BOROUGH OF BARROW-IN-FURNESS

LICENSING REGULATORY COMMITTEE

Meeting, Thursday 4th February, 2016
at 2.00 p.m. (Drawing Room)

A G E N D A

PART ONE

1. To note any items which the Chairman considers to be of an urgent nature.

2. To receive notice from Members who may wish to move any delegated matter non-delegated and which will be decided by a majority of Members present and voting at the meeting.

3. Admission of Public and Press

   To consider whether the public and press should be excluded from the meeting during consideration of any of the items on the agenda.

4. Declarations of Interest.

   To receive declarations by Members and/or co-optees of interests in respect of items on this Agenda.

   Members are reminded that, in accordance with the revised Code of Conduct, they are required to declare any disclosable pecuniary interests or other registrable interests which have not already been declared in the Council's Register of Interests. (It is a criminal offence not to declare a disclosable pecuniary interest either in the Register or at the meeting).

   Members may however, also decide, in the interests of clarity and transparency, to declare at this point in the meeting, any such disclosable pecuniary interests which they have already declared in the Register, as well as any other registrable or other interests.

5. Apologies for Absence/Attendance of Substitute Members.

6. To confirm the Minutes of the meeting held on 17th December, 2015 (copy attached).

FOR DECISION

(D) 7. Zoo Licensing Act 1981 (as amended)
Zoo Licence for South Lakes Safari Zoo Ltd

Direction Order - Public Wooden Walkways and Platforms.

PART TWO

(D) 8. Application for a Hackney Carriage Drivers Licence.

NOT FOR PUBLICATION BY VIRTUE OF PARAGRAPH 2 OF PART ONE OF SCHEDULE 12A OF THE LOCAL GOVERNMENT ACT 1972 AND ACCESS TO INFORMATION (VARIATION) ORDER 2006

NOTE (D) - Delegated
(R) - For Referral to Council

Membership of Committee

Callister (Chairman)
Seward (Vice Chairman)
Biggins
Cassells
Derbyshire
Heath
W. McClure
Maddox
Opie
Proffitt
Wall
One Vacancy

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BOROUGH OF BARROW-IN-FURNESS

LICENSING REGULATORY COMMITTEE

Meeting: Thursday 17th December, 2015
at 2.05 p.m. (Drawing Room)

PRESENT:- Councillors Callister (Chairman), Seward (Vice-Chairman), Biggins, Bleasdale, Derbyshire, Gill, Maddox, Opie and Wall.

Also Present:-

Barrow Borough Council

Anne Pearson (Environmental Health Manager)
Graham Barker (Principal Environmental Protection and Licensing Officer)
Richard Garnett (Principal Environmental Health Officer)
Jennifer Curtis (Senior Licensing Officer)
Jane Holden (Acting Principal Legal Officer)
Sharron Rushton (Democratic Services Officer)
Paula Westwood (Democratic Services Officer)
Liam Casson (Trainee Environmental Health Officer).

Others

Paul O'Donnell (Local Authority Retained Solicitor)
Matthew Brash (Retained Veterinary Consultant)
Inspector Paul Telford (Cumbria Constabulary)

South Lakes Safari Zoo Ltd

Karen Brewer (Marketing and Development Manager)
Ms Christina Fischer (Animal Manager)
Mrs Frieda Rivera-Schreiber (Director of Veterinary Services)
John McIntosh (Resource Manager)

35 – The Local Government Act, 1972 as amended by the Local Government (Access to Information) Act, 1985 and Access to Information (Variation) Order 2006

Discussion arising hereon it was

RESOLVED:- That under Section 100A(4) of the Local Government Act, 1972 the public and press be excluded from the meeting for the following item of business on the grounds that it involved the likely disclosure of exempt information as defined in Paragraph 2 (Minute No. 39) of Part One of Schedule 12A of the said Act.

36 – Apologies for Absence/Attendance of Substitute Members

Apologies for absence were received from Councillors Heath, W. McClure and Proffitt.

Councillor Gill had attended as a substitute for Councillor Heath for this meeting only.

37 – Minutes

The Minutes of the Licensing Regulatory Committee meeting held on 12th November, 2015 were taken as read and confirmed.

38 – Zoo Licensing Act 1981 (as amended) - Zoo Licence for South Lakes Safari Zoo Ltd – Non-Compliance with Conditions

Mr David Stanley Gill holds a zoo licence issued on 8th June, 2010 to operate a zoo at premises known as South Lakes Safari Zoo Ltd, Crossgates, Dalton-in-Furness, Cumbria, LA15 8JR.

On 28th and 29th January, 2014, a Special Inspection was carried out at The Zoo and the results of the inspection were brought to a special meeting of the Licensing Regulatory Committee on 23rd June, 2014 following which Members resolved on 1st July, 2014 to place 11 additional conditions on the zoo licence.

The Zoo had been subject to 3 Special Inspections (11th November, 2014, 26th February, 2015, and 23rd April, 2015) to assess compliance with a number of these conditions. The results of these inspections were reported to the Licensing Regulatory Committee on 13th August, 2015 and the Committee resolved to make alterations to the zoo licence.

Three of these alterations involved conditions:

- **20(a)** – Removal of the muck heap away from the moat in the African Field;
- **21** – Survey of the wooden public walkways; and
- **23** – Firearms protocol and training.

A Periodical Inspection of the zoo had now taken place (17th and 18th November, 2015) and this had revealed that the three above-mentioned conditions had not been complied with in relation to the deadlines set by the Committee. The three conditions and details of the non-compliance along with Officer recommendations were attached to the report for information.

The report had recommended that 3 Direction Orders be served on South Lakes Safari Zoo Ltd due to continued non-compliance with existing conditions on the Zoo Licence.

The 3 Direction Orders outlined in the Environmental Health Manager's report had been discussed in detail and each of the parties concerned had been given the opportunity to make representations and ask questions.

During the course of the meeting, at relevant points, all parties with the exception of the Committee Members, Paul O'Donnell (Solicitor), Jane Holden (Acting Principal Legal Officer), Sharron Rushton (Democratic Services Officer) and Paula Westwood (Democratic Services Officer) withdrew and were re-admitted to the meeting following the Committee's deliberations.

RESOLVED:-

(A) Condition 20(a) – To agree that the Committee elevate Condition 20(a) to a Direction Order with a compliance deadline of 28 days. The Zoo must inform the Council, in writing, when the works are completed;

In accordance with Section 15.6 of the Council's Constitution, Councillor Biggins requested his vote against the decision be recorded.

(B) Condition 21 – To agree that the Committee elevate Condition 21 to a Direction Order with a compliance deadline of 28 days and that the Direction Order required all wooden walkways and wooden platforms to be closed to the public until the Direction Order was lifted;

(C) Condition 23 – To agree that no further action be taken, that the deadline be extended to 1st April 2016 and a progress report be taken back to Committee at this time.

39 – Renewal Application for a Hackney Carriage Drivers Licence

The Senior Licensing Officer reported on a renewal application she had received for a Hackney Carriage Drivers Licence. She submitted information which had been drawn to her attention concerning the applicant and set out details of the Committee's policy regarding such matters.

The applicant attended the meeting to address the Committee.

RESOLVED:- To agree to refuse the application.

40 – Withdrawn Item

The following item had been withdrawn from the Agenda:-

Zoo Licence Act 1981 (as amended) - Zoo Licence for South Lakes Safari Zoo Ltd – Application to Transfer Zoo Licence.

The meeting closed at 4.20 p.m.

