. This specifically applies to the floor frame.

### 3.5 LOADING AND SERVICEABILITY CRITERIA

All lightweight steel internal framing including lintels, trimmers and openings, and connections to roof framing and other wall framing or structure shall be designed to comply with the New Zealand Building Code and adequate to support the loads specified in the New Zealand Loading Code NZS 4203:1992, and in particular the loads and serviceability criteria set out below.

All lightweight steel supplied, shall be designed in accordance with AS 1538:1988 or AISI-LRFD cold-formed steel design.

Item	Design Loads	Serviceability limits for deflection
Wall Framing	Wind loads	Face Loading (Wind)
	q ult = 3.0 KPa	Ply lined walls – H/200
	q serv = 1.95 KPa	Impact (0.7kN mid span)
Roof Framing	Snow load = 3.1 KPa	

## 4.0 CARPENTRY AND GENERAL

### 4.1 WORKMANSHIP

Set out, erect and fix all material and work accurately, level, square and plumb to produce an even finish, flush across joints and suitable for any subsequent work. Execute all cuts, mitres and scribes true to line to produce a first class job and tight junctions. Make all joints in the strongest possible manner, tight and secure. Stagger laps and joints where possible. All exposed surfaces shall have all machine marks removed and left fit for specified finishes.

Adequate protection must be given to all materials to keep them in first class condition and suitable for their intended use and finish. All timber for exposed work shall be free from defects that would prevent a good dressed surface and satisfactory finishing.

### 4.2 UNDERFLOOR INSULATION

Underfloor insulation shall be 55mm "EXPOL" expanded polystyrene under floor insulation laid tight fit between floor joists and adhered to underside of ply flooring with "EXPOL" adhesive along top of spacer ribs.

### 4.3 PLYWOOD FLOORING

Lay 12mm H3 treated Ecoply 'Plyfloor' (CD grade) sheets in stretcher bond pattern, ensuring all end joints land on joists. Butt join all edges.

Fix sheets with 45mm x 10 gauge grade 304 stainless steel self drilling, self tapping screws, driven flush with sheet surface. Fixings 7 - 15mm behind tongues or from sheet edges, spaced at 150mm centres on all edges, and 300mm centres in the body of the sheet.

### 4.4 PLYWOOD WALLS AND CEILING

9mm CD grade untreated Ecoply, with sheets square, horizontal and parallel fixed to wall and ceiling framing. Butt joint sheets together, arris all visible edges. Provide solid fixing for all sheet edges. Where ceiling sheets are not full length, provide a 100mm strip of ply as a backing for full length of joint and fix as noted for edges below.

Fix all sheets with 45mm x 8 gauge hot dip galvanised Wingtek countersunk head screws at spacings as noted below:

Area	Edge fixing	Intermediate fixing
Wall	150mm c/c	300mm c/c
Ceiling	150mm c/c	200mm c/c

### 4.5 MOULDINGS

Joints in lengths of runs shall be neatly and accurately mitred. External corners to be mitred and internal corners scribed. In dressed timber counter sink screws below surface. If necessary, drill screw holes prior to fixing as no split timbers will be accepted.

- Skirtings - 40 x 12 single bevel, untreated Radiata
- Cornice - 40 x 12 single bevel, untreated Radiata
- Architraves— 40 x 12 single bevel, untreated Radiata

Allow for other miscellaneous mouldings and finishing work as required to complete the job.

#### **4.6 AIR SEALS**

Apply 12mm deep bead of Fosroc foamtak SB Air seal on "Fix All" PEF backing rod to all four sides of trimmed opening between timber reveals of joinery units (i.e. windows, door, passive ventilation grilles and the like) and steel framing. Sealant to be flush with internal side of framing as shown on the drawings.

#### **4.7 BUNKS**

Construct and fit two single level bunks in the locations and to the details shown in the drawings.

Generally all framing to bunks shall be 90 x 40 x 0.75mm steel framing to dimensions shown on drawings. Complete with 12mm untreated CD grade ply with 2mm radiused leading edge, and sanded with fine sand paper to smooth finish. Fixed to framing with 45mm x 8 gauge hot dip galvanised Wingtek countersunk head screws at 150mm c/c to edges and 300mm c/c to intermediate framing.

#### **4.8 INTERNAL COOKING BENCH**

Construct and fit internal cooking bench in the location and to the details shown in the drawings.

Construct from 90 x 40 x 0.75mm steel framing. Fix 90 x 40mm timber diagonal brace at each end of benchtop and one central. Provide solid fixing in wall framing for cooking bench. Fabricate and install cooking bench at 900mm above floor level.

Benchtop shall be 1200mm long x 500mm wide grade 304 18/10 stainless steel of minimum 0.9mm gauge with anti-spill front and side edges. Substrate shall be one layer of H3 treated 17mm ply CD grade. Bench to have 150mm upstand to back of benchtop. Fix and seal edge of upstand to ply wall lining with 40 x 12 single bevel untreated Radiata moulding.

#### **4.9 HOOKS**

Supply and install 4 No. "DRAKE & WRIGLEY" hat and coat hooks catalogue number 1033. Finish to be natural brass. Screw fix directly to ply lining at 1500mm above floor level in location shown on the drawings.

#### **4.10 LIFTING EYE**

Lifting eye/hold down bracket roof penetration to be ex 75 x 10 m.s. flat installed and welded to frame strictly as per the details. Cut slot in barge flashing for lifting eye, seal with neutral-cure silicone sealant, and leave penetration weathertight.

## 5.0 ROOFING AND CLADDING

### 5.1 WORKMANSHIP

All work shall be carried out by experienced competent Tradesmen familiar with the products being used, in accordance with the best trade practice and current manufacturers installation specifications. The whole of the cladding shall be installed and left sound and weathertight.

### 5.2 INSULATION

Walls:

Walls are to be insulated with Tasman Insulation "R2.2 WALL PINK BATTS – RESIDENTIAL INSULATION", neatly cut, friction fitting between studs and dwangs. No uninsulated spaces shall be left and all obstructions etc shall have insulation behind them. Batts shall be fitted with inside face flush with inside surface of studs.

Ceiling:

Ceilings are to be insulated with Tasman Insulation "R2.6 CEILING PINK BATTS – RESIDENTIAL INSULATION" neatly cut between all ceiling framing and any blocking. No uninsulated spaces shall be left and all obstructions etc shall have insulation behind them. Batts shall be fitted with inside face flush with inside surface of framing.

### 5.3 BUILDING WRAP

Walls:

Tasman Insulation "Bitumac 860" building paper shall be fixed to outside face of the walls. Lay horizontally, with minimum of 150mm laps, starting at lowest point always. Building paper to be secured to THERMAX B at 300mm centres through Danband polypropylene strapping. No rips or tears or damage to paper. Building paper to lap over flashing, etc. as required to allow the removal of moisture, and to prevent moisture getting into the framing. Seal into window and door openings with Tasman Insulation "Protecto Sill System" flashing tape, 150mm wide

Roof:

Roofing underlay shall be Tasman Insulation "FLAMESTOP 660" laid from vertically from eave to eave over ridge and over purlins, with minimum 150mm laps, and laid towards the prevailing weather. No rips or tears or damage to paper. Building paper to lap over flashing, etc. as required to allow the removal of moisture, and to prevent moisture getting into the framing.

### 5.4 PROFILED METAL ROOFING AND CLADDING

Clad roofs and walls in full length sheets of "COLORSTEEL ENDURA" corrugated profile with strippable film, laid towards prevailing weather. Ensure lines remain vertical and parallel across width of building, and tops and bottoms horizontal and parallel.

Handling and fixing of cladding and accessories shall be strictly as per Manufacturer's instructions. Damaged cladding and accessories shall be rejected.

Walls:

Cladding to be laid vertically. Fasteners shall be Class 4 25mm x 12 gauge type 17 screws, complete with metal and sealing washer.. Set out fasteners in straight and parallel lines and do not over tighten or skew. Pan fix with fixing pattern of fix, miss one, fix, miss two, etc (6 fixings per metre).

**Roof:**

Fasteners shall be Class 4 50mm x 12 gauge type 17 screws, complete with metal and sealing washer. Set out fasteners in straight and parallel lines and do not over tighten or skew. Crest fix with fixing pattern of fix, miss one, fix, miss two, etc (6 fixings per metre).

Washers shall be either EPDM or Neoprene containing no more than 15% carbon black filler by volume or 25% by weight.

Stainless steel or monel fasteners shall not be used with Colorsteel Endura products.

## 5.5 FLASHINGS

Allow for all Flashings and accessories, made from 0.55 BMT "COLORSTEEL ENDURA", colour to match cladding, in as long lengths as possible, as required to complete and make the building weathertight. All joints in flashings made with blind aluminium rivets and a neutral cure silicone rubber sealant. Note that flashings around the windows and doors should not be pre-measured and cut as they may need to take into account variation in peaks and troughs in the exterior claddings.

Flashings to be fabricated to the details shown in the drawings complete with Tetral Industries Ltd polyethylene closed cell "ECOFOAM" of the corrugate profile.

Lifting eye/hold down bracket roof penetration and uPVC Vent shall be flashed with Deks Industries Pty Ltd "DEKTITE" flashing.

## 5.6 THERMAL BREAK

A thermal break shall be provided between all steel framing and the steel cladding. The thermal break shall be 5mm THERAMX B extruded polystyrene (XEPS) directly adhered to the steel stud, nog and top hat sections. THERAMX B strips are to be nominally 42mm wide cut to the required length of the steel section to which it is fixed. Adhere to steel sections with 3M Hi Strength 90 spray adhesive.

Care must be taken to not over tighten the screws used to fix the corrugated sheet cladding to the steel framing. **Set drill clutch to avoid over tightening of the screws.**

Store out of the weather.

THERMAX B is available from: A CLASS INDUSTRY SUPPLIES LTD. Ph:06 3298065

## 6.0 EXTERIOR JOINERY

### 6.1 MATERIALS AND LABOUR

First doors and windows by Aluminium Profiles Ltd are specified as the preferred joinery suite. If 'First' doors and windows are not locally available and an alternative supplier is proposed, they are to be nominated at time of tender and sufficient information provided to demonstrate equivalence in performance.

The Contractor shall supply the whole of the materials, plant and labour necessary for the contract. Work shall be carried out according to best trade practice, by skilled and experienced workers to the standards hereinafter specified. Work shall include the supply and fixing of all units and all associated flashings, hardware, furniture and fixings. Include stays, catches, latches, door stops, cabin hooks etc. as required.

All aluminium windows and doors shall be manufactured in an approved workshop using labour skilled in the trade. Mechanically butt joint corners or all frames and assemble with screws into integral screw traces in the sections. Mitre cut sash corners and assemble with screws into aluminium corner angles mechanically crimped within the section, giving a neat tight fitting joint. Caulk all joints with a thin joint sealant. All opening elements shall be complete with weatherstripping to form a continuous seal between them and the frame. All units shall be assembled square and true to line and level. All fixed glass panels shall be bead glazed into frames.

Ensure that all aluminium is separated from contact with incompatible metals.

### 6.2 ALUMINIUM WINDOWS

Supply and fix windows W1 & W2 to the size and shape as shown on the drawings, fabricated from "FIRST ALUMINIUM 40mm COMMERCIAL SERIES" with a selected Duralloy colour powder-coated finish.

Aluminium frames to be supplied complete with condensation channels all round with drainage path from the sill channel to the exterior of the building. Frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame.

The awning sashes are to be fitted with stainless steel "SAFETY STAYS" to restrict sash projection. Window hardware to be black double tongue handles, cam type fitted to the sash with separate wedges applied to the frame.

All windows shall be glazed in the factory with single glazed units using 6mm polycarbonate.

### 6.3 ALUMINIUM DOOR

Supply and fix entry door D1 to the size and shape as shown on the drawings, fabricated from "FIRST ALUMINIUM MAGNUM 50 COMMERCIAL DOOR" in aluminium frame with a selected Duralloy colour powder-coated finish.

Aluminium frames to be supplied complete with condensation channels all round with drainage path from the threshold to the exterior of the building. Frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame. **No sill section is required for the frame** – refer to the drawings for the rebated sill detail. Doors to be hung on broad leaf butt hinges.

All doors shall be glazed in the factory with single glazed 6mm polycarbonate to top panel and aluminium faced 12mm polystyrene core insulated panel to bottom panel.

Door shall come complete with 300mm high Holyoake powdercoated aluminium louvre Model OHL-F34 fitted into the bottom panel of the door, complete with fine insect proof mesh, 1.2mm powdercoated aluminium weather shield, cabin hook as hold back device, and Lockwood passage latch LW3574SC latch set.

#### **6.4 GLAZING**

Refer to the door and window sections above for the glass types required for joinery units. Glazing shall be designed and installed to include all fixings, sealants, weatherstrips, beads and the like to suit timber or aluminium joinery as appropriate and as required to render the completed system secure, draughtproof and waterproof.

In aluminium joinery neoprene gaskets shall be mitre jointed at corners and not bent around corner of frames and beads and no bowing or bubbling shall be permitted in the Neoprene. Allow for the expansion and contraction of the glass.

#### **6.5 UPVC VENT**

Provide and install a passive ventilation opening at high level to gable wall opposite the entry door, fabricated from 150mm diameter uPVC solvent welded into 'T' shape, and with 90 degree bends at end to form inverted 'U'. Screw fix to steel framing in a solid and secure manner. Cover interior end with fine insect proof mesh before lining is applied, and finish ply opening with 2mm radiused edge. Flash to cladding as detailed in the drawings with flashing tape and DEKTITE flashing with the installation left weathertight.

## 7.0 FINISHING AND PAINTING

### 7.1 WORKMANSHIP AND MATERIALS

All work shall be of a first class standard performed by skilled tradesmen in accordance with sound trade practice. In all situations the finish shall be first class, and matching over any one area in terms of appearance, finish and colour.

Ensure that all surfaces including surfaces of all preceding undercoats are in a suitable condition to enable a first class finish to be obtained. Locks, bolts, fittings, etc. will be removed as necessary to prevent damage or marking and be replaced at completion of work.

All materials shall be applied strictly in accordance with the manufacturers instructions for all coating, stopping and other treatment. Varnishes shall be of the best quality of their respective kinds and shall be brought onto the job in their original containers with seals unbroken. Application shall not be by spraying.

Provide all necessary protection, masking, covering, guards, etc. necessary to protect painting work and any persons in the vicinity. Provide warning signs and remove on completion. No painting shall be carried out under unsuitable conditions. Work damaged by weather, dust or the activities of other trades shall be rubbed down and recoated.

Putty shall consist of whiting thoroughly ground in linseed oil to form a smooth readily workable paste, tinted or stained as necessary to suit the finished colour in all materials.

### 7.2 PREPARATION

For interior work neatly fill in and stop all cracks, nail holes, etc. with putty after first coat has been applied. Where varnish finish is required putty to be colour matched to final colour.

Prepare all surfaces, fill, repair and make good imperfections as required for the system to be applied to a first quality finish. Surfaces must be completely dust free, dry and without oil, grease or foreign matter.

### 7.3 SYSTEMS

#### 1. 4 coats Resene Polythane moisture-cured polyurethane

- Ply flooring and bunk top,

#### 2. 4 coats Resene Aquaclear water-based clear finish

- Interior ply walls, ceiling and cornice
- window and door reveals and architraves
- Mouldings and interior finishes generally



**Miscellaneous:**

Any material or element which does not have a specified finish, but obviously needs finishing to complete the Contract, shall be considered a part of the Contract, and in general shall have the same finish as similar elements or materials. Confirm with Contract Administrator prior to doing this work.

**7.4 COMPLETION**

At the completion, make good at own expense any patchy work, incorrect material, and imperfections to work, and shall eliminate all runs, bubbles, etc. Recover complete sections while rectifying work. Leave job clean and tidy to the satisfaction of the Contract Administrator, with all trade debris removed and all surfaces free from varnish splashes and decoration marks.

## **APPENDIX A: DOC ENGINEER CALCULATIONS/ DETAILS (if required)**

**APPENDIX A2.4: SPECIFICATION**

**STANDARD 2 BUNK VISITOR HUT WITHOUT  
WATER SUPPLY OR TIE-DOWNS**

**CURRENT SPECIFICATION REGISTER**

	<b>Title</b>	<b>Version</b>	<b>Date issued</b>
	Standard 2 bunk visitor hut without water supply and tie-downs	4.0	March 2009

**AMENDMENT REGISTER**

<b>Amendment date</b>	<b>Amendment details (section, page number, block)</b>	<b>Version</b>	<b>Signature of copyholder and date</b>

## SPECIFICATION

of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

# Standard Two Bunk Visitor Hut

Without water supply or tie-downs



Capiche House  
111 Dixon Street  
P.O. Box 2115  
Wellington 1  
Phone: (04) 473 7577  
Fax: (04) 384 5177  
[www.pc-architects.co.nz](http://www.pc-architects.co.nz)

Department of Conservation  
New Zealand

Practical  
&  
Innovative  
Design

## Building Consent & Construction

V4.0 Base Specification March 2009



Department of Conservation  
*Te Papa Atawhai*

Directors:

Ron Pynenburg

BBSc BArch (Hons) PPNZIA

Life member FNZIA

Ken Collins

BBSc BArch (Hons) ANZIA

Tim Burns

BBSc BArch (Hons) ANZIA

<b>CONTENTS</b>	<b>page</b>
<b>1.0 PRELIMINARY AND GENERAL .....</b>	<b>1</b>
1.1 Form of Contract	1
1.2 Requirements of Authorities	1
1.3 Inspections	1
1.4 Use of Documents	1
1.5 Contractor’s Establishment and Work Area	1
1.6 Completion of Works	2
<b>2.0 SITEWORK AND FOUNDATIONS.....</b>	<b>3</b>
2.1 Building Setout	3
2.2 Site Preparation	3
2.3 Obstructions	3
2.4 Over Excavations	3
2.5 Inspection	3
2.6 Backfilling and Disposal	3
2.7 Foundations	4
<b>3.0 LIGHTWEIGHT STEEL FRAMING.....</b>	<b>5</b>
3.1 Scope	5
3.2 Standards	5
3.3 Materials and Workmanship	5
3.4 Surface Preparation	6
3.5 Loading and Serviceability Criteria	7
<b>4.0 CARPENTRY AND GENERAL .....</b>	<b>8</b>
4.1 Workmanship	8
4.2 Underfloor Insulation	8
4.3 Plywood Flooring	8
4.4 Plywood Walls and Ceiling	8
4.5 Mouldings	8
4.6 Air Seals	9
4.7 Bunks	9
4.8 Internal Cooking Bench	9
4.9 Hooks	9
4.10 Lifting Eye	9
<b>5.0 ROOFING AND CLADDING.....</b>	<b>10</b>
5.1 Workmanship	10
5.2 Insulation	10
5.3 Building wrap	10
5.4 Profiled Metal Roofing and Cladding	10
5.5 Flashings	11
5.6 Thermal break	11
<b>6.0 EXTERIOR JOINERY .....</b>	<b>12</b>
6.1 Materials and Labour	12
6.2 Aluminium Windows	12
6.3 Aluminium Door	12
6.4 Glazing	13
6.5 uPVC Vent	13

<b>7.0 FINISHING AND PAINTING .....</b>	<b>14</b>
<b>7.1 Workmanship and Materials</b>	<b>14</b>
<b>7.2 Preparation</b>	<b>14</b>
<b>7.3 Systems</b>	<b>14</b>
<b>7.4 Completion</b>	<b>15</b>

**APPENDIX A: DOC ENGINEER CALCULATIONS/ DETAILS (if required)**

**TWO BUNK HUT INFORMATION:**

**Service Standard:**

- Basic
- 2 visitor bunks
- BCA or RS Visitor Group

**Design Criteria Parameters:**

- Earthquake zone    any
- Wind load            3 kPa maximum
- Snow loading        3.1 kPa maximum
- Floor load           1.5 kPa

## 1.0 PRELIMINARY AND GENERAL

### 1.1 FORM OF CONTRACT

The form of Contract shall be the Department of Conservation General Conditions of Construction Works Contract together with any Special Conditions and/or Schedules provided.