Part One

LICENSING REGULATORY COMMITTEE	(D) Agenda Item 7
Date of Meeting: 4th February, 2016	
Reporting Officer: Principal Environmental Health Officer (Commercial)	

Title: Zoo Licensing Act 1981 (as amended) Zoo Licence for South Lakes Safari Zoo Ltd

Direction Order - Public Wooden Walkways and Platforms

Summary & Purpose of the Report

Mr David Stanley Gill holds a Zoo licence issued on 8th June 2010 to operate a Zoo at premises known as South Lakes Safari Zoo Ltd, Crossgates, Dalton-in-Furness, Cumbria, LA15 8JR.

On 13th August 2015, the Licensing Regulatory Committee considered a report outlining the results of a number of special inspections undertaken since November 2014. The existing condition relating to walkways was amended requiring a report on the design and construction of the wooden walkways/platforms to be produced by 13th November addressing 6 specific issues.

A periodical/renewal inspection took place at the Zoo on 17th and 18th November 2015. On the 17th December 2015 it was reported to Members that the report had not met the requirements of the condition. Members resolved to elevate the condition to a Direction Order requiring compliance within 28 days and that all wooden walkways/platforms be closed to the public until the Direction Order was revoked.

Members should note that the closure only became necessary after the effective date of the direction order (19th January 2016) and this is also the date when the 28 days for compliance starts in relation to the report.

On 19th January 2016 the Zoo submitted an incomplete report as it did not cover all the wooden walkways/platforms. The Zoo also informed the Council that 5 of the 7 wooden walkways/platforms originally in existence were to be taken down or remodeled.

On 20th January 2016, Council Officers visited the Zoo and noted that all wooden walkways/platforms were closed.

Background

Mr David Stanley Gill holds a Zoo licence issued on 8th June 2010 to operate a Zoo at premises known as South Lakes Safari Zoo Ltd, Crossgates, Dalton-in-Furness, Cumbria, LA15 8JR [the Zoo].

A number of public wooden walkways/platforms have been built at the Zoo and these have been a cause of concern over the duration of the Zoo licence. The previous history has been reported to past Committees but in brief concerns were raised during formal inspections in 2009 and 2013. The history since 2014 is as follows:-

In January 2014, a Special Inspection was carried out at The Zoo and the results brought to the Licensing Regulatory Committee in June 2014 following which Members resolved to place 11 additional conditions on the Zoo licence. One of these conditions was in respect of the wooden walkways.

The Zoo has been subject to 3 Special Inspections on 11th November 2014, 26th February 2015, and 23rd April 2015. The results of these inspections were reported to Committee on 13th August 2015 and the Committee resolved to alter a condition on the licence which related to the public wooden walkways and platforms and a compliance deadline of 13th November 2015 was set.

A periodical/renewal inspection took place on 17th/18th November 2015 during which the Zoo admitted to inspectors that they had missed the compliance deadline adding that they had not yet instructed a contractor to undertake the report.

The non-compliance with this condition was brought before Members at the Licensing Regulatory Committee meeting on 17th December 2015. Members decided to escalate the condition to a Direction Order. The Direction Order imposed by Members had an effective date of 19th January 2016; this is when the wooden walkways/platforms were required to be closed. Members decided the report on the walkways should be completed within 28 days. The 28 days started after the effective date which gives a final compliance deadline for the report to be submitted of 16th February 2016.

The Direction Order

Condition 21 which was elevated to a direction order states the following:-

Condition 21 **In accordance with 8.13 and 8.18 of the SSSMZP, the public wooden walkways and platforms must be designed to meet BS 6399-1: 1996 and be able to cope with the heavy duty loading and maintained in safe condition. The effect of any walkway or platform stanchions being submerged in water for prolonged periods should be assessed in terms of deterioration and structural stability. A programme of inspection, maintenance and structural repairs needs to be documented.**

A report must be produced for the Licensing Authority by 13th November, 2015 and presented to this Committee.

To satisfy the condition;

1. The Zoo must produce design calculations that demonstrate that all timber walkways and platforms are designed to carry the loads specified in Clause 10 and Table 4 of BS 6399-1:1996 with the structures considered to be carrying 'heavy duty' loading.
2. Design calculations must be produced to confirm that 'stability-critical' longitudinal and lateral sway stiffness of the structures is confirmed for at least 10% of the $5kNm^{-2}$ vertical loading in the appropriate combinations with lateral loading on the parapets and the timber post supports.
3. The Zoo must demonstrate through design and calculations that the design incorporates protection against any accidental (impact) loading on the timber posts.
4. The Zoo must demonstrate through design and calculations that the design incorporates a suitable assessment for any disproportionate collapse (i.e. structural integrity under failure of one or possibly more timber posts)
5. That the Zoo provides an independent structural engineers report on the condition of the timber walkways and platforms within the Zoo and carry out any works that will meet the design standard and specifications above.
6. That the Zoo implements a regular recorded assessment, inspection, and maintenance regime.

Guidance

For Members' information the relevant sections of the Secretary of State's Standards of Modern Zoo Practice (SSMZP) are reproduced below:-

paragraph 8.13 Buildings and structures to which the public have access must be maintained in a safe condition.

paragraph 8.18 Where a walkway passes over an animal enclosure it should be designed, constructed, and maintained to ensure that it is safe.

Officer Comments

It is fundamental to public safety that the elevated walkways, viewing platforms, and other similar structures have been designed to the correct standard, but are also subject to the correct level of inspection and preventative maintenance. A failure of a walkway or a platform would cause members of the public to fall from height and may place them in close proximity to dangerous animals that may then hamper rescue operations.

At the Committee meeting on 17th December 2016, Ms Karen Brewer, representing the Zoo, stated that the report on the wooden walkways/platforms should be complete by the end of the following week [25th December] but early in January the Council had not received the report. An email was sent on the 8th January 2016 requesting an update.

On 19th January a further email was sent to the Zoo by which stated:

> "*As you are aware the Direction Order dated 18th December 2015 in respect of the timber walkways at the Safari Zoo is now effective. This means that from today (19th January 2016)all the timber walkways must be closed until such time as the Council is in receipt of the required report AND the Direction Order is revoked by the Council. I will inspect the Zoo at 10am on 20th January to ensure that this has been achieved.*
>
> *I must inform you that the report must cover all the timber walkways as they existed when the Condition was attached to your licence dated 11th September 2015*."

Approximately an hour later a report was emailed by Ms. Brewer. The report was written by RG Parkins and Partners Ltd dated 18th January 2016 and given reference K32719/AR a copy of this report is attached at **Appendix A**.

At **para 2.2 [page 2]** of the report it states that the original scope of this report was to include the structural appraisal of the following walkways & viewing platforms:

a) Tiger/aerial walkway.
b) Snow leopard/Wolf access ramp & viewing platform.
c) Giraffe viewing platform.
d) Anteater viewing platform.
e) Lemur walkway.
f) Bear/Worldwide Safari walkway.
g) Restaurant balcony.

It adds that "*during the process of assessing the above walkways, extensive investigation works had to be undertaken. During this time the scope of this report was reduced with five of the seven timber structures omitted, however reference to them still appears in some of the supporting document.*

The appraisal included in this report therefore focuses only on the following structures:

1) Snow Leopard/Wolf access ramp only (viewing platform to be closed).
2) Bear/Worldwide Safari walkway."

At **para 3.1 [page 3]** the report refers to a strength grading report to be provided by CATG Ltd. That report is not included in the main report but Parkins summarise it by stating:-

- *A significant number of the timber components used could not be stress graded and are therefore unsuitable for use in a structural capacity.*
- *The timbers that are suitable for use in a structural capacity are of the lowest structural strength grade used in the UK (except on the Snow Leopard/Wolf access ramp, which were slightly higher).*

On 21st December 2015 Parkins dug 20 trial pits to assess the state of the timbers and foundations. **Para 3.2 [page 3]** of the reports summarises the findings as follows:-

- *It was evident that water ponding and ingress had led to a decay of the timber posts at the interface between the concrete and timber.*
- *The concrete encasement was not of a size that could be defined as a structural foundation, but was purely acting as a barrier to prevent decay of the timber.*

Para 3.3 [page 4] of the report provides a structural appraisal for the Snow Leopard access ramp and Bear walkway. It states that the findings of the two structures were common across all seven of the structures. Those findings being:

- *The existing timber joists and existing decking boards are overstressed.*
- *The timber bearers supporting the joists are overstressed and inadequately fixed to the columns.*
- *No longitudinal bracing is present*
- *The existing handrails are not adequate.*

As the report covered only two of the seven wooden walkways/platforms, Officers advised the Zoo that the Direction Order had not been complied with and that the Zoo would be visited on the morning of 20th January to ensure that all the wooden walkways/platforms were closed.

The results of that visit are summarised below:

a) **Tiger/aerial walkway** – the walkway has been removed. The framework remains as it is being covered to form a roof for the path below. In forming the roof several posts adjacent to the main walkway will be removed in order to negate the vehicle impact risk identified at point (3) of the Direction Order
b) **(i) Snow leopard/Wolf access ramp** – This area is currently closed. The walkway will be the second project after (f) (which is detailed below) that will

undergo works according to drawing K32719/A3/SK2 of the report. This is the access ramp to the snow leopard and wolf enclosure. The works will not impact on the structural integrity of any other structure

(ii) Snow Leopard/Wolf Viewing Platform - the viewing platform itself will remain closed. It is due to be dismantled as the Zoo wish to remodel the viewing experience.

c) **Giraffe viewing platform** – the platform remains intact with a barrier across the entrance to prevent public access. The intention is to remove this platform entirely and create more space for the feeding experience and negate a pinch point in the walkways.

d) **Anteater viewing platform** - the platform remains intact with a barrier across the entrance to prevent public access. The intention is to remove this platform but possibly leave the frame and transform it into a covered picnic area

e) **Lemur walkway** – only the framework remains as all the walk boards have been removed. This framework is due to be removed and the area remodelled.

f) **Bear/Worldwide Safari walkways** – This walkway is closed. The works have started to introduce the strengthening as detailed in the report. The additional bearers have been installed but there is work needed to install the cross bracing and the extra joists. This is drawing K32719/A3/SK1 A of the report. The Worldwide Safari is an isolated walkway so works to it do not affect any other structure.

g) **Restaurant balcony** – this area remains with a temporary barrier to prevent public access as is typical for the winter months when the Zoo does not use the area. The Zoo have expressed their desire to replace the platform with a new structure ready for Spring 2016 but could not provide further details.

For Members' information an email of 19th January 2016 from Mr. David Gill states when and why the decision was made to remove some of the wooden walkways/platforms:

"I can tell you that before any report was received I had already made a long term business decision to remove all the walkways except 2.

This decision was based on the assumption of the inevitable aging of all of the walkways and the potential need for constant maintenance and eventual replacement of individual wood elements as need arose. The economic argument based on the fact we have no funds available to re build the walkways in steel in the short or long term led me to a purely long term financial decision that required a removal of ALL walkways and platforms with immediate effect from your direction Order.

However as we had just opened one walkway in July and the wolf one was essential for viewing I decided to take a proactive approach and have these fully appraised and take whatever remedial action is needed to retain them for the long term.

All the walkways and platforms except the two mentioned above have been closed for a while now and most are already demolished."

(Please see **Appendix B** for complete email from Mr Gill)

As a result of plans to demolish/remodel a number of the wooden walkways/platforms, the following recommendations are being put before Members for consideration:

Recommendation 1

The Zoo be required to confirm that the public wooden walkways/platforms (b)(i) and (f) as stated above, comply with the six points in the direction order. Therefore an addendum to the current Parkins' report is required to confirm the remedial works stated in the report have been undertaken to the required standard.

Reason for the Recommendation

The report produced by Parkins informs that the structures to be retained require remedial works and provides drawings of how the structures can be brought up to the required standard. The Direction Order requires that the report **confirms** that the structures meet the required standard specified in points 1 to 6 of the direction order.

Therefore confirmation that the recommended remedial works have been carried is required in the report.

Options

The options available to Members are:-

- **Accept** the officer recommendation that an addendum to the report is required in order to comply with the Direction Order.
- **Reject** the officer recommendation and deem the Zoo capable of completing the works as directed without external certification.

Recommendation 2:

In relation to the wooden walkways/platforms listed as (a),(b)(ii),(c),(d),(e), and (g) if any framework of the walkways/platforms are to remain in place a report is required to certify that they are suitable for such use and the points to be addressed are 3, 4, 5 and 6 of the Direction Order.

Reason for Recommendation

A report is still required to inform Members as to the suitability of parts of the wooden walkways/platforms to remain in place given information in the current report concerning timbers starting to decay at ground level (section 3.2) and accidental impact loads from vehicles on site (section 3.5). This information is required before the direction order can be lifted on the walkways /platforms stated above.

Options

The options available to Members are:-

- **Accept** the officer recommendation that a report detailing that any remaining structures remaining are safe.
- **Reject** the officer recommendation and decide that no further report is required on the wooden walkways/platforms listed as (a), (b)(ii),(c),(d),(e), and (g) above**.**

Recommendation 3

That the compliance deadline for the reports detail in Recommendation 1 and 2 (currently 16th February 2016) be extended by agreement with the Zoo to allow for remedial works and subsequent reports to be completed.

Reason for Recommendation

To allow the Zoo adequate time to complete the works

Options

The options available to Members are:-

- **Accept** the Officer recommendation and allow the Zoo the opportunity to extend the time limit.
- **Reject** the Officer recommendation and require all reports to be complete by 16th February 2016

Recommendation 4

The Environmental Health Manager be given delegated authority to revoke the direction order once the points specified in it have been complied with.

Reason for Recommendation

The Zoo is a commercial undertaking and having walkways out of action is a concern for them as the spring season draws closer. To aid the Zoo in ensuring that the walkways are opened with the minimal delay it is reasonable that individual walkways be opened upon application by the Zoo, after providing sufficient evidence that the terms of the Direction Order have been met.

Options

The options available to Members are:-

- **Accept** the officer recommendation that the Environmental Health Manager be given delegated the authority to lift the Direction Order in response to the necessary evidence being provided by the Zoo.
- **Reject** the officer recommendation and retain the Committee's right to decide on the compliance of this Direction Order.

Recommendation 5

That all wooden walkways/platforms remain closed until the Direction Order is revoked.

Reason for Recommendation

This will ensure that the public do not have access to walkways until the relevant points in the direction order are addressed.

Options

The options available to Members are:-

- **Accept** the officer recommendation that the walkways/platforms remain closed until the work has been completed.
- **Reject** the officer recommendation and allow the Zoo to reopen the walkways as and when they consider them to be safe.

Considerations

(i) Legal Implications

The Zoo requires a licence to be able to open to the public and the Zoo Licensing Act 1981 makes the local authority responsible for administering the Licence. Anyone running a Zoo without a licence is guilty of an offence.

The Local Authority's power to alter a licence is contained within Section 16 of the same Act

(1) At any time after the grant of a licence under this Act, it may be altered by the local authority if in their opinion it is necessary or desirable to do so for ensuring the proper conduct of the Zoo during the period of the licence (whether their opinion arises from an inspectors' report or an alteration of standards specified under section 9 or otherwise).