For the purposes of this project, where this specification refers to the Contract Administrator, the Contract refers to the Supervisor.

### 1.2 REQUIREMENTS OF AUTHORITIES

The Department of Conservation shall apply for and uplift the Resource Consent (if required), Project Information Memorandum and the Building Consent.

The Contractor shall ascertain and familiarise himself with the requirements of any consents prior to commencing work, and shall employ methods and work practices which comply. The Contractor shall establish which inspections are required by these consents, and shall pay and arrange for the inspections to take place including give all notices and arrange for inspections and the like required by the Building Consent. At the completion of the works the Contractor shall apply for and obtain the Code Compliance Certificate from the Territorial Authority,

These shall be provided to the Contract Administrator.

### 1.3 INSPECTIONS

Where consultation with or inspection by the Contract Administrator or other consultants is required a minimum of 48 hours notice shall be given by the Contractor.

### 1.4 USE OF DOCUMENTS

The Contractor shall read the specification, the drawings and the Conditions of Contract together and as referring to each other. What is omitted in one and included in the other shall be read as included in all. Bring any ambiguity or contradiction to the Contract Administrator's notice for an Instruction before carrying out the affected work.

- Figure dimensions on drawings take precedence over drawings to a smaller scale.
- Drawings to a larger scale take precedence over drawings to a smaller scale.
- Drawings take precedence over the specifications

Do not scale dimensions from the drawings. Any ambiguity or conflict in dimensions must be referred to the Contract Administrator for an Instruction.

### 1.5 CONTRACTOR'S ESTABLISHMENT AND WORK AREA

The Contractor shall liaise with the Local Area Office of the Department of Conservation to determine suitable areas for the Contractor's site sheds/tents and other working areas, and to make arrangements regarding the use of existing toilets, huts, and other facilities.

It shall be the Contractor's responsibility to arrange for any additional accommodation, sanitary facilities, power and communication facilities required, including all permits and approvals from the relevant service authority.

The Contractor shall reinstate all areas affected by the contract, including the establishment and working areas to the reasonable satisfaction of the Contract Administrator.

The Contractor's site areas and sheds/tents shall be made available for use by the Contract Administrator and the Principal and free access to the Contractor's records and documents shall be allowed.

## **1.6 COMPLETION OF WORKS**

Although it may not be expressly mentioned or shown on each and every item, or detailed in the Specification, all equipment, joinery fittings and services shall be left in first class condition and proper working order. All visible work, surfaces, materials and finishes shall be left in first class condition without damage or blemish.

Remove all rubbish arising from this Contract from the Site and Works. Leave all floors swept clean, clean all glass inside and out, remove all paint, concrete and other marks, clean all prefinished or decorated woodwork, fittings, and all items generally to leave the building and site clean and fit for immediate occupation and use by DOC.

The Contractor shall provide to the Contract Administrator a copy of an "as built" plan showing to a suitable scale, the position of all underground services, as relating to the contract works. The "as built" plan shall be forwarded to the Contract Administrator prior to any retention monies being released.



## **2.0 SITEWORK AND FOUNDATIONS**

### **2.1 BUILDING SETOUT**

Refer to the site plan for building locations, relative levels and areas for excavation (if any). Floor level established from setting out top of shortest pile to be 150mm above ground level.

The location of all buildings and finished levels shall be confirmed on site by the Contract Administrator.

### **2.2 SITE PREPARATION**

Remove all leaf-litter or other material from the area to be built upon.

When shown on the drawings, excavate for hut platform and for foundations to be built to the dimensions and details shown allowing for working room as necessary. Batters and cut faces shall be a minimum of 1m clear of the hut outline. Ground surrounding the hut shall fall a minimum of 50mm towards any batter or cut face. Ensure that falls underneath and surrounding hut are formed to provide a well-drained sub-floor area without ponding.

### **2.3 OBSTRUCTIONS**

Excavate and remove any obstruction that is encountered that may interfere with the specified ground levels and contours and shape and size of the foundations as detailed.

### **2.4 OVER EXCAVATIONS**

The pile depths shown are indicative, based on site investigations, and bearing depth may occur at lower levels. Any additional excavation caused solely by encountering poor ground conditions or other natural weakness shall be treated as a variation provided such work has been authorised by the Contract Administrator.

### **2.5 INSPECTION**

The Administrator shall be given 48 hours notice to enable inspection of the foundation excavations. Approval shall be obtained before installation of piles commences.

### **2.6 BACKFILLING AND DISPOSAL**

All material removed from the excavation, and which is approved as suitable by the Contract Administrator, shall be used as far as practicable in backfilling foundations in accordance with the directions noted in the Foundation System section of this specification and on the drawings. Surplus or unsuitable excavated material shall be disposed of as directed by the Contract Administrator in a safe and legal manner.

## 2.7 FOUNDATIONS

Conqra Lightfoot foundations comprising Ezi-Yaka lightfoot pad set at base of pile with 125 x 125 H5 sawn piles installed and with connections to sub-floor framing as per the details. Piles to be accurately positioned and set plumb and vertical, 150mm minimum out of ground.

The pile depths shown are indicative, based on site investigations, and bearing depth may occur at lower levels. Any additional excavation caused solely by encountering poor ground conditions or other natural weakness shall be treated as a variation provided such work has been authorised by the Contract Administrator.

Provide all temporary bracing necessary to the piles until such time as the piles can support the structure without distress to either element. All piles to be accurately cut to levels for floor framing.

Provide bracing as noted in the foundation plan on the drawings.

## 3.0 LIGHTWEIGHT STEEL FRAMING

### 3.1 SCOPE

This section covers all cold rolled galvanised steel wall and roof framing and specifically includes the light weight steel wall frames and their fixings.

### 3.2 STANDARDS

Work and materials shall comply with the following relevant standards:

NZS 3441:1978	Hot Dipped Zinc Coated Steel Coil and Cut Lengths
AS 1397:1984	Hot Dipped Zinc Coated Steel Coil and Cut Lengths
AS 1594:	Hot Rolled Unalloyed Low Carbon Steel Sheet and Strips

### 3.3 MATERIALS AND WORKMANSHIP

#### Steelwork:

All steelwork shall be of the size and weights figured on the drawings. The following Standards Sections shall be used:

Wall frames	Steelite framing 90 x 40 x 0.55
Floor frame	Steelite framing double 90 x 40 x 0.55
Roof frame	150 x 0.95 top hat
Bunks and bench frame	Steelite framing 90 x 40 x 0.75

Contact Harris Foster Ltd (Maurice Harris ph 09 367 1070, email [Maurice@hfc.co.nz](mailto:Maurice@hfc.co.nz)) for supply of steel framing. All necessary cleats brackets angles etc shall be prepared as above. Should the lightweight steel frame supplier wish to make alterations to the details and sizes given, he shall submit the altered details on shop drawings to the engineer.

All pre-made frames shall be provided with shop drawings indicating sizes, weights and dimensions. All openings, including lintels, jambs and sills shall be detailed. All lightweight steel framing and fixings shall be designed to the loading criteria given in Section 3.5.

#### Dimensions:

The contractor and steel framing supplier shall check all dimensions prior to fabrication of wall frames and other frames and other framing components.

Should any discrepancy be found, the engineer shall be notified at once.

#### Fabrication:

Frame and lintel components shall be accurately cut to length so that they fit firmly against abutting members and shall be held firmly in place until properly fastened.

The following shall apply:

- Studs shall be seated squarely in bottom plates with webs at 90° to the face of the wall.
- Studs shall be accurately located, plumbed and securely fastened to the flanges of top and bottom plates.
- Multiple studs shall be used as required at all points of concentrated load e.g. opening jambs.

- Plates shall be provided in lengths to maintain continuity.
- Splices in studs shall not be permitted.
- In order to maintain structural integrity and to support linings, short studs shall be provided between bottom plates and windowsills, between top plates and window heads, and between top plates and door heads or in other areas around openings where appropriate.
- All frames shall be adequately braced until linings are fixed.
- The preferred method of fastening is self-drilling self-tapping screws, or approved blind rivets.
- All frames shall be supplied with noggin, folded plates and support points for the linings and intersecting walls shown on the architect's drawings.

#### Erection:

Provision shall be made to clamp all framing firmly together while on site TEK screwed joints are being completed. All frames shall be true to line and plumb prior to fixing. The following shall apply:

- The frames are to be fabricated in a factory and fixed together to form the frame for a transportable building.
- Lifting, loading and transportation of prefabricated frames shall be accomplished with sufficient care to prevent local damage to frames.
- Site connections shall be as specified.
- The bottom plate shall be securely anchored to floors using 2/12g TEK screws at 600mm max. c-c and at door jambs. These screws must go through the bottom plate, the ply flooring and fix into the floor frame trimming member.
- **All bottom plates and other lightweight steel sections shall be separated from the treated bearers using a malthoid membrane.**

#### Fixings:

Generally TEK screws, self-drilling of minimum 10 gauge shall be used to fix frames to frames. 12gauge screws shall be used to fix the bottom plate to the floor frame and to fix the purlins to the top plates. 4.5mm blind steel rivets shall be used to fabricate the frames. The lightweight steel-framing contractor shall supply all fixing details necessary to comply with the loadings. All the screws fixings steel components shall be electroplated (zinc plated with a gold chromate finish).

#### Finishing:

Leave all this work in first class condition for the following trades. On completion of framing all debris shall be removed from cavities in bottom plates. This includes all metal fillings etc.

#### General:

Handle and store channels, studs and accessories to avoid damage. Keep dry in transit, store clear of the ground on timber pallets and under cover. If they become wet, separate out, wipe dry with a cloth and restack allowing full air circulation.

### **3.4 SURFACE PREPARATION**

All cold rolled steel sections used for roof and wall framing and not specifically listed for special treatment shall be galvanised with a zinc coating of not less than 275 g/m<sup>2</sup> in accordance with the relevant standards in Section 3.2.

Any areas of galvanising which are damaged during erection shall be cleaned and touched up with zinc rich primer.

Floor Joists and other external exposed surfaces shall be sprayed with “Goldseal” prior to fabricating the frame. This specifically applies to the floor frame.

### 3.5 LOADING AND SERVICEABILITY CRITERIA

All lightweight steel internal framing including lintels, trimmers and openings, and connections to roof framing and other wall framing or structure shall be designed to comply with the New Zealand Building Code and adequate to support the loads specified in the New Zealand Loading Code NZS 4203:1992, and in particular the loads and serviceability criteria set out below.

All lightweight steel supplied, shall be designed in accordance with AS 1538:1988 or AISI-LRFD cold-formed steel design.

Item	Design Loads	Serviceability limits for deflection
Wall Framing	Wind loads	Face Loading (Wind)
	q ult = 3.0 KPa	Ply lined walls – H/200
	q serv = 1.95 KPa	Impact (0.7kN mid span)
Roof Framing	Snow load = 3.1 KPa	

## 4.0 CARPENTRY AND GENERAL

### 4.1 WORKMANSHIP

Set out, erect and fix all material and work accurately, level, square and plumb to produce an even finish, flush across joints and suitable for any subsequent work. Execute all cuts, mitres and scribes true to line to produce a first class job and tight junctions. Make all joints in the strongest possible manner, tight and secure. Stagger laps and joints where possible. All exposed surfaces shall have all machine marks removed and left fit for specified finishes.

Adequate protection must be given to all materials to keep them in first class condition and suitable for their intended use and finish. All timber for exposed work shall be free from defects that would prevent a good dressed surface and satisfactory finishing.

### 4.2 UNDERFLOOR INSULATION

Underfloor insulation shall be 55mm "EXPOL" expanded polystyrene under floor insulation laid tight fit between floor joists and adhered to underside of ply flooring with "EXPOL" adhesive along top of spacer ribs.

### 4.3 PLYWOOD FLOORING

Lay 12mm H3 treated Ecoply 'Plyfloor' (CD grade) sheets in stretcher bond pattern, ensuring all end joints land on joists. Butt join all edges.

Fix sheets with 45mm x 10 gauge grade 304 stainless steel self drilling, self tapping screws, driven flush with sheet surface. Fixings 7 - 15mm behind tongues or from sheet edges, spaced at 150mm centres on all edges, and 300mm centres in the body of the sheet.

### 4.4 PLYWOOD WALLS AND CEILING

9mm CD grade untreated Ecoply, with sheets square, horizontal and parallel fixed to wall and ceiling framing. Butt joint sheets together, arris all visible edges. Provide solid fixing for all sheet edges. Where ceiling sheets are not full length, provide a 100mm strip of ply as a backing for full length of joint and fix as noted for edges below.

Fix all sheets with 45mm x 8 gauge hot dip galvanised Wingtek countersunk head screws at spacings as noted below:

Area	Edge fixing	Intermediate fixing
Wall	150mm c/c	300mm c/c
Ceiling	150mm c/c	200mm c/c

### 4.5 MOULDINGS

Joints in lengths of runs shall be neatly and accurately mitred. External corners to be mitred and internal corners scribed. In dressed timber counter sink screws below surface. If necessary, drill screw holes prior to fixing as no split timbers will be accepted.

- Skirtings - 40 x 12 single bevel, untreated Radiata
- Cornice - 40 x 12 single bevel, untreated Radiata
- Architraves— 40 x 12 single bevel, untreated Radiata

Allow for other miscellaneous mouldings and finishing work as required to complete the job.

#### **4.6 AIR SEALS**

Apply 12mm deep bead of Fosroc foamtak SB Air seal on "Fix All" PEF backing rod to all four sides of trimmed opening between timber reveals of joinery units (i.e. windows, door, passive ventilation grilles and the like) and steel framing. Sealant to be flush with internal side of framing as shown on the drawings.

#### **4.7 BUNKS**

Construct and fit two single level bunks in the locations and to the details shown in the drawings.

Generally all framing to bunks shall be 90 x 40 x 0.75mm steel framing to dimensions shown on drawings. Complete with 12mm untreated CD grade ply with 2mm radiused leading edge, and sanded with fine sand paper to smooth finish. Fixed to framing with 45mm x 8 gauge hot dip galvanised Wingtek countersunk head screws at 150mm c/c to edges and 300mm c/c to intermediate framing.

#### **4.8 INTERNAL COOKING BENCH**

Construct and fit internal cooking bench in the location and to the details shown in the drawings.

Construct from 90 x 40 x 0.75mm steel framing. Fix 90 x 40mm timber diagonal brace at each end of benchtop and one central. Provide solid fixing in wall framing for cooking bench. Fabricate and install cooking bench at 900mm above floor level.

Benchtop shall be 1200mm long x 500mm wide grade 304 18/10 stainless steel of minimum 0.9mm gauge with anti-spill front and side edges. Substrate shall be one layer of H3 treated 17mm ply CD grade. Bench to have 150mm upstand to back of benchtop. Fix and seal edge of upstand to ply wall lining with 40 x 12 single bevel untreated Radiata moulding.

#### **4.9 HOOKS**

Supply and install 4 No. "DRAKE & WRIGLEY" hat and coat hooks catalogue number 1033. Finish to be natural brass. Screw fix directly to ply lining at 1500mm above floor level in location shown on the drawings.

#### **4.10 LIFTING EYE**

Lifting eye/hold down bracket roof penetration to be ex 75 x 10 m.s. flat installed and welded to frame strictly as per the details. Cut slot in barge flashing for lifting eye, seal with neutral-cure silicone sealant, and leave penetration weathertight.

## 5.0 ROOFING AND CLADDING

### 5.1 WORKMANSHIP

All work shall be carried out by experienced competent Tradesmen familiar with the products being used, in accordance with the best trade practice and current manufacturers installation specifications. The whole of the cladding shall be installed and left sound and weathertight.

### 5.2 INSULATION

Walls:

Walls are to be insulated with Tasman Insulation "R2.2 WALL PINK BATTS – RESIDENTIAL INSULATION", neatly cut, friction fitting between studs and dwangs. No uninsulated spaces shall be left and all obstructions etc shall have insulation behind them. Batts shall be fitted with inside face flush with inside surface of studs.

Ceiling:

Ceilings are to be insulated with Tasman Insulation "R2.6 CEILING PINK BATTS – RESIDENTIAL INSULATION" neatly cut between all ceiling framing and any blocking. No uninsulated spaces shall be left and all obstructions etc shall have insulation behind them. Batts shall be fitted with inside face flush with inside surface of framing.

### 5.3 BUILDING WRAP

Walls:

Tasman Insulation "Bitumac 860" building paper shall be fixed to outside face of the walls. Lay horizontally, with minimum of 150mm laps, starting at lowest point always. Building paper to be secured to THERMAX B at 300mm centres through Danband polypropylene strapping. No rips or tears or damage to paper. Building paper to lap over flashing, etc. as required to allow the removal of moisture, and to prevent moisture getting into the framing. Seal into window and door openings with Tasman Insulation "Protecto Sill System" flashing tape, 150mm wide

Roof:

Roofing underlay shall be Tasman Insulation "FLAMESTOP 660" laid from vertically from eave to eave over ridge and over purlins, with minimum 150mm laps, and laid towards the prevailing weather. No rips or tears or damage to paper. Building paper to lap over flashing, etc. as required to allow the removal of moisture, and to prevent moisture getting into the framing.

### 5.4 PROFILED METAL ROOFING AND CLADDING

Clad roofs and walls in full length sheets of "COLORSTEEL ENDURA" corrugated profile with strippable film, laid towards prevailing weather. Ensure lines remain vertical and parallel across width of building, and tops and bottoms horizontal and parallel.