Section 18(9) states

A direction to which this subsection applies shall not have effect—

(a) during the period within which the holder is entitled to appeal against it;

Subsection (9) applies to the following directions—

(a) a direction under section 16A(2)(d) which requires the Zoo or a section of it to be closed to the public;

(b) a direction under section 13(8)(c), 16A(2) or 16E(6) which imposes a requirement on the operator of the Zoo to carry out works he would not otherwise be required to carry out; and

There is a right of appeal under Section 18 to the Magistrate's Court if the holder of the licence wishes to challenge the decisions of the Committee.

The Council have the power to prosecute for a failure to meet a licence condition under Section 19 of the Act

(ii) Risk Assessment

Not Applicable

(iii) Financial Implications

The Council may be subject to an appeal against the Committee's decision in the Magistrates' Court under Section 18 of the Zoo Licensing Act 1981.

(iv) Key Priorities or Corporate Aims

None identified

(v) Equality and Diversity

Not Applicable.

(vi) Other Human Rights

All licence holders have a right to a fair hearing.
Any action taken by the Council must be taken having regard to the principle of proportionality. When determining what action is appropriate the Committee will balance the rights of the licence holder with the rights of the public at large.

(vii) Health and Well-being Implications

One of the purposes of the Zoo Licensing Act 1981 is to protect the safety of the public visiting premises licensed under the Act.

Background Papers

Zoo Licence held by South Lakes Safari Zoo Ltd
LRC 17th December 2015 Committee Report
Table of Decision from LRC 17th December 2015

APPENDIX No. A

R. G. PARKINS & PARTNERS LTD

CONSULTING CIVIL & STRUCTURAL ENGINEERS

STRUCTURAL APPRAISAL OF TIMBER WALKWAYS AT SOUTH LAKES SAFARI ZOO, DALTON-IN-FURNESS

Our ref: K32719/AR

18 January 2016

R. G. PARKINS & PARTNERS LTD
CONSULTING CIVIL & STRUCTURAL ENGINEERS

Structural Appraisal
Of Timber Walkways
at
South Lakes Safari Zoo,
Dalton-In-Furness

Version	Amendment	Date
1		

Notice

This report is for the sole use of South Lakes Safari Zoo. R G Parkins & Partners Ltd will not be held responsible for any actions taken or decisions made by any third party as a result of this report.

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1.0 BRIEF

RG Parkins & Partners Ltd were appointed by South Lakes Safari Zoo to carry out a structural appraisal of the existing timber walkways and to provide a set of structural calculations to satisfy the requirements of Barrow Borough Council.

The requirements set out by Barrow Borough Council were communicated via a letter, dated 10th November 2015, sent from Barrow Borough Council (Environmental Health) to South Lakes Safari Zoo (Appendix A).

2.0 INTRODUCTION

2.1 History

South Lakes Safari Zoo have previously appointed Bleasdale Wand Ltd to appraise the structural suitability of the walkways. The assessments carried out by Bleasdale Wand Ltd will not be commented on in this report, however the loading requirements adopted by Bleasdale Wand Ltd at the time, do not meet the loading requirements set out by Barrow Borough Council.

2.2 The Walkways

The original scope of this report was to include the structural appraisal of the following walkways & viewing platforms:

a) Tiger/aerial walkway
b) Snow leopard/Wolf access ramp & viewing platform.
c) Giraffe viewing platform
d) Anteater viewing platform
e) Lemur walkway
f) Bear/Worldwide Safari walkway
g) Restaurant balcony

During the process of assessing the above walkways, extensive investigation works had to be undertaken. During this time the scope of this report was reduced with five of the seven timber structures omitted, however reference to them still appears in some of the supporting document.

The appraisal included in this report focuses only on the following structures:

1) Snow Leopard/Wolf access ramp only (viewing platform to be closed).
2) Bear/Worldwide Safari walkway.

3.0 OBSERVATIONS

3.1 Timber

RG Parkins & Partners Ltd carried out an initial site inspection on 9th December 2015 to record the structural dimensions of the walkways. During this inspection it became evident that the timber used in the walkways was not marked with a structural strength class (to BS EN 338: Structural Timber).

In order for timber to be used for a structural purpose, it must be able to achieve a structural strength class.

Therefore, RG Parkins & Partners Ltd arranged for Certification and Timber Grading (CATG) Ltd to undertake the visual strength grading of the in-situ timbers, the findings of which can be found in CATG Ltd's report (Appendix B), but are summarised as follows:

- A significant number of the timber components used could not be stress graded and are therefore unsuitable for use in a structural capacity.
- The timbers that are suitable for use in a structural capacity, are of the lowest structural strength grade used in the UK (except on the Snow Leopard/Wolf access ramp, which were slightly higher).

3.2 Foundations

It had been suggested that the existing timber columns supporting the structures were installed 1m into the ground and encased in concrete. In order to prove this claim, RG Parkins & Partners Ltd attended site on 21st December 2015 to inspect approximately 20 trial pits that had been dug adjacent to the columns. The summary of findings from these trial pits are as follows:

- The timber posts were, as suggested, encased in concrete below ground level.
- It was evident that water ponding and ingress had led to a decay of the timber posts at the interface between the concrete and timber.
- The concrete encasement was not of a size that could be defined as a structural foundation, but was purely acting as a barrier to prevent decay of the timber.

From the observations made, it was determined that during the structural analysis of the walkways, the post bases should be considered as nominally pinned, although in the locations where decay has set in, remedial works would need to be carried out.

3.3 Structural Appraisal

As previously noted this appraisal will focus solely on the Snow Leopard/Wolf access ramp and the Bear/Worldwide Safari walkway, however it should be noted that preliminary design calculations were carried out on all seven of the aforementioned walkways. The findings of the two structures focused on herewith were common across all seven of the structures.

The preliminary calculations originally carried out have been amended to suit the structural timber grading noted in CATG Ltd's report. The revised calculations (Appendix C) indicate a number of flaws in the structures, which need to be addressed in order for the remaining two walkways to meet the structural requirements set out by Barrow Borough Council.

The remedial works required have been indicated on drawing for ease of reference (Appendix D), but are summarised here for completeness:

- The existing timber joists and existing decking boards are overstressed. The addition of supplementary joists in between each of the existing joists, will half the span of the decking boards and half the load on the existing joists, permitting them to meet the loading criteria.

- The timber bearers supporting the joists are overstressed and inadequately fixed to the columns. An additional timber bearer beneath the existing, with a revised bolting arrangement is required.

- No longitudinal bracing is present and needs adding to provide structural stability as well as due resilience to disproportionate collapse.

- The existing handrails are not adequate for resisting the appropriate horizontal loading and need supplementary rails adding.

3.4 Handrails

It is a UK Building Regulations requirement that no openings in balustrading should allow a 100mm sphere to pass through. From the observations made on site, it is evident that this regulation is not being met, although it is noted that these external timber structures do not necessarily fall within the UK Building Regulation requirements.

3.5 Impact Loading

One of the requirements set out by Barrow Borough Council is for an allowance in the structures to resist an accidental impact load from the vehicles used on site. An assessment of this potential accidental load gives a design load value of approximately 150kN that, by inspection, the timber walkways will not be able to resist.

4.0 CONCLUSIONS

In order for the two timber structures that are to remain, to meet the requirements of Barrow Borough Council, the remedial works as indicated on the drawings in Appendix D need to be carried out.

RG Parkins & Partners Ltd would recommend that Barrow Borough Council are consulted on the requirements for all handrail detailing and any supplementary works are carried out at the same time as the remedial works noted.

The risk of impact loading needs to be removed. This can either be done by way of a site management plan, or by way of using secondary barriers in front of the existing walkways/platforms.

5.0 DISCLAIMER

5.1 Copyright of this report remains the property of R G Parkins & Partners Ltd.

Adam Roberts
R G Parkins & Partners Ltd

18 January 2016

APPENDIX A

DESIGN REQUIREMENTS
BARROW BOROUGH COUNCIL LETTER

North West

South Lakes Safari Zoo Ltd
Broughton Road
Dalton in Furness
LA15 8JR

BOROUGH OF BARROW IN FURNESS
www.barrowbc.gov.uk

Regeneration & Built Environment Directorate
Environmental Health

TOWN HALL DUKE STREET
BARROW-IN-FURNESS CUMBRIA LA14 2LD
Tel: (01229) 876543
DX NO: DX63917 BARROW-IN-FURNESS

Email: customerservices@barrowbc.gov.uk

Our Ref:
Your Ref:

Contact Name: Richard Garnett
Direct Line: 01229 [redacted]

Date: 10 November 2015

Dear Mr Gill

Zoo Licencing Act 1981
The Safari Zoo
Licence Condition 21 – Timber Walkways

At the Licencing Regulatory Committee held in August 2015 the Committee received a report on the compliance with Condition 21 which relates to the timber walkways used throughout the Zoo.

In July 2014 the following condition was adopted: In accordance with 8.13, 8.15, 8.18 of SSSMZP, public walkways must be maintained in safe condition. Measures must be taken to reduce likelihood of slipping on all wooden surfaces. Where the operator has deemed weather conditions have caused slipping risks, the walkways must be closed with a physical barrier. The effect of walkway and platform stations being submerged in water for prolonged periods should be assessed for deterioration and structural stability and a maintenance programme of structural repairs needs to be documented.

For the Zoo Bleasdale Wand Ltd compiled a structural report which confirmed that the structure was consistent with British Standard BS6399 Part 1 (1984) with a design loading of $4kNm^{-2}$. The Council referred this report to an independent structural engineer R.G. Parkins and Partners Ltd who stated that the British Standard BS6399 Part 1 (1996) should have been utilised with a stated design loading of at least (general duty walkway) $5kNm^{-2}$ or even (heavy duty walkway) $7.5kNm^{-2}$.

Having considered the report the Committee agreed that current Condition 21 be replaced by the following Licence Condition with revised wording:-

"In accordance with 8.13 and 8.18 of the SSSMZP, the public wooden walkways and platforms must be designed to meet BS 6399-1: 1996 and be able to cope with the heavy duty loading and maintained in safe condition. The effect of any walkway or platform stanchions being submerged in water for prolonged periods should be assessed in terms of deterioration and structural stability. A programme of inspection, maintenance and structural repairs needs to be documented.

A report must be produced for the Licensing Authority by 13th November, 2015 and presented to this Committee, addressing the following six issues:-

1) The Zoo must produce design calculations that demonstrate that all timber walkways and platforms are designed to carry the loads specified in Clause 10 and Table 4 of BS 6399-1: 1996 with structures considered to be carrying 'heavy duty' loading;

2) Design calculations must be produced to confirm that 'stability critical' longitudinal and lateral sway stiffness of the structures is confirmed for at least 10% of the $5kNm^{-2}$ vertical loading in the appropriate combinations with lateral loading on the parapets and the timber post supports;

3) The Zoo must demonstrate through design and calculations that the design incorporates protection against any accidental (impact) loading on the timber posts;

4) The Zoo must demonstrate through design and calculations that the design incorporates a suitable assessment for any disproportionate collapse (i.e. structural integrity under failure of one or possibly more timber posts);

5) That the Zoo provides an independent Structural Engineer's report on the condition of the timber walkways and platforms within the Zoo and carry out any works that will meet the design standard and specifications above; and

6) That the Zoo implements a regular recorded assessment, inspection and maintenance regime."

The Committee added that they would need to determine what remedial works were high, medium and low risk/priority.

Can you please ensure that the report is submitted as requested as I would like to be able to report to the Committee on 17th December. If there are any issues then please contact me.

Yours sincerely

[redacted]

Richard Garnett
Principal Environmental Health Officer

APPENDIX B

SITE INSPECTION REPORT
CERTIFICATION AND TIMBER GRADING (CATG) LTD
TIMBER GRADING

Insert CATG Ltd final report here, when available (estimated to be 19/01/15).

APPENDIX C

CALCULATIONS
RG PARKINS & PARTNERS LTD
STRUCTURAL APPRAISAL

R G PARKINS & PARTNERS LTD
CONSULTING CIVIL & STRUCTURAL ENGINEERS

Meadowside Shap Road Kendal LA9 6NY
Tel: (01539) 729393 Fax: (01539) 740609

97 King Street Lancaster LA1 1RH
Tel: (01524) 32548 Fax: (01524) 843998

CALCULATIONS

JOB NUMBER	**K32719**
DATE	**18/01/16**
DESIGNED	**SR**

RELEVANT INFORMATION

R G Parkins & Partners Ltd – Calculations K32719-SL01 to SL15 and drawing K32719/A3/SK02 Carnivore Country Snow Leopard walkway Strengthening Sections and Details .

Architects – None

Others - None

SNOW LEOPARD WALKWAY

SAFARI ZOO
DALTON IN FURNESS

DESIGN INFORMATION

Timber Design to BS 6399	✓
Masonry Design to EC6	
Steel Design to EC3	
RC Design to EC2	