Handling and fixing of cladding and accessories shall be strictly as per Manufacturer's instructions. Damaged cladding and accessories shall be rejected.

Walls:

Cladding to be laid vertically. Fasteners shall be Class 4 25mm x 12 gauge type 17 screws, complete with metal and sealing washer.. Set out fasteners in straight and parallel lines and do not over tighten or skew. Pan fix with fixing pattern of fix, miss one, fix, miss two, etc (6 fixings per metre).



**Roof:**

Fasteners shall be Class 4 50mm x 12 gauge type 17 screws, complete with metal and sealing washer. Set out fasteners in straight and parallel lines and do not over tighten or skew. Crest fix with fixing pattern of fix, miss one, fix, miss two, etc (6 fixings per metre).

Washers shall be either EPDM or Neoprene containing no more than 15% carbon black filler by volume or 25% by weight.

Stainless steel or monel fasteners shall not be used with Colorsteel Endura products.

## 5.5 FLASHINGS

Allow for all Flashings and accessories, made from 0.55 BMT "COLORSTEEL ENDURA", colour to match cladding, in as long lengths as possible, as required to complete and make the building weathertight. All joints in flashings made with blind aluminium rivets and a neutral cure silicone rubber sealant. Note that flashings around the windows and doors should not be pre-measured and cut as they may need to take into account variation in peaks and troughs in the exterior claddings.

Flashings to be fabricated to the details shown in the drawings complete with Tetral Industries Ltd polyethylene closed cell "ECOFOAM" of the corrugate profile.

Lifting eye/hold down bracket roof penetration and uPVC Vent shall be flashed with Deks Industries Pty Ltd "DEKTITE" flashing.

## 5.6 THERMAL BREAK

A thermal break shall be provided between all steel framing and the steel cladding. The thermal break shall be 5mm THERAMX B extruded polystyrene (XEPS) directly adhered to the steel stud, nog and top hat sections. THERAMX B strips are to be nominally 42mm wide cut to the required length of the steel section to which it is fixed. Adhere to steel sections with 3M Hi Strength 90 spray adhesive.

Care must be taken to not over tighten the screws used to fix the corrugated sheet cladding to the steel framing. **Set drill clutch to avoid over tightening of the screws.**

Store out of the weather.

THERMAX B is available from: A CLASS INDUSTRY SUPPLIES LTD. Ph:06 3298065

## 6.0 EXTERIOR JOINERY

### 6.1 MATERIALS AND LABOUR

First doors and windows by Aluminium Profiles Ltd are specified as the preferred joinery suite. If 'First' doors and windows are not locally available and an alternative supplier is proposed, they are to be nominated at time of tender and sufficient information provided to demonstrate equivalence in performance.

The Contractor shall supply the whole of the materials, plant and labour necessary for the contract. Work shall be carried out according to best trade practice, by skilled and experienced workers to the standards hereinafter specified. Work shall include the supply and fixing of all units and all associated flashings, hardware, furniture and fixings. Include stays, catches, latches, door stops, cabin hooks etc. as required.

All aluminium windows and doors shall be manufactured in an approved workshop using labour skilled in the trade. Mechanically butt joint corners or all frames and assemble with screws into integral screw traces in the sections. Mitre cut sash corners and assemble with screws into aluminium corner angles mechanically crimped within the section, giving a neat tight fitting joint. Caulk all joints with a thin joint sealant. All opening elements shall be complete with weatherstripping to form a continuous seal between them and the frame. All units shall be assembled square and true to line and level. All fixed glass panels shall be bead glazed into frames.

Ensure that all aluminium is separated from contact with incompatible metals.

### 6.2 ALUMINIUM WINDOWS

Supply and fix windows W1 & W2 to the size and shape as shown on the drawings, fabricated from "FIRST ALUMINIUM 40mm COMMERCIAL SERIES" with a selected Duralloy colour powder-coated finish.

Aluminium frames to be supplied complete with condensation channels all round with drainage path from the sill channel to the exterior of the building. Frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame.

The awning sashes are to be fitted with stainless steel "SAFETY STAYS" to restrict sash projection. Window hardware to be black double tongue handles, cam type fitted to the sash with separate wedges applied to the frame.

All windows shall be glazed in the factory with single glazed units using 6mm polycarbonate.

### 6.3 ALUMINIUM DOOR

Supply and fix entry door D1 to the size and shape as shown on the drawings, fabricated from "FIRST ALUMINIUM MAGNUM 50 COMMERCIAL DOOR" in aluminium frame with a selected Duralloy colour powder-coated finish.

Aluminium frames to be supplied complete with condensation channels all round with drainage path from the threshold to the exterior of the building. Frames to be fitted with ex 20mm Radiata H3.2 reveals suitable for architraves and fully primed to all non-visible surfaces prior to fixing to the aluminium frame. **No sill section is required for the frame** – refer to the drawings for the rebated sill detail. Doors to be hung on broad leaf butt hinges.

All doors shall be glazed in the factory with single glazed 6mm polycarbonate to top panel and aluminium faced 12mm polystyrene core insulated panel to bottom panel.

Door shall come complete with 300mm high Holyoake powdercoated aluminium louvre Model OHL-F34 fitted into the bottom panel of the door, complete with fine insect proof mesh, 1.2mm powdercoated aluminium weather shield, cabin hook as hold back device, and Lockwood passage latch LW3574SC latch set.

#### **6.4 GLAZING**

Refer to the door and window sections above for the glass types required for joinery units. Glazing shall be designed and installed to include all fixings, sealants, weatherstrips, beads and the like to suit timber or aluminium joinery as appropriate and as required to render the completed system secure, draughtproof and waterproof.

In aluminium joinery neoprene gaskets shall be mitre jointed at corners and not bent around corner of frames and beads and no bowing or bubbling shall be permitted in the Neoprene. Allow for the expansion and contraction of the glass.

#### **6.5 UPVC VENT**

Provide and install a passive ventilation opening at high level to gable wall opposite the entry door, fabricated from 150mm diameter uPVC solvent welded into 'T' shape, and with 90 degree bends at end to form inverted 'U'. Screw fix to steel framing in a solid and secure manner. Cover interior end with fine insect proof mesh before lining is applied, and finish ply opening with 2mm radiused edge. Flash to cladding as detailed in the drawings with flashing tape and DEKTITE flashing with the installation left weathertight.

## 7.0 FINISHING AND PAINTING

### 7.1 WORKMANSHIP AND MATERIALS

All work shall be of a first class standard performed by skilled tradesmen in accordance with sound trade practice. In all situations the finish shall be first class, and matching over any one area in terms of appearance, finish and colour.

Ensure that all surfaces including surfaces of all preceding undercoats are in a suitable condition to enable a first class finish to be obtained. Locks, bolts, fittings, etc. will be removed as necessary to prevent damage or marking and be replaced at completion of work.

All materials shall be applied strictly in accordance with the manufacturers instructions for all coating, stopping and other treatment. Varnishes shall be of the best quality of their respective kinds and shall be brought onto the job in their original containers with seals unbroken. Application shall not be by spraying.

Provide all necessary protection, masking, covering, guards, etc. necessary to protect painting work and any persons in the vicinity. Provide warning signs and remove on completion. No painting shall be carried out under unsuitable conditions. Work damaged by weather, dust or the activities of other trades shall be rubbed down and recoated.

Putty shall consist of whiting thoroughly ground in linseed oil to form a smooth readily workable paste, tinted or stained as necessary to suit the finished colour in all materials.

### 7.2 PREPARATION

For interior work neatly fill in and stop all cracks, nail holes, etc. with putty after first coat has been applied. Where varnish finish is required putty to be colour matched to final colour.

Prepare all surfaces, fill, repair and make good imperfections as required for the system to be applied to a first quality finish. Surfaces must be completely dust free, dry and without oil, grease or foreign matter.

### 7.3 SYSTEMS

#### 1. 4 coats Resene Polythane moisture-cured polyurethane

- Ply flooring and bunk top,

#### 2. 4 coats Resene Aquaclear water-based clear finish

- Interior ply walls, ceiling and cornice
- window and door reveals and architraves
- Mouldings and interior finishes generally

**Miscellaneous:**

Any material or element which does not have a specified finish, but obviously needs finishing to complete the Contract, shall be considered a part of the Contract, and in general shall have the same finish as similar elements or materials. Confirm with Contract Administrator prior to doing this work.

**7.4 COMPLETION**

At the completion, make good at own expense any patchy work, incorrect material, and imperfections to work, and shall eliminate all runs, bubbles, etc. Recover complete sections while rectifying work. Leave job clean and tidy to the satisfaction of the Contract Administrator, with all trade debris removed and all surfaces free from varnish splashes and decoration marks.

## **APPENDIX A: DOC ENGINEER CALCULATIONS/ DETAILS (if required)**

**APPENDIX A3.1: STRUCTURAL CALCULATIONS**  
**LIGHTWEIGHT STEEL FRAMING CALCULATIONS**  
**CURRENT SPECIFICATION REGISTER**

	<b>Title</b>	<b>Version</b>	<b>Date issued</b>
	Structural Calculations for Flyable Bivvy for Department of Conservation	1.0	23-3-2006

**AMENDMENT REGISTER**

<b>Amendment date</b>	<b>Amendment details (section, page number, block)</b>	<b>Version</b>	<b>Signature of copyholder and date</b>

# **STRUCTURAL CALCULATIONS**

**for**

**Flyable Bivvy**

**For**

**Department of Conservation**

**23-3-2006**

**JOB NO. 2128**

E: SOLUTIONS@HFC.CO.NZ

T: 09 367 1070  
F: 09 367 1071

LEVEL 2 8 GEORGE STREET PO BOX 109 106  
NEWMARKET AUCKLAND NEW ZEALAND

**HFC | HARRIS FOSTER CONSULTING LTD**  
**CIVIL & STRUCTURAL ENGINEERS**



# CONTENTS

SECTION	DESCRIPTION
A	Loadings
B	Floor framing
C	Wall framing
D	Roof framing
E	Bunks
F	Fixings
G	Lifting lugs
H	Lateral loads
I	Weights
Appendix	Frame elevations Structural details

Loadings

Floor loading

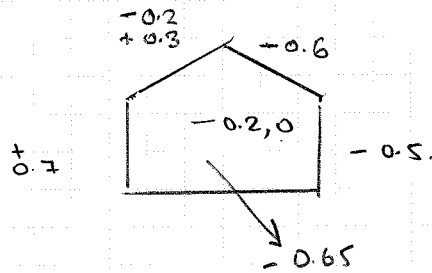
SW. framing -  $0.06 \text{ kN/m}^2$  - G  
 17.5mm -  $0.1 \text{ kN/m}^2$  - G  
 LL  $1.5 \text{ kN/m}^2$  - G or  $1.8 \text{ kN}$  pt load

Roof

as above -  $0.06 \text{ kN/m}^2$  - G.  
 cladding -  $0.06 \text{ kN/m}^2$  - G  
 internal lining -  $0.05 \text{ kN/m}^2$  - G.  
 LL  $0.25 \text{ kN/m}^2$   
 SN.  $3.1 \text{ kN/m}^2$

Wind

$3 \text{ kN/m}^2$  ultimate -  $q_u$   
 $1.95$  serviceability -  $q_s$



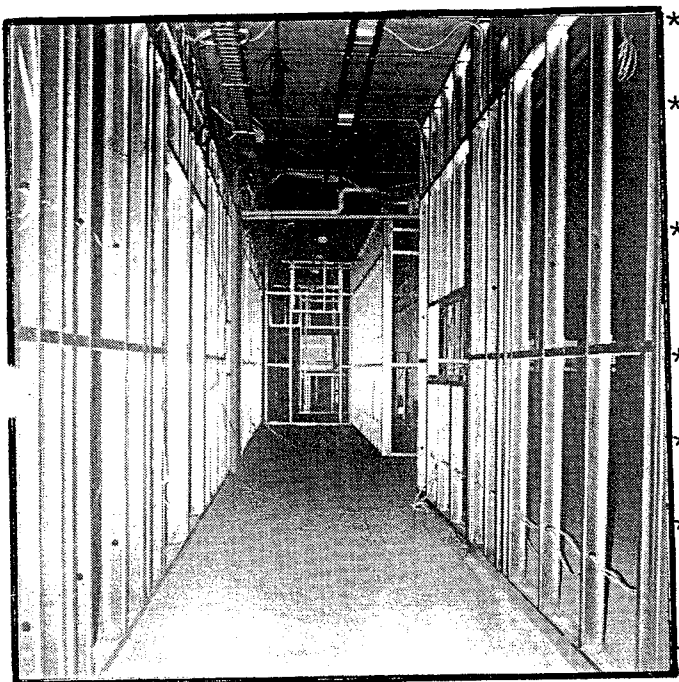
Snow

$3.1 \text{ kN/m}^2$



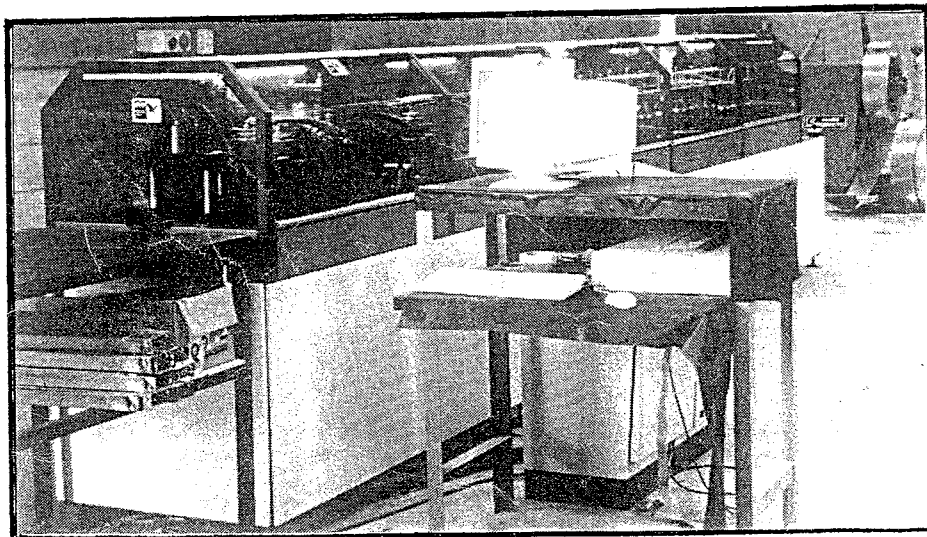
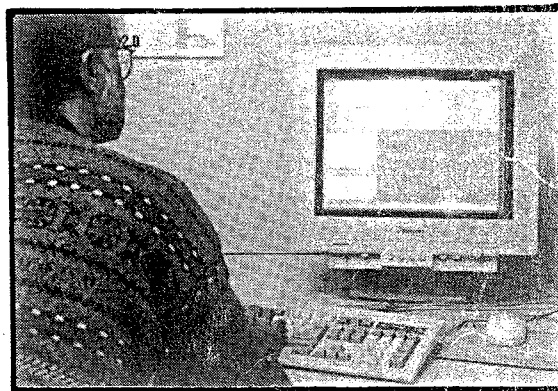
## STIEELITE FRAMING™

New generation steel stud framing for load bearing and non-load bearing walls. Rivetted assembly on-site or off-site. Fire and acoustic rated.

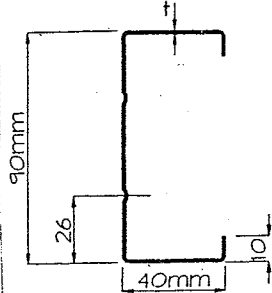


- \* 90x40 stud - compatible with dry timber frame
- \* Wide flange for easier fixing providing minimum edge distance for Hardies products
- \* 3 gauges of steel providing extended span and load capacity
- \* Nogs - optional position and number of rows
- \* 28mm service holes in positions to suit
- \* Can be supplied with timber top plate for use with timber floors and/or trusses
- \* Pre-punched hold down fixing holes

- \* Computer controlled manufacture
- \* Input desired panel parameters only
- \* Run to order - no cutting or waste
- \* Automatic schedule, cut to length, notched, swaged and prepunched rivet holes for assembly
- \* Eliminates tape measure for member set out
- \* No skilled labour required for assembly
- \* Automatic additional studs around openings



## Section Properties

	Thickness t (BMT)	Weight	Area Gross	Yield Stress	Moment of Area (Gross)		Moment of Area (for Deflection calculation)
	mm	kg/m	mm <sup>2</sup>	MPa	I <sub>xx</sub> 10 <sup>3</sup> mm <sup>4</sup>	I <sub>yy</sub> 10 <sup>3</sup> mm <sup>4</sup>	I <sub>xx</sub> 10 <sup>3</sup> mm <sup>4</sup>
	0.55	0.84	100	550	128.3	19.4	99.9
0.75	1.12	137	550	173.0	25.9	141.2	
0.95	1.41	173	550	216.7	32.2	184.0	

## Non-Load Bearing Walls - Maximum Stud Heights

30% U<sub>wind</sub>  
135 Remo 75 x 0.55 stud

Serviceability Wind Pressure (kPa)	0.25		0.35		0.50		0.75	
Stud Spacing (mm)	400	600	400	600	400	600	400	600
Steel Thickness t (mm)	Walls lined both sides with 12.5mm Gib <sup>R</sup> Plasterboard							
0.55	5400	4950	4750	4450	4200	3900	3650	3400
0.75	6000	5500	5300	4850	4650	4250	4000	3650
0.95	6200	5650	5500	4950	4800	4300	4150	3700
Steel Thickness t (mm)	Walls lined both sides with 9.5mm Gib <sup>R</sup> Plasterboard							
0.55	5000	4600	4450	4050	3950	3550	3400	-
0.75	5450	4800	4800	4250	4200	3650	-	-
0.95	5700	5000	-	-	-	-	-	-
Steel Thickness t (mm)	Walls with nogs at 1200 ctrs max without linings each side							
0.55	3950	3400	3550	3100	3150	2800	2750	-
0.75	4450	3850	4000	3500	3560	3200	3100	2850
0.95	4900	4250	4350	3800	3850	3350	3350	2950

### Notes

- The wind pressures given are based on serviceability wind load (generally deflections govern)
- Typical serviceability wind pressures for internal stud walls in the following wind speed areas are:- (all based on C<sub>p1</sub> = 0.6)
  - Low - 0.24kPa
  - Med - 0.32kPa
  - High - 0.47kPa
  - Very High - 0.59kPa
- Spans given are limited to deflections of span/240
- Walls lined one side should be fitted with nogs and spans determined by using the table for walls without Plasterboard.
- All linings must be fixed in accordance with recommendations of Winstone Wallboards Ltd.

## Load Bearing Walls

STEELITE Framing™ is also a full load bearing framing system suitable for residential, commercial and industrial wall framing. The walls can be factory or site assembled and braced for seismic and wind loading. Please contact Steel Technology (NZ) Ltd for specific design information.