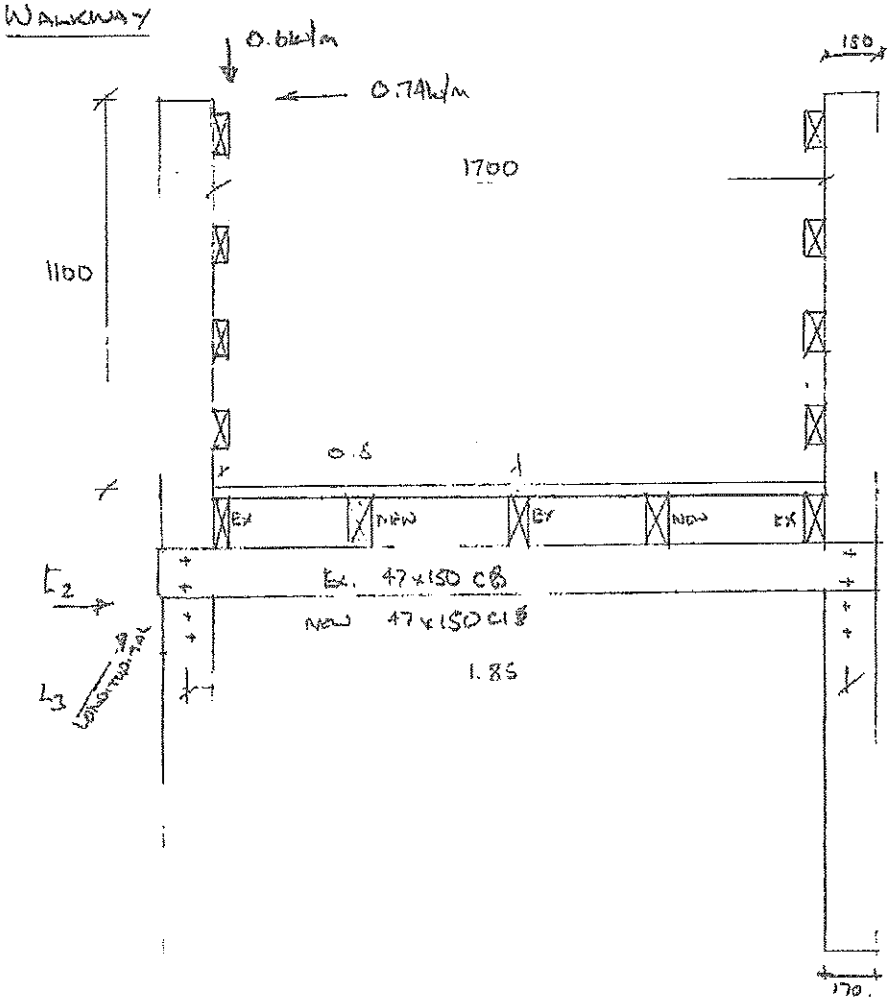
Others

MATERIALS

Steel Grade	S275		
	S355		
Concrete Grade			
Reinforcement fy	250		
	500		

R. G. PARKINS & PARTNERS LTD CONSULTING CIVIL & STRUCTURAL ENGINEERS	CALCULATION	JOB no	K32719	PAGE	SL01
☒ KENDAL Meadowside Shap Road	JOB SAFARI ZOO DALTON-IN-FURNESS	DRG no		DATE	JAN '16
☐ LANCASTER 97 King Street		REVIS		INITIAL	SR
	TITLE SNOW LEOPARD WALKWAY	CHECKED			

WALKWAY



APPLY 10% NOTIONAL LOADING OF LIVE LOAD

NOTIONAL LOADING = (17x2)x5
= 17kN/m
= 4.25x0.1
= 0.425 kN.

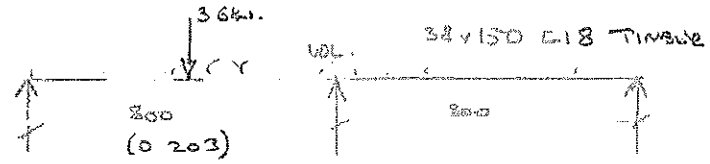
∴ L_2 = 0.85kN
L_3 = 0.85kN

CHECK EX. ST-16 WALKWAY FOR IMPOSED LOAD OF 5 kN/m² (GUIDEBOOK DUTY WALKWAY - (REGULAR TWO-WAY PEDESTRIAN TRAFFIC)) TO BS 6399-1 : 1996 TABLE 1 - C3 OR WITH A CONCENTRATED LOAD OF 3.6 kN. MINIMUM HORIZONTAL LOAD AT PARAPET 0.74 kN/m (TABLE 4 - C3) AND VERTICAL LOAD 0.6 kN/m (CLAUSE 10).

DEAD LOAD = 38mm THICK DECKING — 0.23
47x150 JOIS @ — 0.08
0.31 kN/m²

R. G. PARKINS & PARTNERS LTD CONSULTING CIVIL & STRUCTURAL ENGINEERS	CALCULATION	JOB no	K32719	PAGE	SL02
☒ KENDAL Meadowside, Shap Road	JOB SAFARI ZOO, DALTON-IN-FURNESS	DRG no		DATE	JAN '16
☐ LANCASTER 97 King Street		REVIS		INITIAL	SL
	TITLE: SNOW LEOPARD WALKWAY	CHECKED			

CHECK EXISTING DECKING BOARDS



Load case ① = W/L, 5 x 0.15 = 0.75 kN/M

$M = WL^2/8 = \frac{0.75 \times 0.8^2}{8} = 0.06$ kNm

Load case ② = P, = 3.6 kN

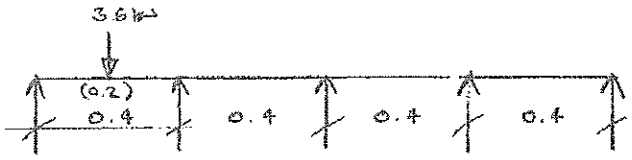
coefficient from Fig 28.9 Timber Designers manual

M = Coefficient (0.203) x 3.6 x 0.8 = 0.585 kNm

$\therefore \quad S_{M,adm,11} = 5.8 \times 0.8(k_2) \times 1.5(k_3) \times 1.17(k_7)$
$= 8.14 \text{ N/mm}^2$

$S_{M,a,11} = \frac{0.585 \times 10^6 \times 6}{150 \times 38^2} = 16.2 \text{ N/mm}^2 > 8.14 \text{ N/mm}^2$ FAIL

CHECK DECKING BOARDS WITH THE INTRODUCTION OF ADDITIONAL JOISTS



COEFFICIENT FROM F.G 28.9 TIMBER DESIGNERS MANUAL.

M = Coefficient 0.2 x 3.6 x 0.4 = 0.288 kNm

$\therefore \quad S_{M,a,11} = \frac{0.288 \times 10^6 \times 6}{150 \times 38^2} = 7.98 \text{ N/mm}^2 < 8.14$

$d_{1\,max} = \frac{PL^3}{48EI} = \frac{3.6 \times 10^3 \times 400^3 \times 12}{48 \times 6000 \times 150 \times 38^3 \times 0.8k_2} = \underline{1.45\text{mm}}$ .. OK'

IT IS STATED IN CHAPTER 3 CLAUSE 3.3 TIMBER DESIGNERS MANUAL CONCENTRATED LOADS ARE ASSUMED TO ACT OVER AN AREA 'APPROPRIATE TO THEIR CAUSE' TYPICALLY THIS HAS BEEN TAKEN AS A 12.5mm SQUARE FOR FOOTFALL LOADS.

∴ DEFLECTIONS ARE COMPARATIVE

∴ 150x 38mm THICK TIMBER DECKING BOARDS SATISFACTORY WITH JOISTS SPACED AT 400mm CENTRES

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☑ KENDAL Meadowside Shap Road	JOB SAFARI ZOO	DRG no		DATE	Jan '16
☐ LANCASTER 97 King Street	DALTON-IN-FURNESS	REVIS		INITIAL	AL
	TITLE	CHECKED			
	SNOW LEOPARD WALKWAY				

CHECK ENTRANCE JOISTS

C18 160 x 47 SPAN 2m @ 800mm c/c

AS DECKING BOARDS CAN NOT SPAN 800mm THEN ADDITIONAL JOISTS WILL BE REQUIRED, JOISTS WILL BE AT 400mm CENTRES.

JOISTS 400mm CENTRES, THEREFORE LOADSHARING BETWEEN JOISTS CAN BE ASSUMED, CHAPTER 5 BS6399-1 : 1996 PERMITS THE CONCENTRATED LOAD TO BE DISREGARDED WHERE THERE IS EFFECTIVE LATERAL DISTRIBUTION OF LOAD

LOADING

UDL = (0.31 + 5) x 0.4 = 2.124 kN/m

MOMENT

$M = WL^2/8 = 2.124 \times 2^2 \times 0.125 = 1.062$ kNm

REACTIONS

$F_v = WL/2 = 2.124 \times 2 \times 0.5 = 2.124$ kN

BENDING PARALLEL TO GRAIN (CHECK AS C16)

$\sigma_{m,adm,11} = 5.3\ N/mm^2 \times k_2 \times k_3 \times k_7 \times k_8$

$k_2 = 0.8$ TABLE 16 (SERVICE CLASS 3)
$k_3 = 1.5$ TABLE 17 (SHORT-TERM LOADING)
$k_7 = (300/150)^{0.11} = 1.08$ CLAUSE 2.10.6
$k_8 = 1.1$ CLAUSE 2.9

$\sigma_{m,adm,11} = 5.3 \times 0.8 \times 1.5 \times 1.08 \times 1.1 = 7.56\ N/mm^2$

$\sigma_{m,a,11} = \frac{M}{Z} = \frac{1.062 \times 10^6 \times 6}{47 \times 150^2} = 6.03\ N/mm^2$ ∴ OK!

R. G. PARKINS & PARTNERS LTD CONSULTING CIVIL & STRUCTURAL ENGINEERS		CALCULATION	JOB no	K3279	PAGE	SLO 4
☑ KENDAL	Meadowside Shap Road	JOB SAFARI ZOO DALTON - IN - FURNESS	DRG no		DATE	JAN '16
☐ LANCASTER	97 King Street	TITLE SNOW LEOPARD WALKWAY	REVIS		INITIAL	SR
			CHECKED			

JOIST (CHAT)

DEFLECTIONS

$$\text{BENDING} = \frac{5}{384} \times \frac{2.124 \times 2000^4 \times 12}{8800 \times 0.8(k_2) \times 47 \times 150^3} = 4.75\,\text{mm}$$

$$\text{SHEAR} = \frac{K_{form} \times M_o}{AG} = \frac{1.2 \times 1.062 \times 10^6}{47 \times 150 \times 550 \times 0.8(k_2)} = 0.41\,\text{mm}$$

$$= 5.16\,\text{mm}$$

LIMITING DEFLECTION = 2000×0.003 = 6mm ∴ OK!

47 x 150 C16 (min.) TIMBER JOISTS AT 400mm CENTRES SATISFACTORY

NOTE :

CLAUSE 2.10 & LATERAL SUPPORT – STATES THE DEPTH TO BREATH RATIO OF SOLID RECTANGULAR SECTIONS SHOULD BE CHECKED TO ENSURE THAT THERE IS NO RISK OF BUCKLING UNDER DESIGN LOAD

TABLE 4.3 (TIMBER DESIGNERS MANUAL)

$$I_x = \frac{47 \times 150^3}{12} = 13218750\,\text{mm}^3 \qquad I_y = \frac{150 \times 47^3}{12} = 1297787.5\,\text{mm}^3$$

$$\text{RATIO } \frac{I_x}{I_y} = \frac{13218750}{1297787.5} = 10.2 \text{ DEGREE OF RESTRAINT}$$

10 - 20 = ROWS SHOULD BE HELD IN LINE AT THE ENDS.

∴ TIMBER NOGGINS REQUIRED AT EACH END BETWEEN JOISTS

SUMMARY

PROVIDE 2 N° ADDITIONAL 47 x 150 C16 (MINIMUM) TIMBER JOISTS, AS SO SPACED AT 400mm CENTRES. PROVIDE TIMBER NOGGINS AT EACH END BETWEEN THE JOISTS TO PROVIDE LATERAL RESTRAINT.

R. G. PARKINS & PARTNERS LTD
CONSULTING CIVIL & STRUCTURAL ENGINEERS

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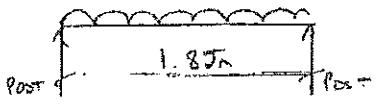
CALCULATION

JOB no	K82719	PAGE	SL05
DRG no		DATE	Jan '16
REVIS		INITIAL	SR
CHECKED			

JOB SAFARI 200
DALTON-IN-FURNESS

TITLE
SNOW LEOPARD WALKWAY

CHECK TIMBER BEARER



EXISTING MEMBER = 47x150 C18

LOADING

UDL = (0.31+5) x 1 = 5.31 kN/m

BENDING MOMENT

$M = WL^2/8 = 5.31 \times 1.85^2 \times 0.125 = 2.27$ kNm

REACTIONS

$F_V = WL/2 = 5.31 \times 1.85 \times 0.5 = 4.9$ kN

BENDING PARALLEL TO GRAIN

$\sigma_{m,adm,11} = 5.8 \times k_2 \times k_3 \times k_7$

$= 5.8 \times 0.8 \times 1.5 \times 1.08 = 7.5$ N/mm²

$\sigma_{m,a,11} = \frac{2.27 \times 10^6 \times 6}{47 \times 150^2} = 12.9$ N/mm² ∴ FAIL!

TRY ADDITIONAL 47x150

$\sigma_{m,a,11} = \frac{2.27 \times 10^6 \times 6}{47 \times 300^2} = 3.2$ N/mm² OK!

$d_{,max} = \frac{5}{384} \times \frac{5.31 \times 1850^4 \times 12}{5820 \times 11 \times 300^3 \times 0.8}$ = 1.65mm ∴ OK!

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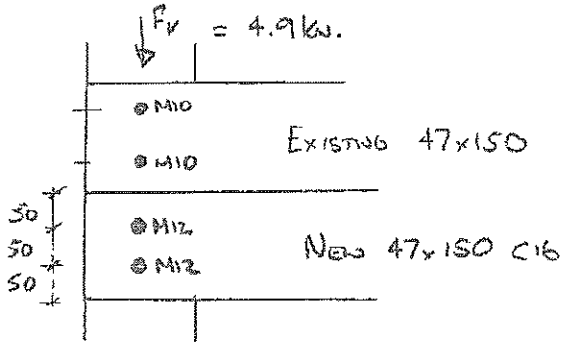
☐ LANCASTER 97 King Street	DALTON-IN-FURNESS	REVIS		INITIAL	CB
	TITLE	CHECKED			
	SNOW LEOPARD WALKWAY				

END BRACING BEAM (cont)

CHECK BOLTED CONNECTIONS

TIMBER TO TIMBER JOINT IN BASIC SINGLE SHEAR



$F_{adm} = F \times K_{58} \times K_{57}$

F = 1.96 (M10) 2.26 (M12) TABLE 7D, SHORT TERM LOAD TO GRAIN THICKNESS 47mm

K_{58} = 0.70 SERVICE CLASS 3

K_{57} = 1.00

4No BOLTS = $((1.96 \times 2) + (2.26 \times 2)) \times 0.7 \times 1$ = 5.9kN > 4.9kN OK!

∴ PROVIDE ADDITIONAL 47x150 C16 (MINIMUM) TIMBER FIX BETWEEN EXISTING 47x150 BEARER AND FIXED TO POSTS USING 2 No M12 BOLTS AT 50mm CENTRES.

CHECK BOLTS WITH 'OUT OF PLANE' LATERAL LOADING. 0.85kN

M10 perpendicular to grain short term through 47mm	= 1.96 x 0.7 x 2	= 2.744
M12 " " " "	= 2.26 x 0.7 x 2	= 3.164
		5.91
M10 parallel to grain short term through 47mm	= 2.20 x 0.7 x 2	= 3.08
M12 " " " "	= 2.61 x 0.7 x 2	= 3.65
		6.73kN

Unity = $\frac{F_{a,11}}{F_{adm,11}} + \frac{F_{a,\perp}}{F_{adm,\perp}} \leq 1$ $\frac{0.85}{6.73} + \frac{4.9}{5.9}$ = 0.126 + 0.83 = 0.956 OK!