For further information contact:

YOUR LOCAL SUPPLIER:

PROJECT: Flyable Binven for DOC

PROJECT #: NEE 2128

DESCRIPTION:

DATE: June 2006

REF/DWGS: Pyneberg & Collins

PAGE #: 31 OF:

# HFC | CALCULATIONS

ENGINEER: MN

\* Amended June 2006

## Flow panel.

Max span between bearers = 1216 mm

Max combined span 302 mm

floor loading:  $1.5 \text{ kN/m}^2 - U$

double joists at 400 c/c (12 mm plywood over)

joist loading =  $0.2 \times 0.4 = 0.08 \text{ kN/m} - Q$

$1.5 \times 0.4 = 0.6 \text{ kN/m} - Q$

pt load 1.80 kW, max span

$$1.2U + 1.6Q = 1.2 \times 0.08 + 1.6 \times 0.6 = 1.06 \text{ kN/m}$$

$$\text{or } 1.2 \times 0.08 = 0.1 \text{ kN/m} - \text{UJCL}$$

$$1.6 \times 1.8 = 2.9 \text{ kW pt load}$$

$$M^* = 1.06 \times 1.216^2 \times 0.125 = 0.196 \text{ kNm}$$

$$M^* = 0.1 \times 1.216^2 \times 0.125 + 2.9 \times 1.216 / 4 = 0.018 + 0.88 = 0.898 \text{ kNm}$$

capacity of double  $90 \times 40 \times 0.55$  back to back

$$pmb = 1.15 \text{ kNm} > 0.898$$

check deflection using double 0.55 studs at 400 c-c

(9+Q)

$$dy \div \frac{5}{384EI} \frac{0.08 \times 1200^4}{2 \times 10^6 \times 2 \times 99.9 \times 10^3} + \frac{1.8 \times 10^3 \times 1200^3}{48 \times 2 \times 10^6 \times 99.9 \times 10^3 \times 2}$$

$$= 0.05 + 1.62 = 1.67 \text{ mm span/718. } \checkmark$$

PROJECT: Phoebe Boring for Doc

PROJECT #: NRE 2128

DESCRIPTION:

DATE: June 2006

REF/DWGS: Lynenborg + Collins

PAGE #: 132 OF:

# HFC | CALCULATIONS

ENGINEER: mra

\* Amended June 2006

check 1km pt head for flow vibration

$$d_{f1} = \frac{1000 \times 1200^3}{48 \times 2 \times 10^6 \times 2 \times 99 \times 10^3} = 0.9 \text{ mm. OK}$$

check 3mm criteria on flow push

Sur wall + roof on end walls

head for wall on

$$= 0.3 \times 2.4 = 0.72 \text{ kNm} - G$$

head on roof

$$= 3.1 \times 3/2 = 4.65 \text{ kNm} - Su$$

$$0.12 \times 3/2 = 0.18 \text{ kNm} - G$$

$$0.25 \times 3/2 = 0.375 \text{ kNm} - Q$$

$$1.2G + 1.6Q = 1.2 \times 0.72 + 1.6 \times 0.375 = 1.824 \text{ kNm}$$

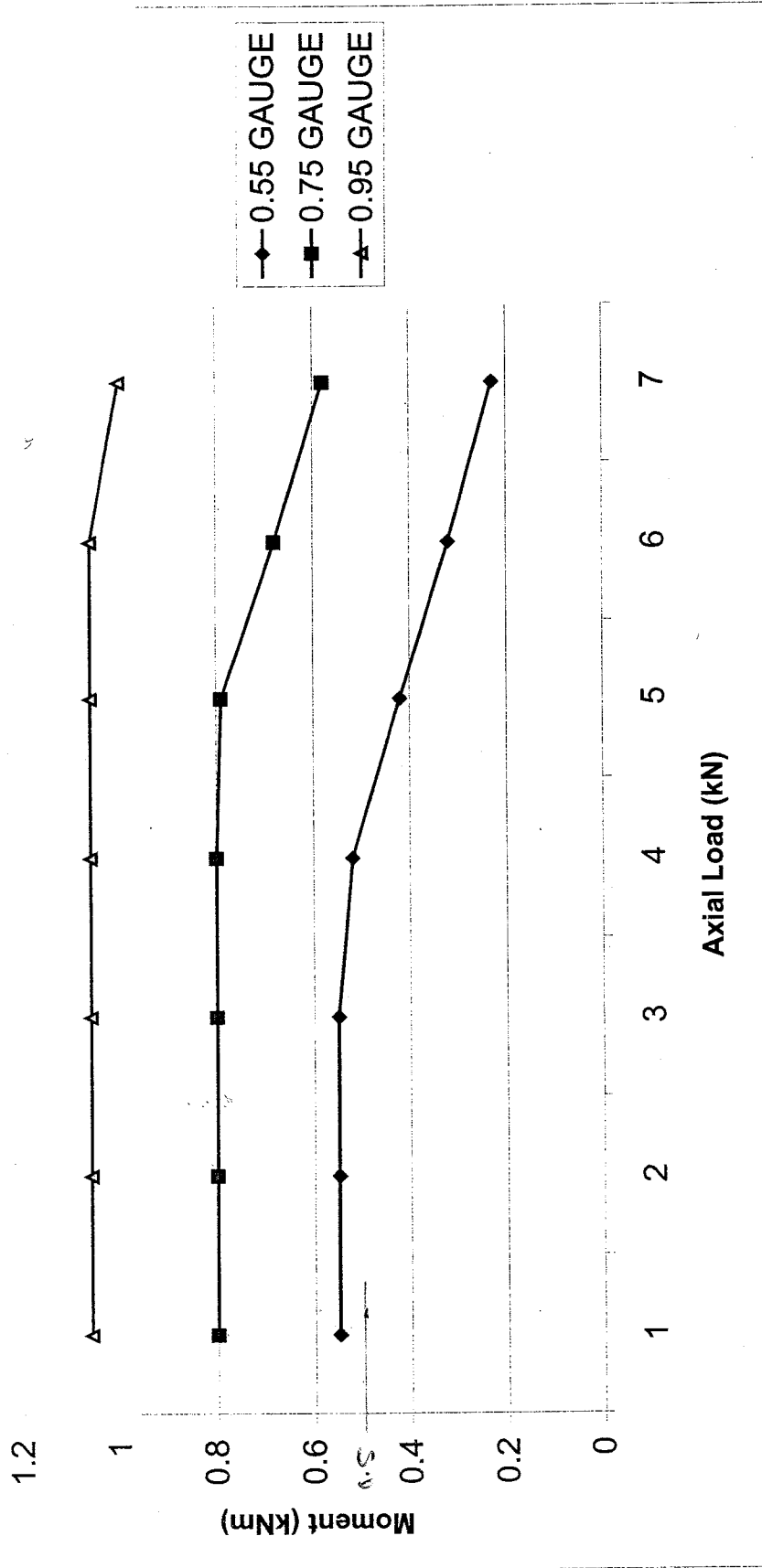
$$1.2G + 1.2Su = 1.2 \times 0.72 + 1.2 \times 4.65 = 6.80 \text{ kNm}$$

$$\text{Max pt head on a D joint} = 6.8 \times 0.4 = 2.72 \text{ kNm}$$

$$\text{M* cant } (1.2G + 1.2Su) = 0.3 \times 2.72 = 0.816 \text{ kNm} < 1.15 \text{ kNm}$$

Use 2/90x40x0.55 @ 400 cc

2.7 STUD CAPACITY CHART



PROJECT: Flyable Boring

PROJECT #: NSR 2128

DESCRIPTION:

DATE: March 2016

REF/DWGS:

Pynenburg + Collins

PAGE #: C1 OF:

# HFC | CALCULATIONS

ENGINEER: mka

## Wall Forming

Side walls.

1680 high

Max lateral load due to wind

$$= 3 \times (0.9) = 2.7 \text{ kN/m}^2$$

stands at 600 c-c generally

$$\text{stand loading} = 0.6 \times 2.7 = 1.62 \text{ kN/m}$$

$$M^* = 1.62 \times 1.64^2 \times 0.125 = 0.55 \text{ kNm}$$

$$\text{Capacity of } 90 \times 40 \times 0.55 \text{ stud} = 0.55 \text{ kNm}$$

$$90 \times 40 \times 0.75 \text{ stud} = 0.80 \text{ kNm}$$

check deflection (0.55 stands)  $W_s = 1.05 \text{ kN/m}$

$$\text{def} = \frac{5}{384} \times \frac{1.05 \times 1.64^4}{2 \times 10^6 \times 99.9 \times 10^3}$$

$$= 4.95 \text{ mm span/331}$$

ok for ply linings, internal  
and external outside

Use  $90 \times 40 \times 0.55$  linings

check frings refer to section



PROJECT: Flyable Bivvy

PROJECT #: N12E 2128

DESCRIPTION:

DATE: March 2006

REF/DWGS:

Pymenburg + Collins

PAGE #: 02 OF:

# HFC | CALCULATIONS

ENGINEER: mia

## End walls

max stud length

1840 single stud  
2000 double stud

$$\text{loading} = 0.9 \times 3 = 2.7 \text{ k/m}^2$$

loading on studs. max spacing 400 cc

$$= 2.7 \times 0.4 = 1.08 \text{ k/m}$$

$$M^* = 1.08 \times 1.84^2 \times 0.125 = 0.45 \text{ kNm}$$

$$\text{Capacity of } 90 \times 40 \times 0.55 \text{ stud} = 0.55 \text{ kNm} \quad \checkmark$$

check deflection  $W_s$

$$\text{def} = \frac{5}{384} \times \frac{0.70 \times 1840^4}{12 \times 10^6 \times 99.9 \times 10^3} = 5.22 \text{ span} / 352 \quad \checkmark$$

check double studs at openings.

$$\text{loading} = 0.5 \times 2.7 = 1.35 \text{ k/m}$$

$$\text{loading on double stud} = 1.35 \times 2 \times 0.125 = 0.675 \text{ kNm}$$

$$\text{Capacity of double stud} = 1.1 \text{ kNm}$$

Use double studs either side of openings.

check axial load on end wall studs.

due to snow load on roof

$$\text{max stud load } N^* = 3.1 \times 0.6 \times 3/2 = 1.77 \text{ kN} - N^*$$

Capacity of 0.55 stud

$$\phi W_c = 3 \text{ kN} \\ @ 0.55 \text{ kNm} \quad \checkmark$$

PROJECT: Flyable Buggy

PROJECT #: NEE 2128

DESCRIPTION:

DATE: March 2006

REF/DWGS: Pyrenburg + Collins

PAGE #: 01 OF:

# HFC | CALCULATIONS

ENGINEER: MW

\* Amended June 2006

check roof framing

Max load snow.  $3.1 \text{ kN/m}^2$

Max wind load  
 $= 3 \times 0.6 \times 0.6 = 1.94 \text{ kN/m} \uparrow$

$$1.2G + Q_w + 1.2S_w$$

$$3 \times 0.6 \times 0.5 = 0.9 \text{ kN/m} \downarrow$$

$$0.9G - W_w$$

(Purlins at 500 c/c)

loading on roof purlin

$$\begin{aligned}
 &= 0.6 \times 0.17 = 0.102 \text{ kN/m} - G \\
 &0.6 \times 0.25 = 0.15 \text{ kN/m} - Q \\
 &3.1 \times 0.6 = 1.86 \text{ kN/m} - S_w
 \end{aligned}$$

uplift

$$1.08 \text{ kN/m} \uparrow - W_w$$

$$0.71 \text{ kN/m} \uparrow W_s$$

$$1.2G + 1.5Q = 1.2 \times 0.1 + 1.5 \times 0.15 = 0.345 \text{ kN/m} \downarrow$$

$$1.2G + 1.2S_w = 1.2 \times 0.1 + 1.2 \times 1.86 = 2.35 \text{ kN/m} \downarrow \leftarrow \text{critical}$$

$$\begin{aligned}
 0.9G - W_w &= 0.9 \times 0.1 - 1.94 = -1.85 \text{ kN/m} \uparrow \\
 &+ 0.9 = 0.99 \text{ kN/m} \downarrow
 \end{aligned}$$

$$M^* = 2.35 \times 3^2 \times 0.125 = 2.64 \text{ kNm}$$

Try  $150 \times 0.95$  HST top hats

capacity for 3.0m span = weak (simple span)

check onhand head due to wind simple span 3.0m

$$\text{capacity} = 2.58 \text{ kNm} \gg 1.85 \text{ kNm}$$

check inward head due to snow

$$\text{capacity} = 3.64 \text{ kNm} \gg 2.35 \text{ kNm}$$

}  $120 \times 0.95$  purlins

Use  $150 \times 0.95$  top hat purlins at 500 c/c

refer to drawings section.

PROJECT: Amable Bivvy

PROJECT #: NEE 2128

DESCRIPTION:

DATE: March 2006

REF/DWGS: Pynenburg & Collins

PAGE #: E1 OF:

# HFC | CALCULATIONS

ENGINEER: mw

check bunk supports

1) double stud on outside edge

loading 1.80 kN midspan

max span 2070 mm

loading from slabs

$$0.175 \times 0.25 / 2 = 0.021875 \text{ kN/m} - q$$

1.80 kN per head

$$1.25 + 1.50 = 1.2 \times 0.065 = 0.078 \text{ kN/m} - w$$

$$1.5 \times 1.8 = 2.7 \text{ kN}$$

$$M^* = 0.078 \times 2.07^2 \times 0.125 + 2.7 \times 2.07 / 4$$

$$= 0.042 + 1.39 = 1.43 \text{ kNm}$$

Use double 90x40x0.75,  $\phi_{mb} = 1.61 \text{ kNm}$

(3-4 mm)

check deflection G+Q

$$def = \frac{5}{384} \times \frac{0.065 \times 2070^4}{12 \times 10^6 \times 2 \times 141.2 \times 10^3} + \frac{1.8 \times 10^3 \times 2070^3}{48 \times 12 \times 10^6 \times 141.2 \times 10^3 \times 2}$$

$$= 0.275 + 5.88 = 6.15 \text{ mm span/336. OK}$$

Use 90x40x0.75 studs to join bunks and bench.

Bench props use (90x40 timber.)

PROJECT: Flyable Bivvy

PROJECT #: NEE 2128

DESCRIPTION:

DATE: March 2006

REF/DWGS: Pymenburg + Collins

PAGE #: F1 OF:

## HFC | CALCULATIONS

ENGINEER: MH

### Fixings.

check fixings for cladding to 0.55 thick steel.

Max load on cladding

$$= 3 \text{ kN/m}^2 \times 0.65 \times 1.5,$$

(assume 1.5 load factor)

$$= 2.92 \text{ kN/m}^2$$

Assume 1 row of nogs in side walls 840 c-c

$\therefore$  max loading on central row of nogs

$$= 2.92 \times 0.80 = 2.33 \text{ kN/m}$$

capacity of 12.9 screws fixing cladding to walls (to AS/NZS 4600)  
(0.5mm cladding)

pull out

$$\phi N_t = 0.5 \times 0.85 \times 0.55 \times 5.59 \times 550 = 718 \text{ N per screw}$$

pull over

$$\phi N_t = 0.5 \times 1.5 \times 0.5 \times 10 \times 700 = 525 \text{ N per screw}$$

$$\therefore \text{require } 2.33 / 0.718 = 3.2 \text{ screws/m}$$

Use 3 No 12 g screws per sheet (800 wide)

similar for roof

PROJECT: Flyable Binny

PROJECT #: NSE 2128

DESCRIPTION:

DATE: March 2006

REF/DWGS: Pyrenburg + Collins.

PAGE #: E2 OF:

# HFC | CALCULATIONS

ENGINEER: MR

Amended June 2006

Fixing of purlins 100 x 0.95 top hats @ 900cc

Uplift on purlins

$$= 3 \times 0.9 \times 0.4 \times 3/2 = 1.62 \text{ kN}$$

12g screws pull out. overhead

capacity of 12g screw = 0.718 N (into 0.55 thick g550)

$$\text{No of screws reqd} = 1.62 / 0.718 = 2.25$$

Use 4/12g screws each end of each purlin

Use 1.2mm folded angle at edge to fix top of decking

PROJECT: Flyable Bivvy

PROJECT #: WEE 2128

DESCRIPTION:

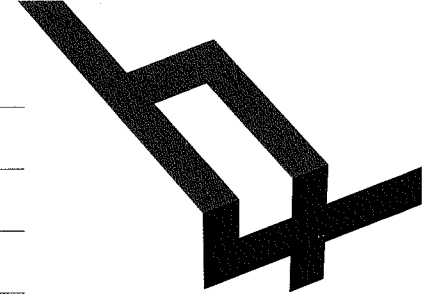
DATE: July 2006

REF/DWGS:

PAGE #: F3 OF:

# HFC | CALCULATIONS

ENGINEER: MJA



confirm edge details. inside lining

(1) side walls.

lateral load at top of wall

$$0.9 \times 3 \times 1.8 / 2 = 2.43 \text{ kN/m}$$

inward

$$\text{outward} = 0.5 \times 3 \times 1.8 / 2 = 1.35 \text{ kN/m}$$

Bending on top plate

$$= 2.43 \times 3^2 \times 0.125 = 2.73 \text{ kNm}$$

(needs lateral support at top of wall)

top of wall)

inside corner folded angle with ply lining fixed through folded angle

pullout on 8g screws

$$= 0.85 \times 0.55 \times 4.17 \times 550 \times 0.5^{1.3}$$

$$= 0.54 \text{ kN per screw}$$

8g winglike screws at

150 mm max around edges

$$\text{capacity} = 0.54 \times 1000 / 150 = 3.6 \text{ kN/m}$$

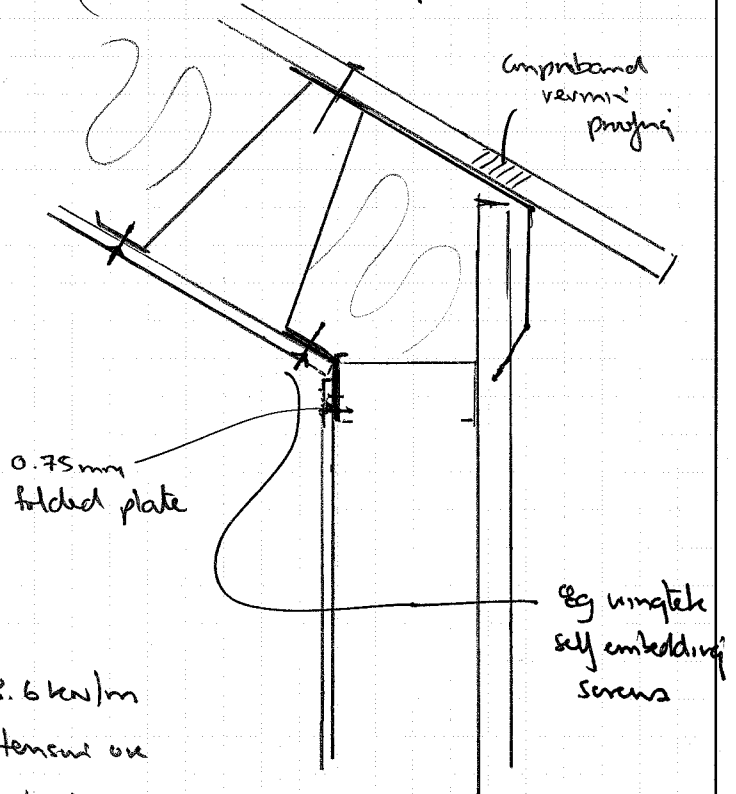
tension on

By observation show unobstructed to top had problem ok

check capacity of 8g screw in plywood - (show)

$$\text{Bearing capacity (7mm) ply (140 B/m)} \quad 7 \text{ kN/m}$$

$$1.05 \text{ kN per screw, OK}$$



T: 09 367 1070  
F: 09 367 1071

LEVEL 2 8 GEORGE STREET PO BOX 109 106  
NEWMARKET AUCKLAND NEW ZEALAND

HFC | HARRIS FOSTER CONSULTING LTD  
CIVIL & STRUCTURAL ENGINEERS

PROJECT: Flyash Runway

PROJECT #: NEE 2178

DESCRIPTION:

DATE: July 2016

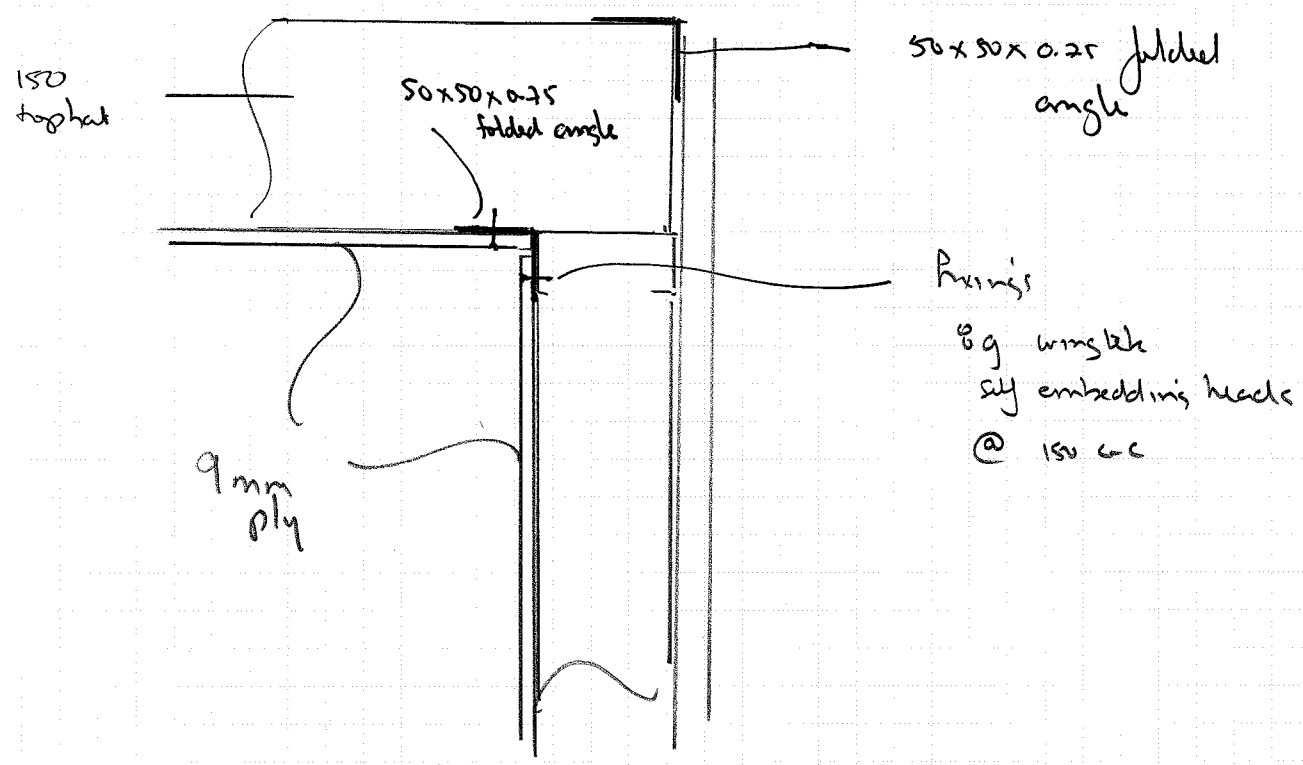
REF/DWGS:

PAGE #: F4 OF:

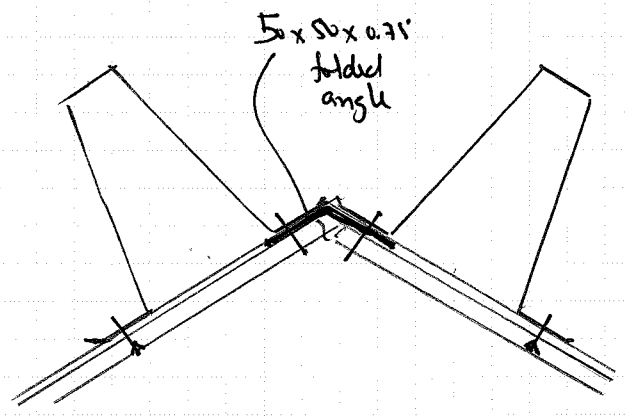
# HFC | CALCULATIONS

ENGINEER: MN

## (ii) side walls



## (iii) ridge.



T: 09 367 1070  
F: 09 367 1071

LEVEL 2 8 GEORGE STREET PO BOX 109 106  
NEWMARKET AUCKLAND NEW ZEALAND

HFC | HARRIS FOSTER CONSULTING LTD  
CIVIL & STRUCTURAL ENGINEERS

PROJECT: Flycatcher Bwinny

PROJECT #: NEE 2128

DESCRIPTION:

DATE: June 2006

REF/DWGS: Rignenburg + Collins

PAGE #: 91 OF:

# HFC | CALCULATIONS

ENGINEER: mma

Amended June 2006

Lifting lugs / hold down points

Sw. wt.  $\approx$  600 kg.

lifting on 4 lugs

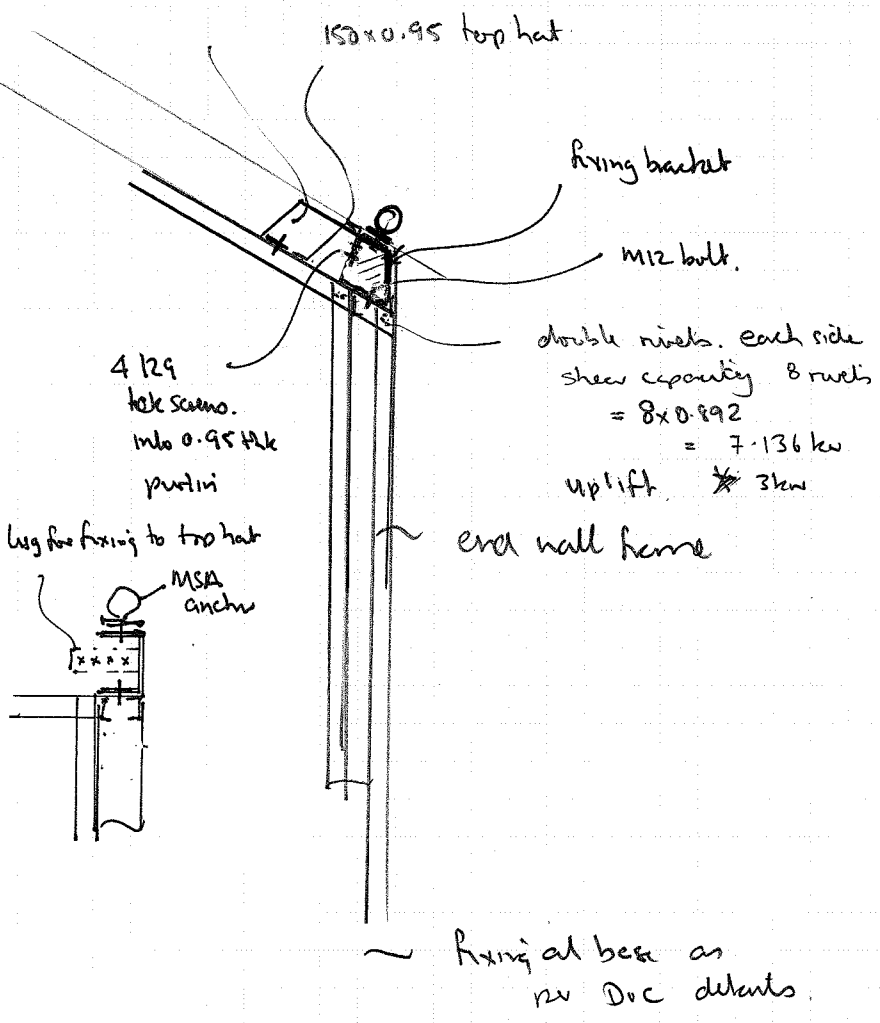
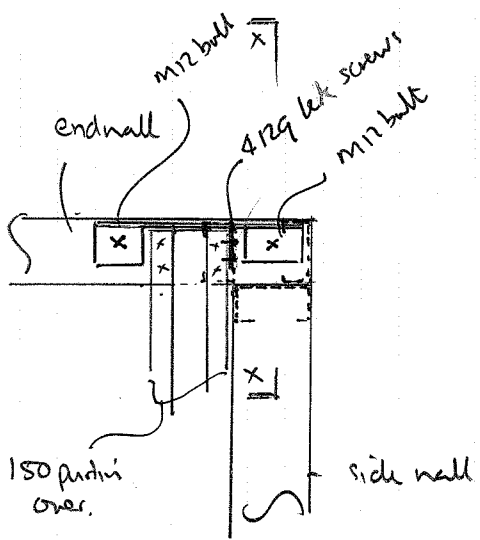
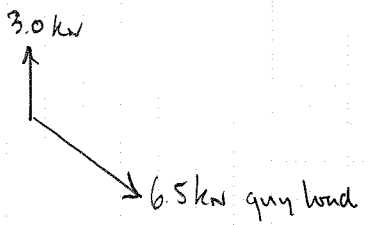
$$\text{lifting load} = 600/4 \times 1.4 \times 1.25 = 263 \text{ kg per lug.}$$

Say 300 kg.  $\rightarrow$  check bearing heads later

MSA anchor points permanent anchor 22kn capacity  $\gg$  3kn

lifting load = 3kn,

anchor load = 6.5kn.



T: 09 367 1070  
F: 09 367 1071

LEVEL 2 8 GEORGE STREET PO BOX 109 106  
NEWMARKET AUCKLAND NEW ZEALAND

HFC | HARRIS FOSTER CONSULTING LTD  
CIVIL & STRUCTURAL ENGINEERS



PROJECT: Flyable Bivy

PROJECT #: NEE 2128

DESCRIPTION:

DATE: June 2006

REF/DWGS: Pynenburg + Griffin

PAGE #: 92 OF:

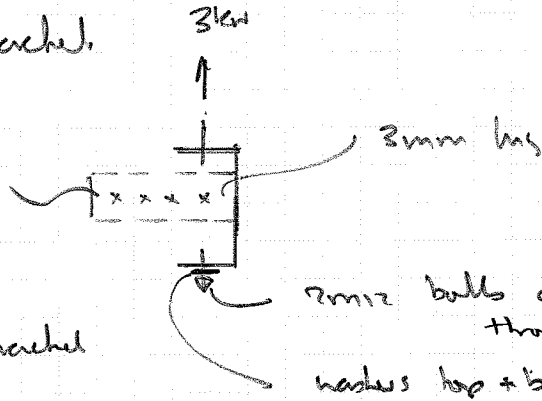
# HFC | CALCULATIONS

ENGINEER: ms

Amended June 2006

lifting bracket

4 12g tek  
screws  
into top hat



Bending on bracket

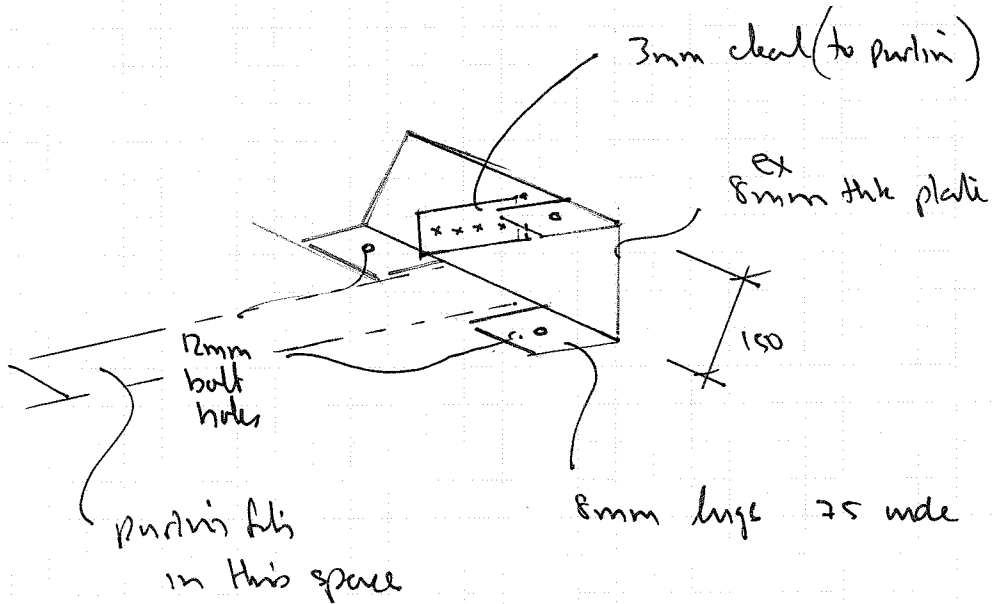
$$= 3 \times 0.04$$

$$= 0.12 \text{ kNm}$$

capacity of 6mm plate  $\phi_{mb} = 0.121 \text{ kNm}$

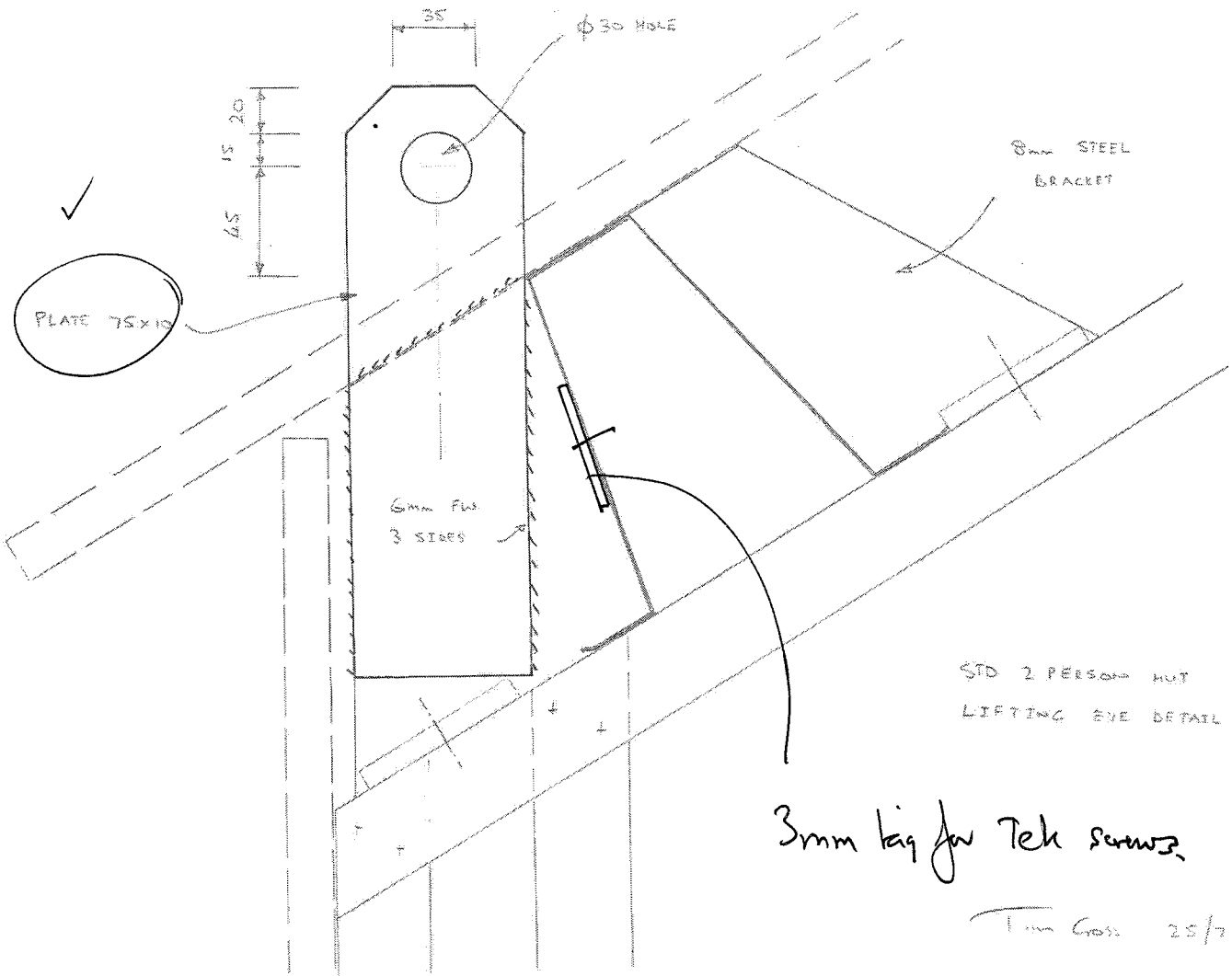
75 long

Use 8mm plate with 3mm long against partition



Shops drawing to be drawn

4 open brackets per. unit



PROJECT: Flyable Bay

PROJECT #: NEE 2128

DESCRIPTION:

DATE: March 2006

REF/DWGS: Pymenburg & Collins

PAGE #: H1 OF:

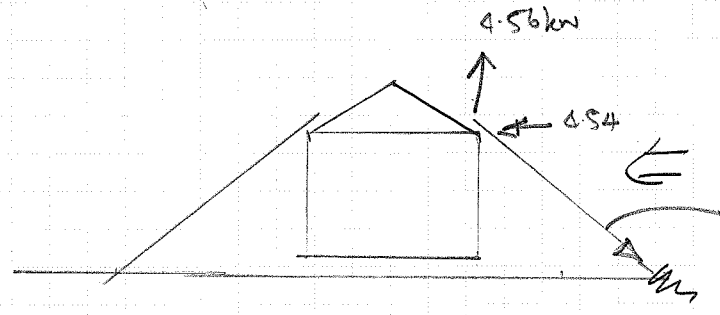
# HFC | CALCULATIONS

ENGINEER: mH

## lateral loads

Resisted by guy wires and anchors (designed by others) \*

lateral load acting on guy wires



Tie load  
 $= \frac{4.54}{\cos 45}$   
 $= \underline{\underline{6.42 \text{ kN}}}$

lateral load =  $1.2 \times 3 \times \frac{3}{2} \times \frac{1.68}{2} = 4.54 \text{ kN}$

uplift =  $0.9 \times 3 \times 3 \times \frac{2.25}{4} = 4.56 \text{ kN}$

Tie force as above

Use anchor bolt or mega anchors or others.

use lifting eyes to connect anchors

lateral loads resisted by guys roof diaphragm ok to transfer load over 3.0m

i.e.  $\frac{4.54}{1.5} = 3.0 \text{ kN/m}$

2.4m deep diaphragm (1.25 kN/m) 25 B16m

10g unsplit screw at 300 cc

0.37 kN/screw · 9.5mm ply ok

all ply use 300cc unsplit 150cc at stud joints
---

PROJECT: Phable Runy

PROJECT #: NEE 2124

DESCRIPTION:

DATE: March 2006

REF/DWGS: Rynenburg + Collins

PAGE #: 142 OF:

# HFC | CALCULATIONS

ENGINEER: MA

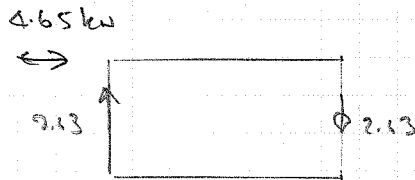
Bracing along the building

lateral loads are resisted by side walls

lateral load

$$3 \times 2\frac{1}{2} \times 2.25 \times 1.2 = 9.31 \text{ kN at eaves.}$$

$$\text{ei} \quad \frac{9.31}{2} = 4.65 \text{ kN per wall}$$



$$\text{uplift} = \frac{4.65 \times 1.7}{3} = 2.63 \text{ kN} \uparrow$$

uplift resisted by  
guy holdowns

shear in ply. (9.5mm thick)

$$= 4.65 \text{ kN. ei } 1.55 \text{ kN/m (31 Bu/m)}$$

Use std. sp1 ply bracing details

Use 10g screws at 150 mm around edges and 300 mm internally

PROJECT: Flyable Bivvy PROJECT #: NEE

DESCRIPTION: DATE: March 2006

REF/DWGS: Pymenburg + Collins PAGE #: I2 OF:

# HFC | CALCULATIONS

ENGINEER: mjt

Checked 2006

floor	12mm ply	$3.0 \times 2.25 \times 6.8$	=	45.9 kg.
internal side walls	-	$1.68 \times 2.82 \times 4.9 \times 2$	=	46.43 kg
end walls	-	$2.3 \times 2.07 \times 2 \times 4.9$	=	46.65 kg
ceiling	-	$2 \times 1.2 \times 2.82 \times 4.9$	=	33.1 kg

## external linings

walls side		$3.0 \times 1.75 \times 2 \times 6.0$	=	63 kg
end walls		$2.25 \times 2.3 \times 2 \times 6.0$	=	62.1 kg

## Internal miscellaneous

bunks	-	$17.5 \times 0.75 \times 2.1 \times 2$	=	55 kg
bench	-	$17.5 \times 0.5 \times 2$	=	17.5 kg

insulation		$1 \times (10.5 + 10.35)$	=	21 kg
				<hr/>
				360.68

Total weight  $\approx 361 + 225 = 586 \text{ kg.}$

PROJECT: Flyable Buggy PROJECT #: NEE

DESCRIPTION: \_\_\_\_\_ DATE: March 2006

REF/DWGS: Pyrenburg + Collins PAGE #: I.1 OF: \_\_\_\_\_

# HFC | CALCULATIONS

ENGINEER: MA

Amended Tim 2006

## SW. framing

floor -  $47 \text{ m} \times 0.84 \text{ kg/m} = 40 \text{ kg}$

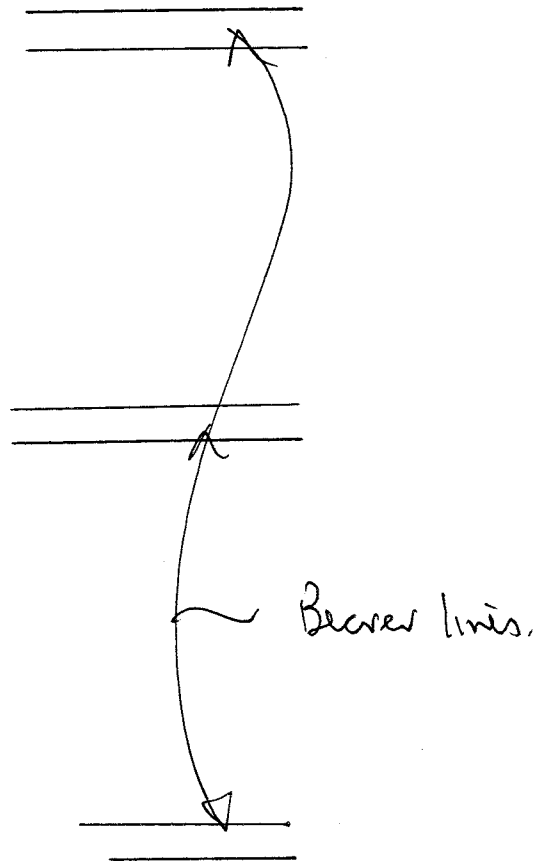
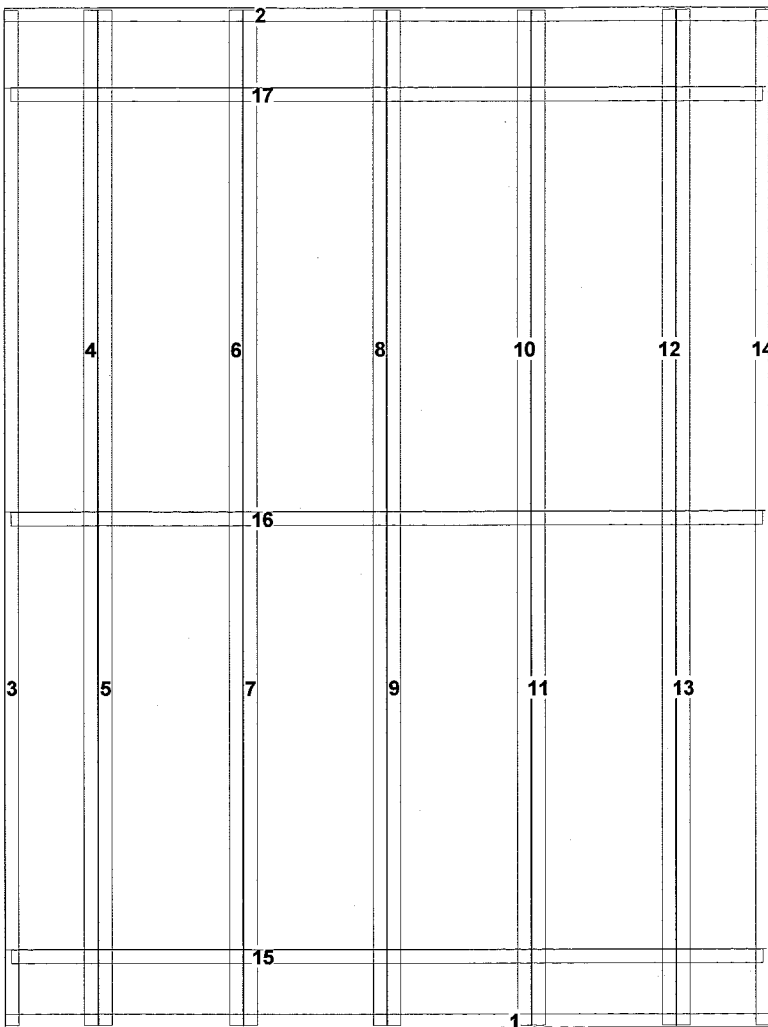
Walls	- side	-	$21.2 \times 0.84 =$	$17.8 \text{ kg}$	} $94.2 \text{ kg}$
	side	-	$33.65 \times 0.84 =$	$28.26 \text{ kg}$	
	end	-	$38.99 \times 0.84 =$	$32.75 \text{ kg}$	
	end	-	$28.39 \times 0.84 =$	$24 \text{ kg}$	

roof -  $6 \times 3 \times 3.2 \text{ t} = 58 \text{ kg}$

## bench / bunks

$16.6 \text{ m} \times 1.12 =$	$18.59$	} $23.66 \text{ kg}$
$6.19 \times 0.82 =$	$5.07$	

Total frame weight = 225 kg



- 1 ( 2250
- 2 ) 2250
- 3 ( 2986
- 4 ) 2986
- 5 ( 2986
- 6 ) 2986
- 7 ( 2986
- 8 ) 2986
- 9 ( 2986
- 10 ) 2986
- 11 ( 2986
- 12 ) 2986
- 13 ( 2986
- 14 ) 2986
- 15 ) 2212
- 16 ) 2212
- 17 ) 2212

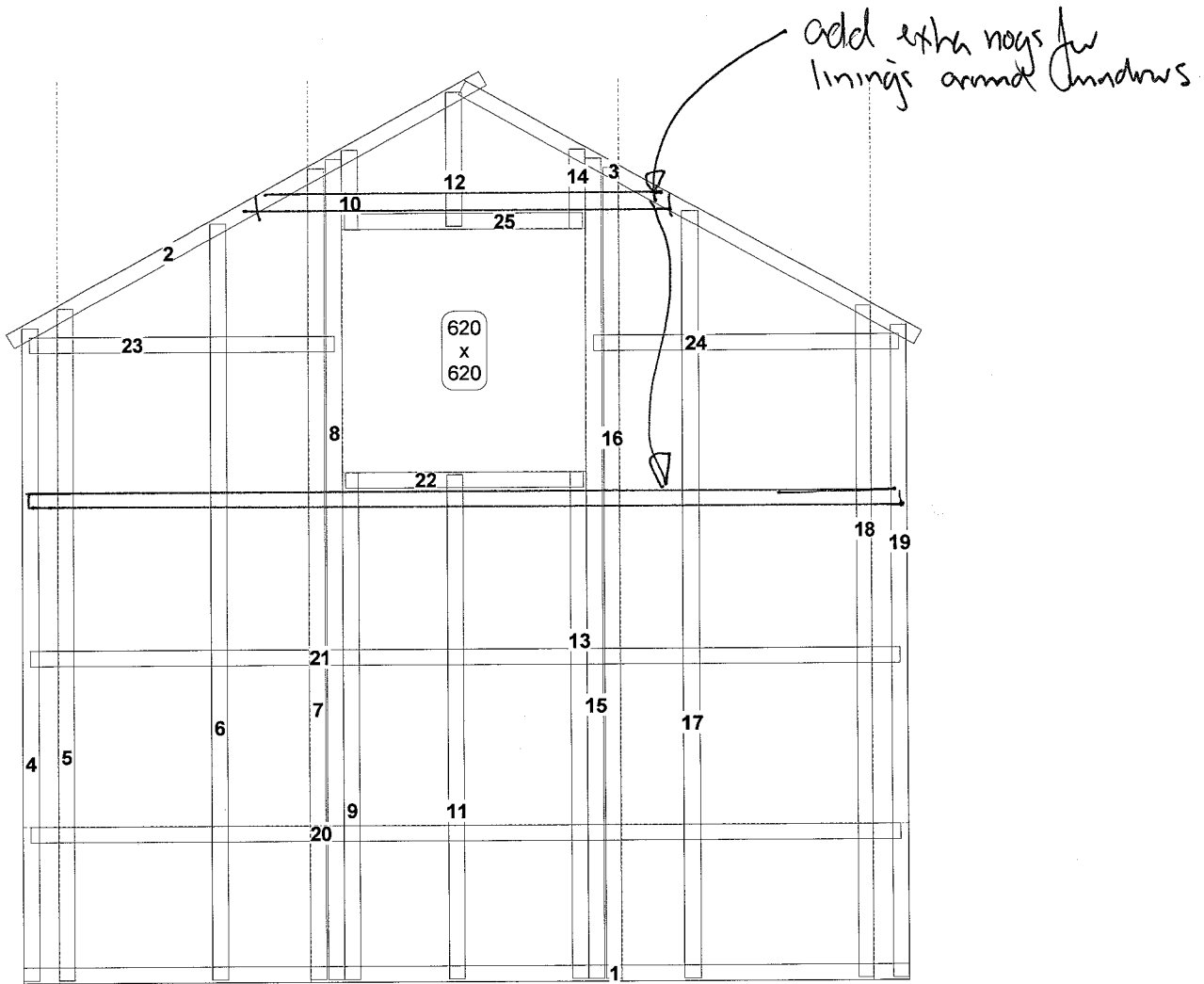
46.97 m  
168 Rivets

Standard floor  
panel  
for 3000 x 2200  
Brim

just at 425 cc

Date	AssemntStart	Finish	Lunch/Smoko

Works Order No	Initial	Date
Rolled		
Checked		



- 1 ( 2250
- 2 ) 1373
- 3 ) 1322
- 4 ( 1666
- 5 ( 1716
- 6 ( 1931
- 7 ( 2070
- 8 ) 2094
- 9 ( 1295
- 10 ( 202
- 11 ( 1288
- 12 ( 341
- 13 ) 1295
- 14 ) 202
- 15 ( 2094
- 16 ) 2070
- 17 ( 1959
- 18 ) 1716
- 19 ) 1666
- 20 ) 2212
- 21 ) 2212
- 22 ) 606
- 23 ) 777
- 24 ) 777
- 25 ( 606

35.74 m  
184 Rivets

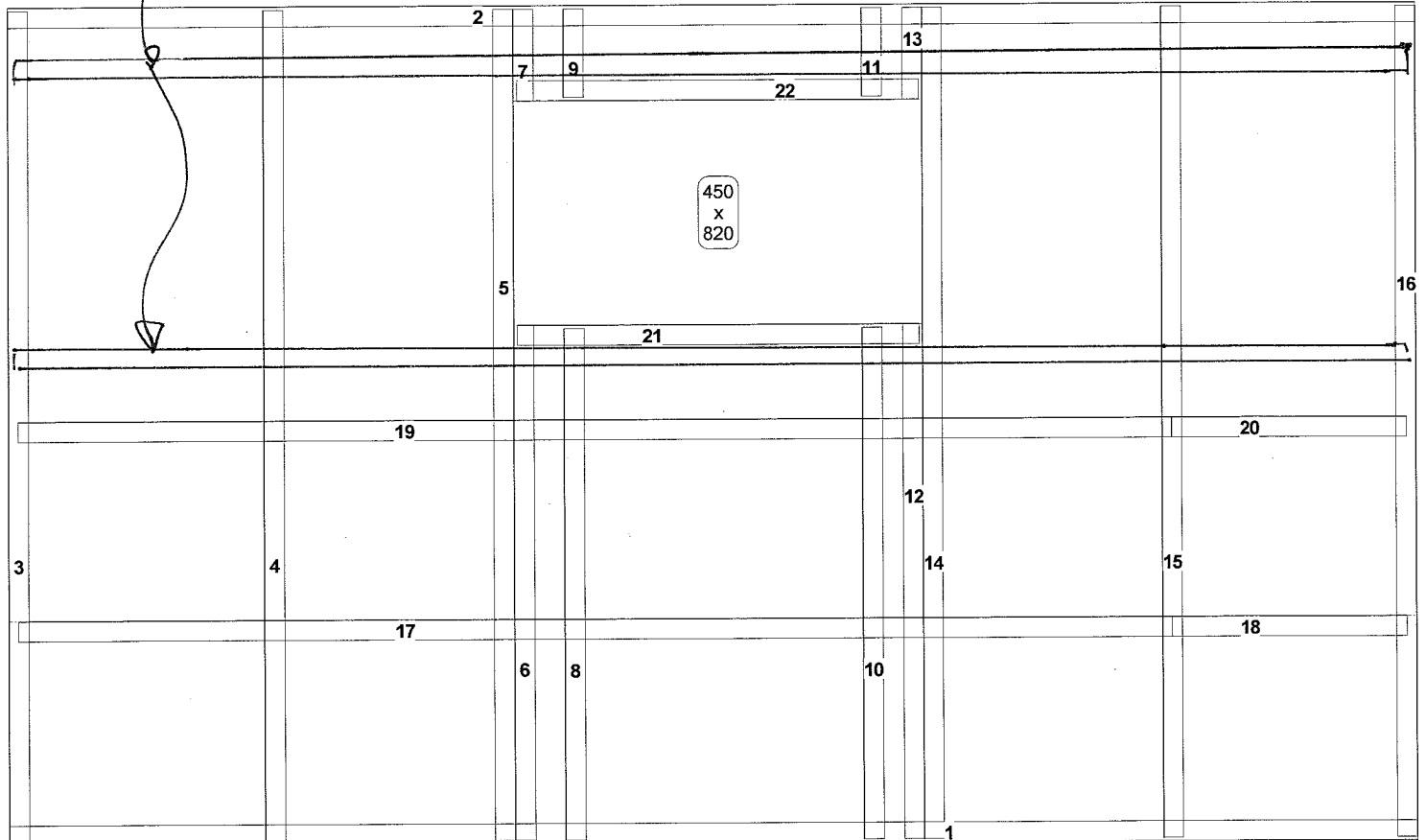
End wall for  
2250 wide Bivy

Date	Assem	Start	Finish	Lunch/Smoko

Works Order No	Initial	Date
Rolled		
Checked		



extra mags for linings



- 1 ( 2820
- 2 ) 2820
- 3 ( 1666
- 4 ( 1666
- 5 ) 1666
- 6 ( 1033
- 7 ( 183
- 8 ( 1026
- 9 ( 176
- 10 ( 1026
- 11 ( 176
- 12 ) 1033
- 13 ) 183
- 14 ( 1666
- 15 ( 1666
- 16 ) 1666
- 17 ) 2311
- 18 ) 472
- 19 ) 2311
- 20 ) 472
- 21 ( 806
- 22 ( 806

27.65 m  
128 Rivets

3000 mm long Bivvy

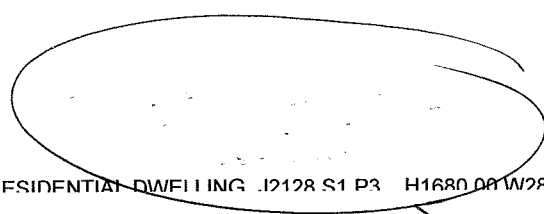
side wall with

820 x 450 H window opening  
and mag line for equipment  
bench

Date	Assemnt	Start	Finish	Lunch/Smoko

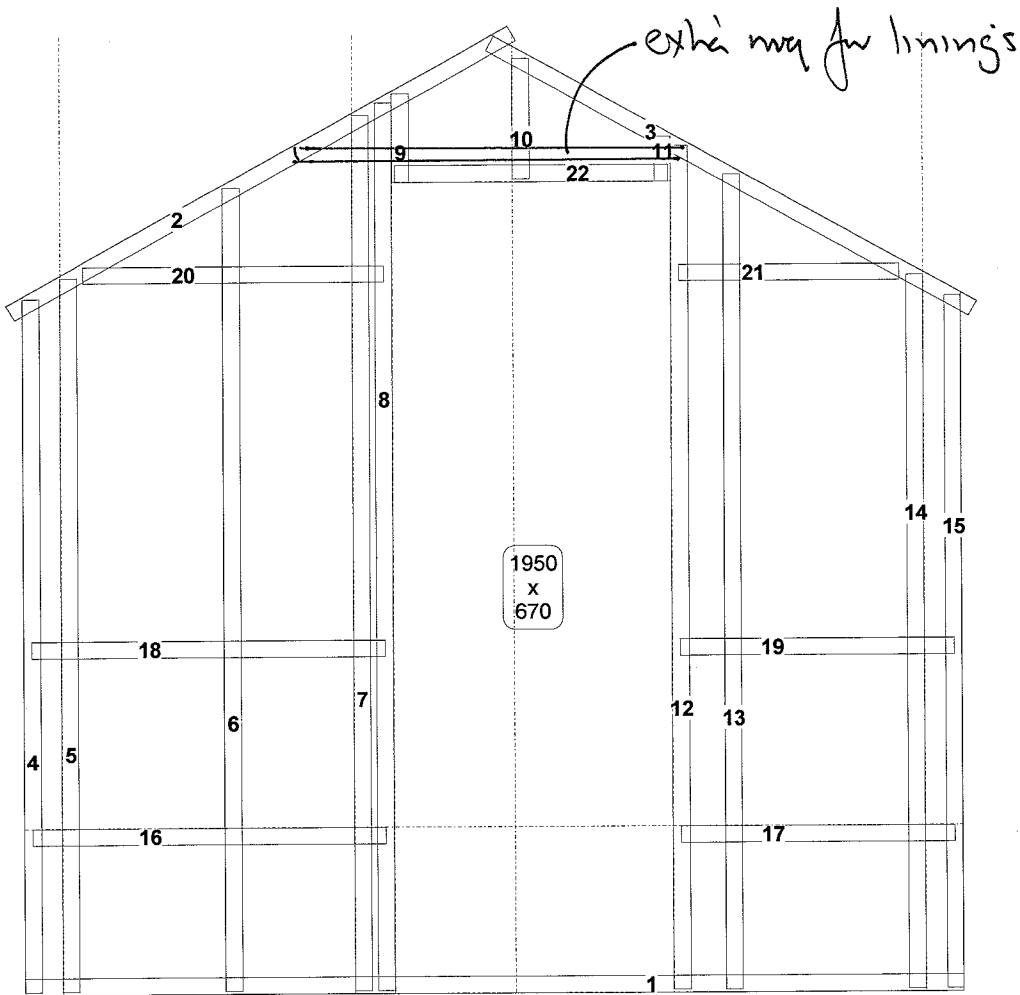
Works Order No	
Initial	Date
Rolled	
Checked	

**WAIT. 3**  
**55**



Amended Sun 2006

\*



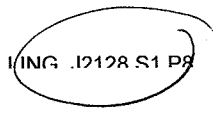
- 1 ( 2250
- 2 ) 1373
- 3 ) 1322
- 4 ( 1666
- 5 ( 1716
- 6 ( 1931
- 7 ( 2103
- 8 ) 2133
- 9 ( 212
- 10 ( 288
- 11 ) 107
- 12 ( 2028
- 13 ( 1959
- 14 ) 1716
- 15 ) 1666
- 16 ) 847
- 17 ) 657
- 18 ) 847
- 19 ) 657
- 20 ) 720
- 21 ) 530
- 22 ( 656

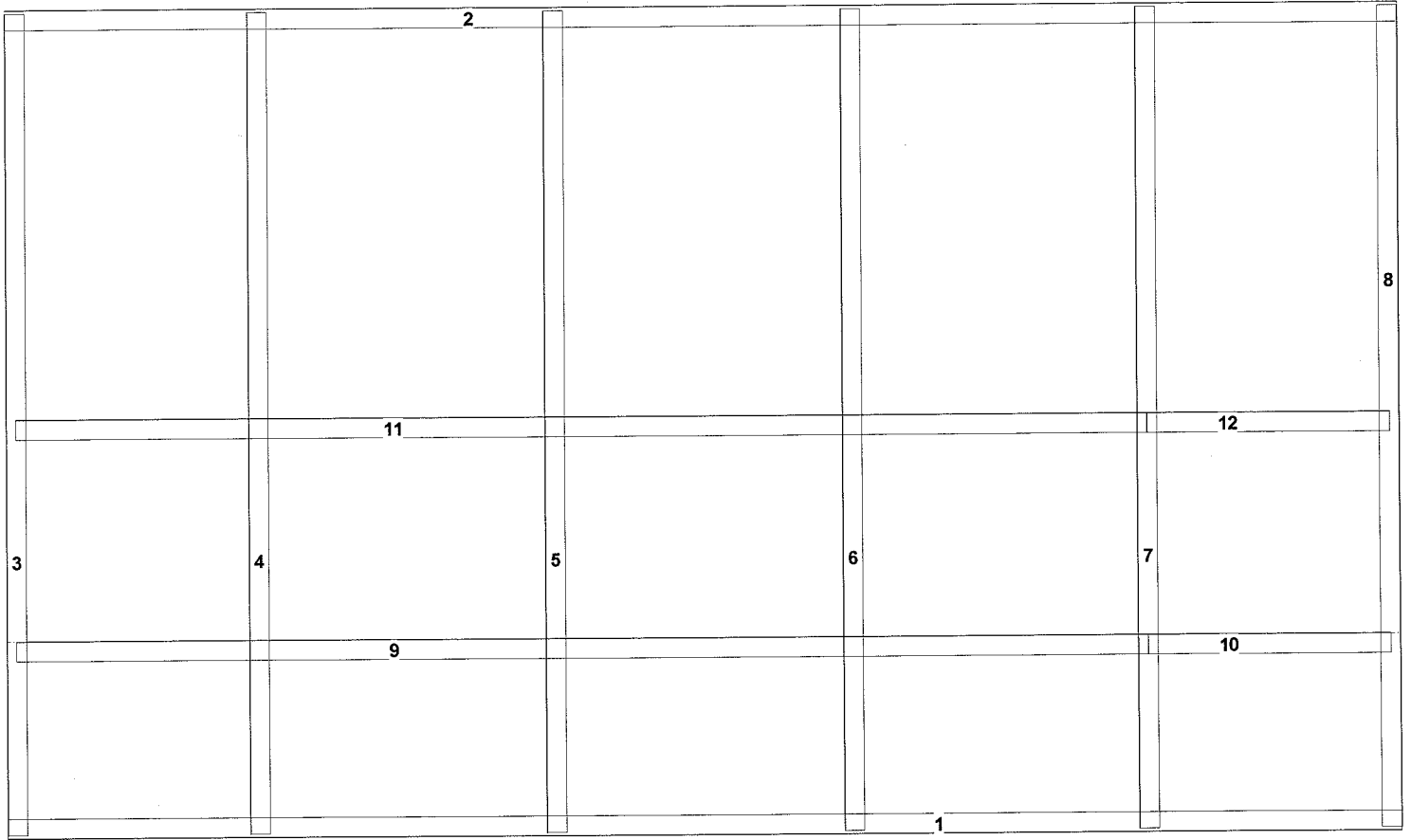
End wall  
2250 wide Bravy

27.39 m  
142 Rivets

Date	AssemntStart	Finish	Lunch/Smoko

Works Order No	Initial	Date
Rolled		
Checked		





- 1 ( 2820
- 2 ) 2820
- 3 ( 1666
- 4 ( 1666
- 5 ( 1666
- 6 ( 1666
- 7 ( 1666
- 8 ) 1666
- 9 ) 2291
- 10 ) 492
- 11 ) 2291
- 12 ) 492

21.20 m  
76 Rivets

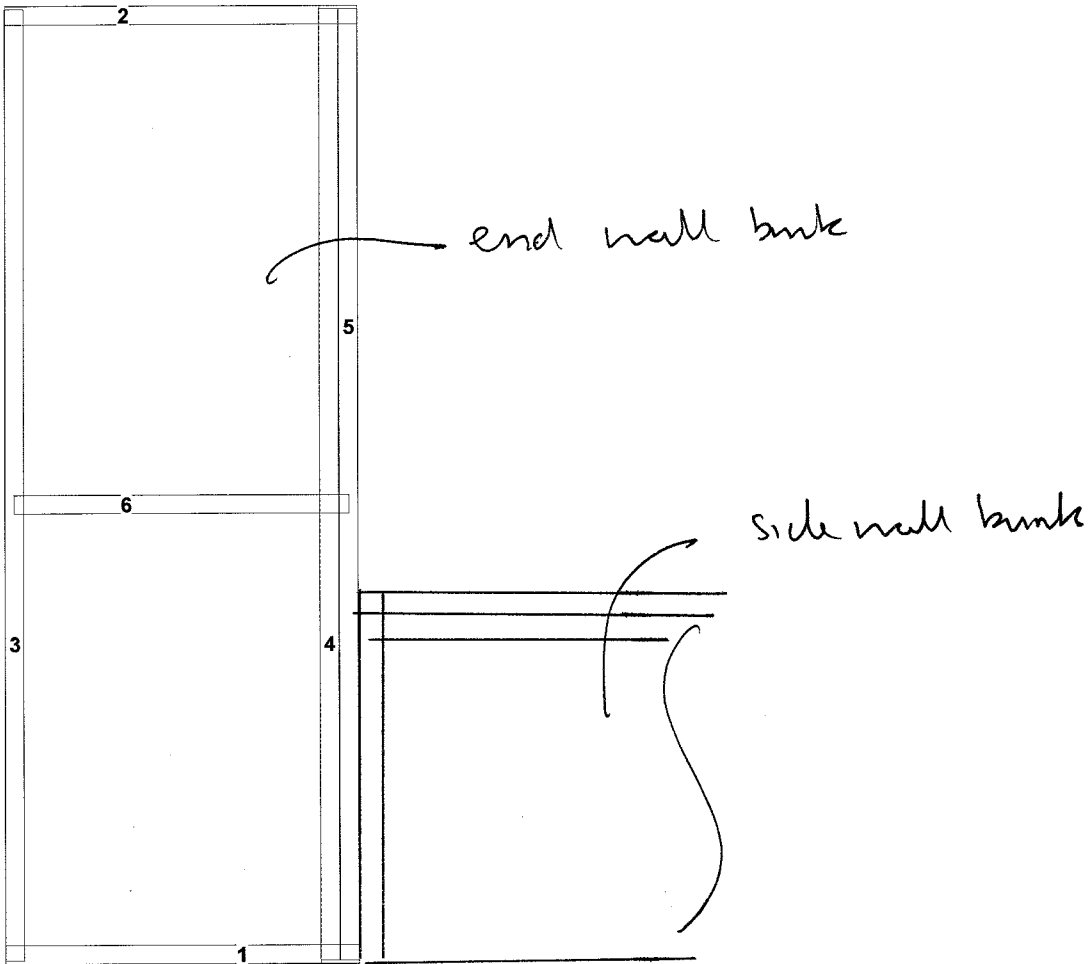
3000 long Bivy

Side wall no window  
nog line at bunk level

Date	AssemtStart	Finish	Lunch/Smoko

Works Order No	Initial	Date
Rolled		
Checked		

**WALL 1**  
**55**



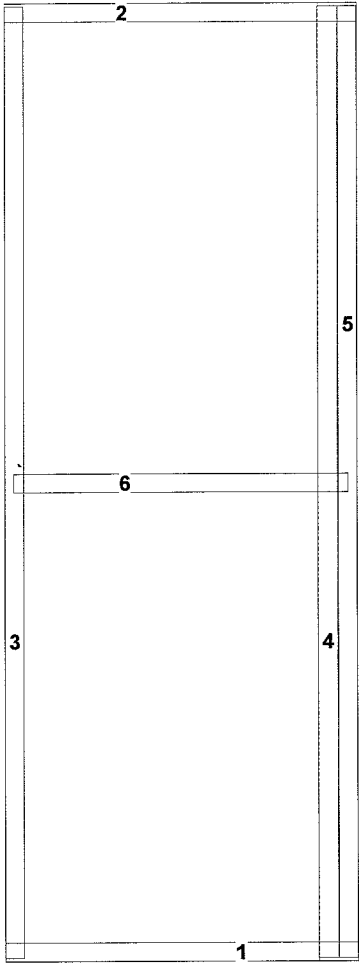
- 1 ( 750
- 2 ) 750
- 3 ( 2031
- 4 ( 2031
- 5 ) 2031
- 6 ) 712

8.30 m  
30 Rivets

Bivy Bunk for  
2250 wide Bivy  
End wall bunk

Date	Assemnt	Start	Finish	Lunch/Smoko

Works Order No	Initial	Date
Rolled		
Checked		



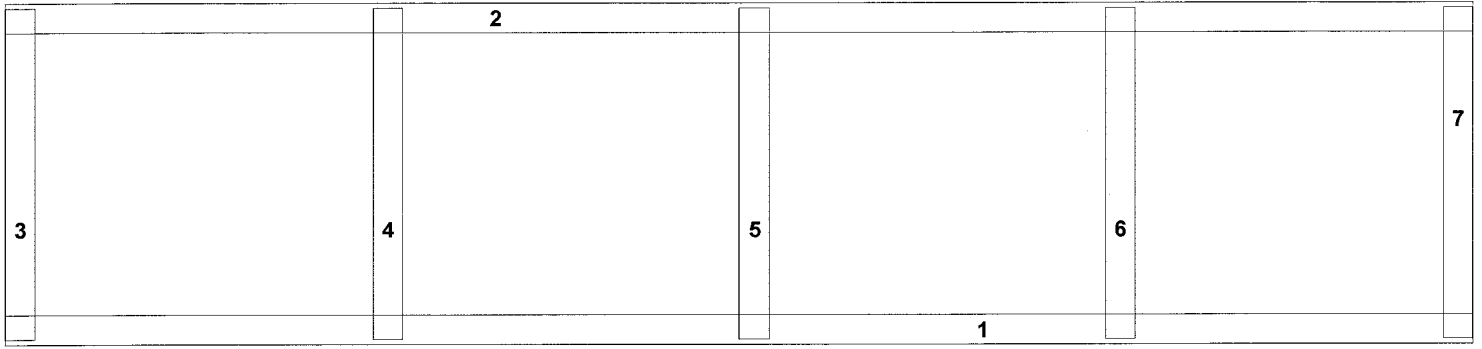
- 1 ( 750
- 2 ) 750
- 3 ( 2031
- 4 ( 2031
- 5 ) 2031
- 6 ) 712

8.30 m  
30 Rivets

Bivy Bunk  
for 3000 long  
Bivy  
side wall bunk

Date	Assem	Start	Finish	Lunch/Smoko

Works Order No	Initial	Date
Rolled		
Checked		



- 1 ( 1980
- 2 ) 1980
- 3 ( 446
- 4 ( 446
- 5 ( 446
- 6 ( 446
- 7 ) 446

6.19 m  
40 Rivets

Bivy Bench  
Frame for  
3000 x 2250 Bivy

Date	AssemntStart	Finish	Lunch/Smoko

Works Order No	
Initial	Date
Rolled	
Checked	

## **APPENDIX A3.2: STRUCTURAL CALCULATIONS**

### **LAPISH ENTERPRISES PS1 AND CALCULATIONS**

#### **CURRENT REGISTER**

	<b>Title</b>	<b>Version</b>	<b>Date issued</b>
	Producer Statement - Design		15/11/06
	Calculations		15/11/06

#### **AMENDMENT REGISTER**

<b>Amendment date</b>	<b>Amendment details (section, page number, block)</b>	<b>Version</b>	<b>Signature of copyholder and date</b>

# Lapish Enterprises Ltd.

## PRODUCER STATEMENT - DESIGN

P.I.M. No.....

ISSUED BY *Ernest Bertram Lapish*

TO(Owner) *Department of Conservation*

IN RESPECT OF: (building work) *Flyable Bivvy*

AT(address) *anywhere on N.Z. subject to wind load below*

LOT *5* DP *3* SO.....

This firm has been engaged by *Department of Conservation*

to provide the design services listed below which identifies the relevant clause(s) of the Building Regulations 1992 for

All (Yes/No) ..... or *h1* Part only, as specified below and no other.

*CONGR LIGHT FOOT* *four stations and sub-floor framing*

The design has been prepared in accordance with the following standards..... of the approved documents issued by the Building Industry Authority and the work prepared by the

Design firm *Lapish Enterprises* Titled *Standard Urstora 2 bunk beds* Numbered *3558*

and the specification and other documents according to which the building is proposed to be constructed. As an independent professional covered by a current policy of Professional Indemnity Insurance to a minimum value of \$200,000, I BELIEVE ON REASONABLE GROUNDS that subject to:

1 the verification of the following design assumptions: *for a 2.5 m high wind speed (s.g.) does not exceed 70 mps and all corner held down by tie ropes by other end in all E0 zones* and

2 all proprietary products meeting the performance specification requirements, that the drawings, specifications, and other documents according to which the building is proposed to be constructed comply with the relevant provisions of the building code.

*E. B. Lapish* Date: *15/11/03*

MICE C.Eng.(London) FIPENZ(Structural) CPEng IntPE(NZ)



**note:**  
 the following, if required are not shown on this drawing:  
 - excavation  
 - water tank & stand  
 - New-downs.  
 Refer to sheet 01 for further information.

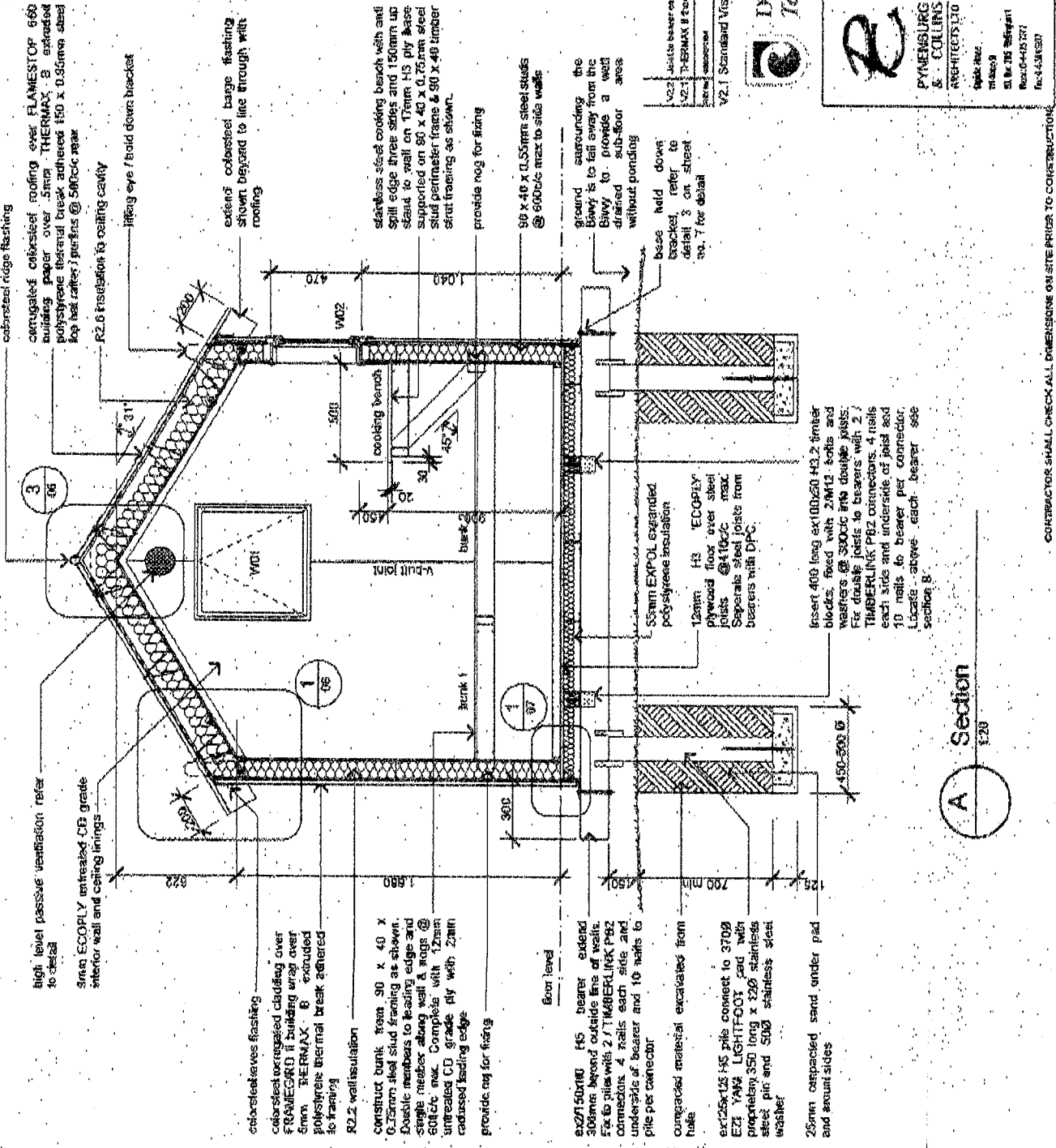
**LAPSHENTERPRISES LTD**  
 84 STAMFORD PARK ROAD  
 HILLSBOROUGH, AUCKLAND 4  
 NEW ZEALAND  
 PHONE: 09 625 5085  
 09 625 4823  
 FAX: 09 625 4825  
 09 625 5085  
 MOB: 021 795 004

*Susan Maynard*  
 15/10/08

DATE	13-11-05	CR	RP
DATE	24-10-06	CR	RP
DATE			
DATE			

Department of Conservation  
 Te Papa Ataturangi

PROJECT	Standard Visitor 2 Bunk Hut
LOCATION	New Zealand
CLIENT	ARAWA REGION
DESIGNER	Section A
SCALE	1:20
DATE	JUNE 2008
REVISION	NO. DESCRIPTION
1	4



**A** Section  
 1:20

CONTRACTOR SHALL CHECK ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION

**note:**  
 See following, if required are not shown on this drawing:  
 - excavation  
 - water tank & stand  
 - tie-downs  
 REFER TO SHEET 01 FOR FURTHER INFORMATION

**LAPISH ENTERPRISES LTD**  
 84 STAMFORD PARK ROAD  
 HILLSBOROUGH, AUCKLAND 4  
 NEW ZEALAND  
 PHONE: 09 625 5085  
 09 625 4823  
 FAX: 09 625 4825  
 09 625 5085  
 MOB: 021 795 004

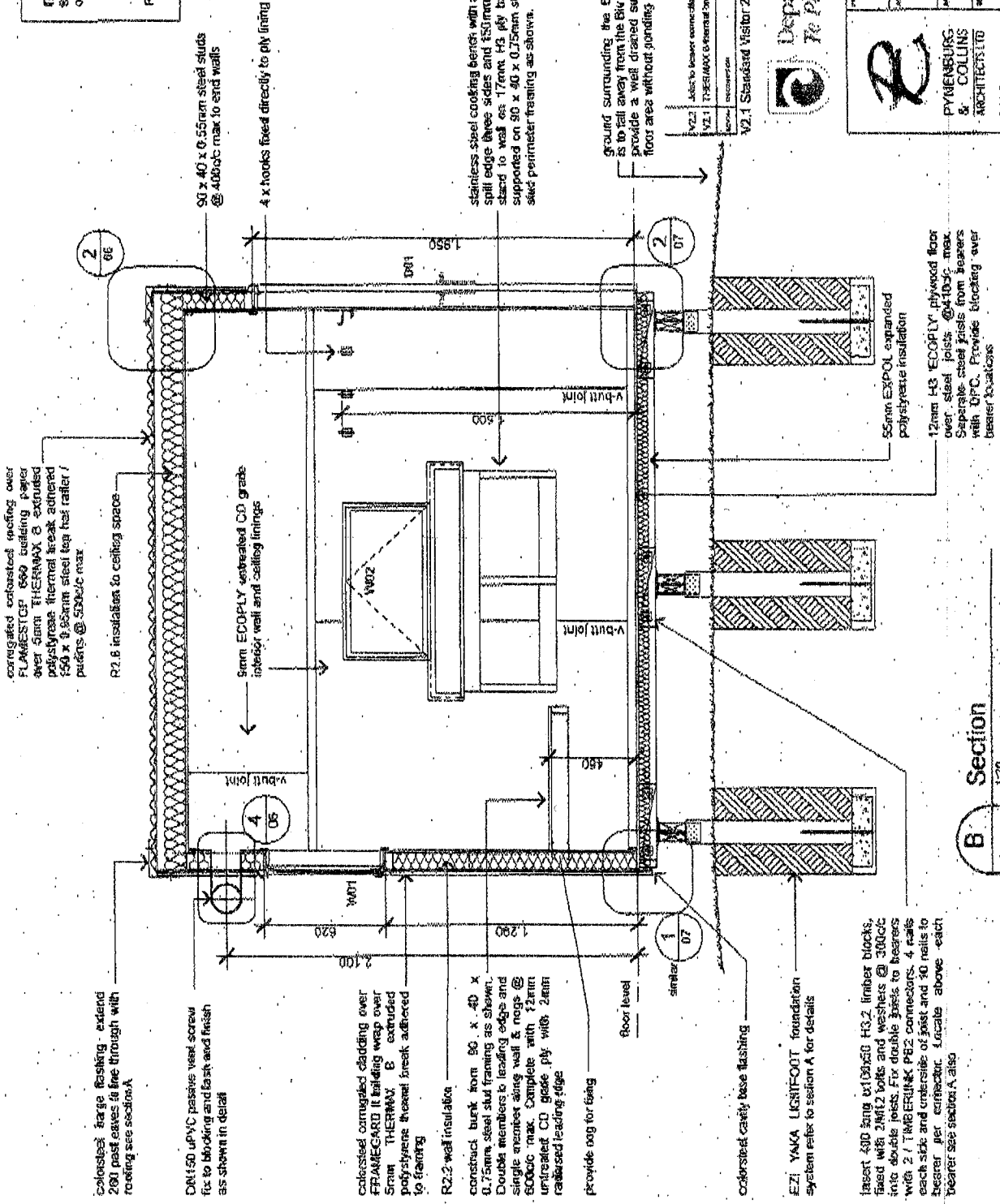
*Speed Approval*  
*15/11/06*

REV	DATE	BY	CHK
V2.1	15/11/06	LA	LA
V2.2			

V2.1 Standard Visitor 2 Bank Hut Base Drawing

Department of Conservation  
 Te Papa Ahureira

<b>Standard Visitor 2 Bank Hut</b>	
New Zealand	
All Area Offices	
SECTION	SECTION B
SCALE	1:20
DATE	June 2006
PROJECT NO.	100000000
PROJECT NAME	100000000
PROJECT LOCATION	100000000
PROJECT DRAWING NO.	100000000
PROJECT DRAWING TITLE	100000000
PROJECT DRAWING SCALE	1:20
PROJECT DRAWING DATE	100000000
PROJECT DRAWING BY	100000000
PROJECT DRAWING CHECKED BY	100000000
PROJECT DRAWING APPROVED BY	100000000
PROJECT DRAWING DATE	100000000



**B**  
 Section  
 1:20

CONTRACTOR SHALL CHECK ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION

LAPISH ENTERPRISES LTD  
 84 STAMFORD PARK ROAD  
 HILLSBOROUGH, AUCKLAND 4  
 NEW ZEALAND  
 PHONE: 09 825 5085  
 09 825 4823  
 FAX: 09 825 4825  
 09 825 5085  
 MOB: 021 795 004

~~CONCRETE HIGH RISE BUILDINGS~~

for Flexible Bldg.  
 (steel frame building)

Perilous walls

from HZC calculations — 580 kg — 9.8 kPa

check 2150 x 90 joint joint span. 1.9 m  
 span. 1.3

use 6 E250A studs per height

lateral capacity =  $\frac{EA}{L} = \frac{6 \times 2.1}{4} = 3.15 \text{ kPa}$   
 Zone 1  
 Wind =  $6 \times 4.16 = 24.96 \text{ kPa}$   
 $6 \times 5 = 30.00 \text{ kPa}$

Perilous walls =  $580 + 1.5 \times 6 \times 2.9 \times 2.2 / 10$   
 = 9688 tonnes  $\sqrt{3.5 \text{ ok}}$

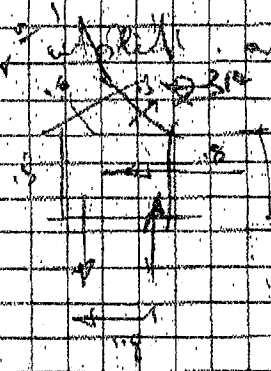
wind capacity across building =  $24.96 = 9 \times 1.95 \times 2.9 \times (1.5 + 1)$   
 $V = 3.39 \text{ kPa} = 640 \times 10^{-3}$   
 $V = 35 \text{ m/s}$

wind capacity along building

$30.00 = 9 \times \left( \frac{2+2.1}{4} \right) \times 2.9 \times V \times 1.12$   
 for 1.6 kPa = 500 kg

Steel joist of height same as 250 x 6 = 1728 kg = 2.65 tonnes  $V = 66 \text{ m/s}$  steel ok

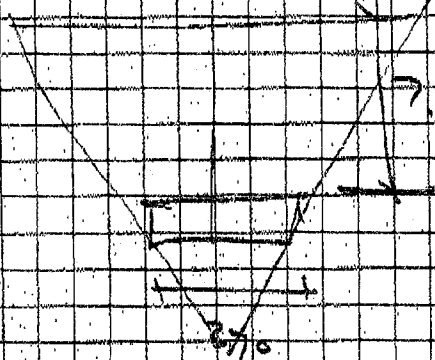
wind load 3 kPa from HZC calc.  
 $\frac{1}{2} \times 2 \times 3 \times 1.95 \times 2.9 \times 1.12 = 11.317$   
 $\frac{1}{2} \times 3 \times 1.95 \times 2.9 \times 1.12 + 2.9 \times 6 \times 1.3 \times 3 \times 2.2 = 11.857 = 13.19$



uplift on 3 studs = 4.39 kPa

Depth 1 ~~required~~ in self

A ~~500~~ way required

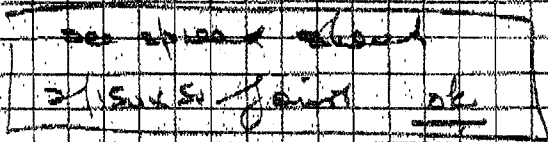


$$\phi = 20^\circ$$

Depth . 25 . up left - 5.28 kN

check 2/50x50 floor joist span 1.9 m

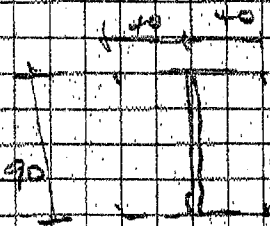
span 1.3 m



100 x 100 joist

steel joists in line 1 number

hook for cold formed steel joist



$$\phi_{M_b} = 1.15 \text{ kN/m}$$

$$M^* = \frac{500 \times 99.9 \times 10^3 \times 2}{45} = 21977.78 \text{ kNm}$$

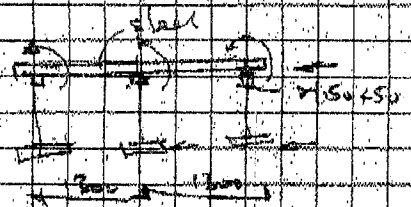
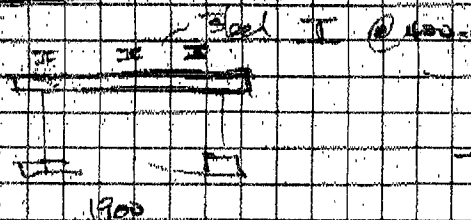
aliter konthammer u 2.5 ok

$$I_p = 99.9 \times 10^3 \times 2 = 199.8 \times 10^3$$

Dimension  $\phi_{M_b} = 2.70 \text{ kNm}$

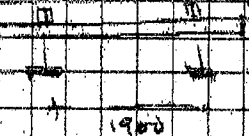
$$I_{x3} = \frac{100^3 \times 90}{12} = 67500$$

$$I_{x2} = \frac{200^3 \times 100}{12} = 666666.67$$



Building main  $\phi = 2.70 \text{ kNm}$   $\phi = 2.98 \text{ kNm}$

$$I_{x3} = \frac{100^3 \times 150}{12} = 125000$$



$$I_{x2} = \frac{200^3 \times 100}{12} = 666666.67$$

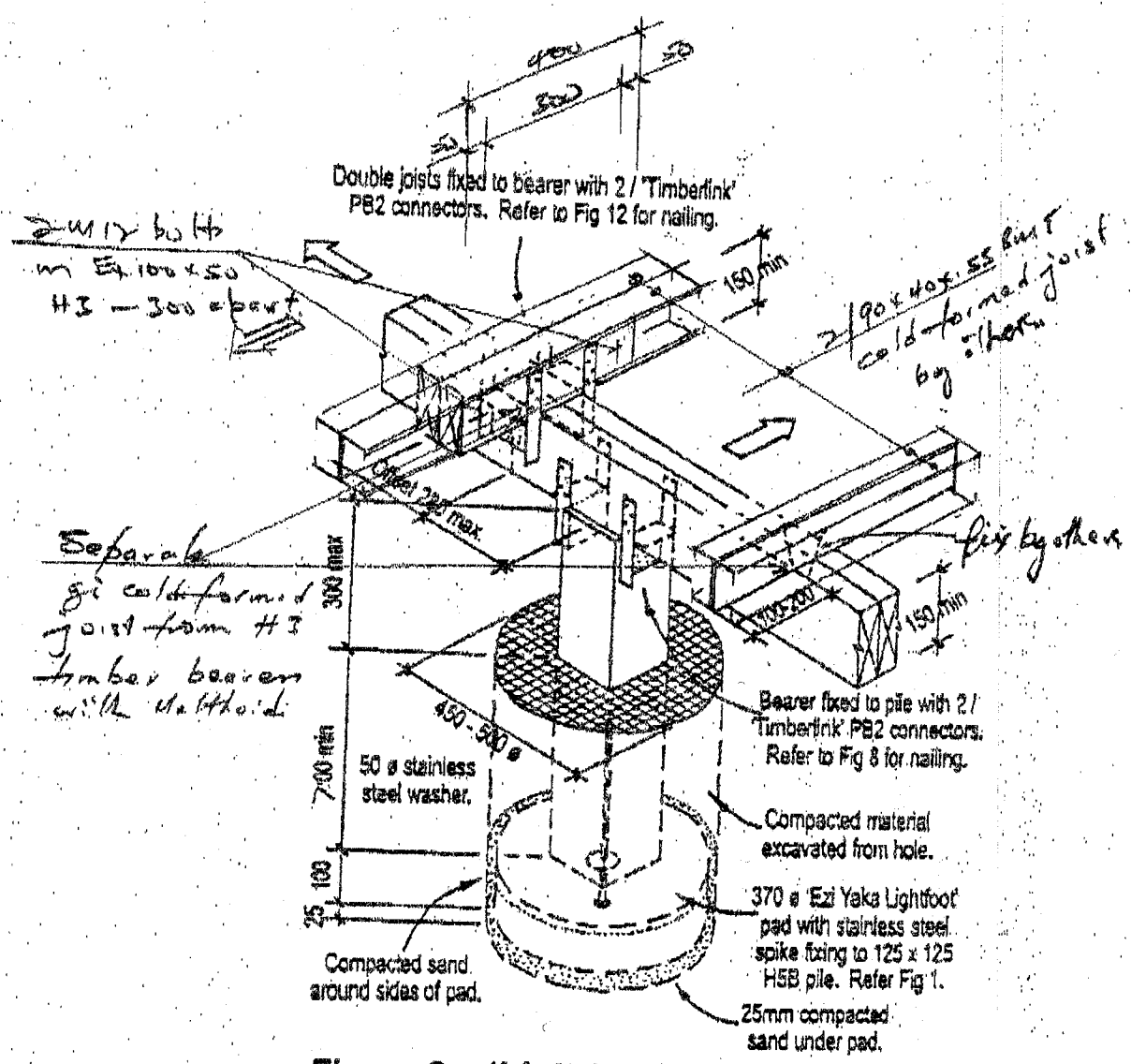
2/100x100x1.55 beam

cold form joist

Depth of footing in sand

Depth $d_f$	0.65	sand	$\phi$	Degrees	Radians
Diameter footing	370			30	0.523
Uplift load	5.28		$\alpha$	17	





**Figure 2. - 'Lightfoot' Short Bracing Pile**