R. G. PARKINS & PARTNERS LTD
CONSULTING CIVIL & STRUCTURAL ENGINEERS

☑ KENDAL Meadowside Shap Road

☐ LANCASTER 97 King Street

CALCULATION

JOB [illegible]

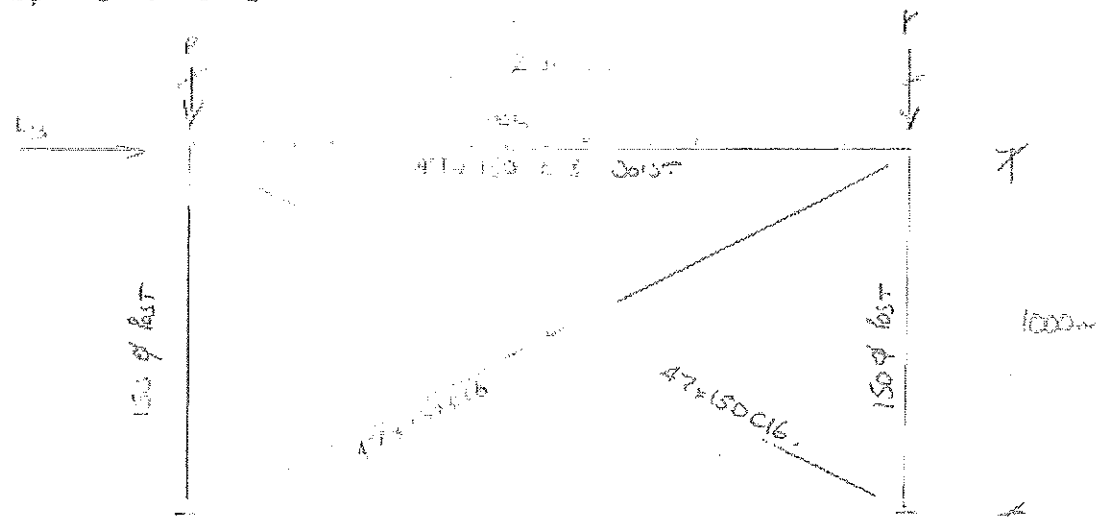
TITLE Basic Loaded Unbraced

JOB no	[illegible]	PAGE	5 of 57
DRG no		DATE	[illegible]
REVIS		INITIAL	[illegible]
CHECKED			

Longitudinal Bracing

Check Frame with out of [illegible]

To Bracing Every [illegible] Bay



P = Timber Loading = 4.9 x 2 = 9.8 kN

Lg = Notional Lateral = 0.01 x 4 = 3.4 kN

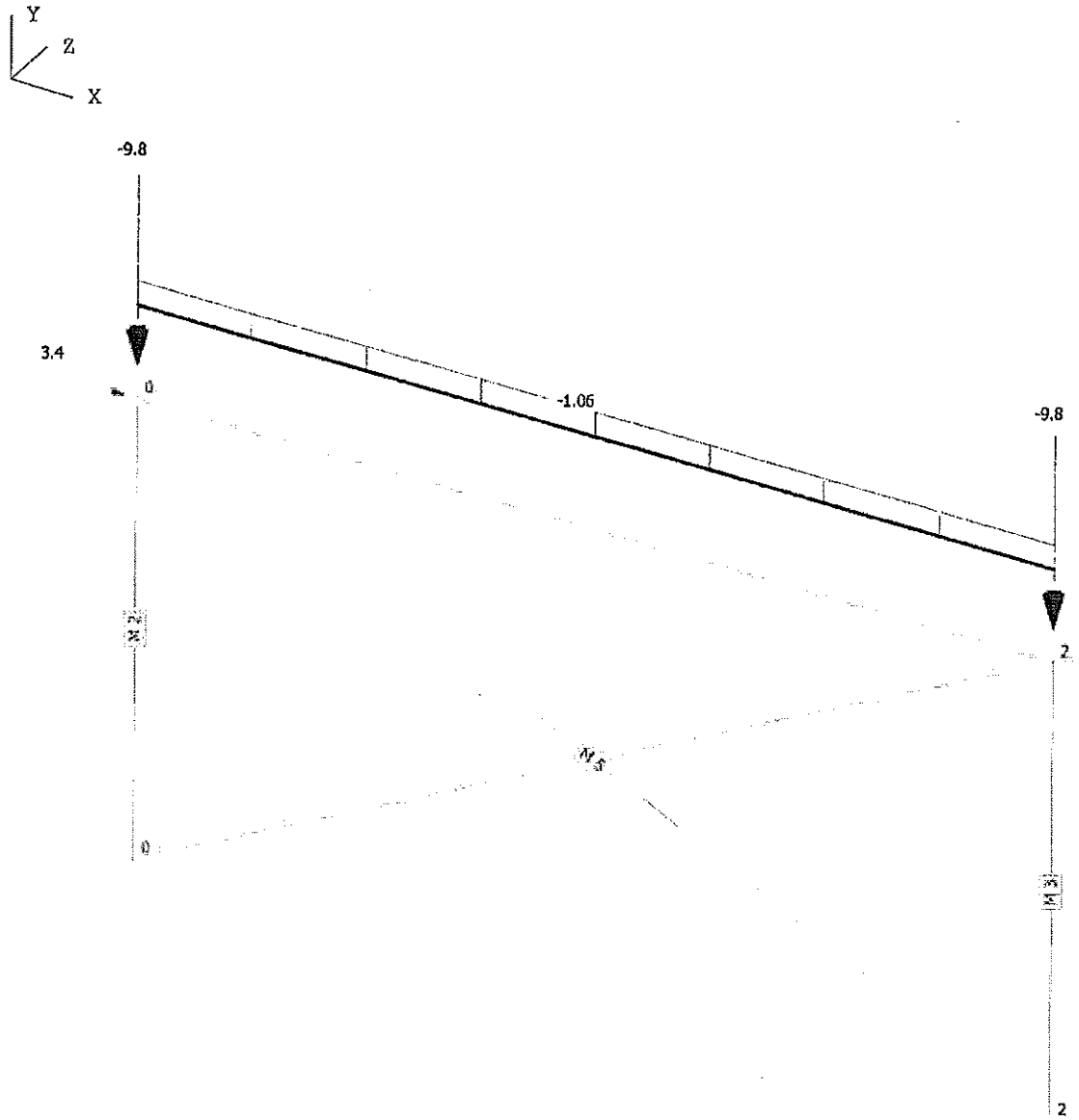
WL = Floor = 5.31 x 2 = 1.062 kN/m

Refer to following Computer Analysis

R G Parkins & Partners Ltd 25256
97 King Street Meadowside
Lancaster Shap Road
LA1 1RH Kendal
Tel: (01524) 32548

SL08

Job Ref : K32719
Sheet : /
Made by : SR
Date : 19 January 2016 / Ver. 2015.06
Checked : AR
Approved :



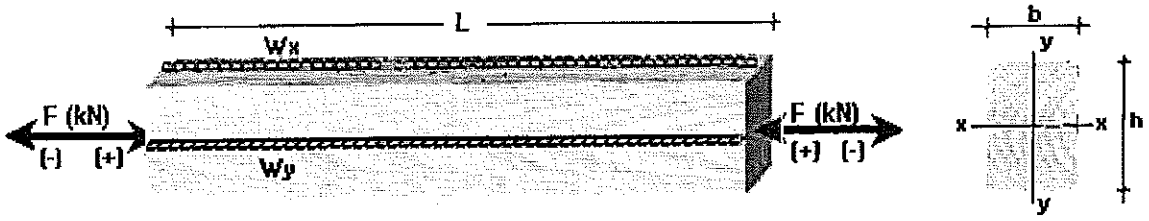
Load Diagram - Load Case 002 - All Groups - XYZ Loads
Frame Geometry - (Full Frame) - 3D Front View

Not to Scale

R G Parkins & Partners Ltd 25256
97 King Street Meadowside
Lancaster Shap Road
LA1 1RH Kendal
Tel: (01524) 32548

Job Ref : K32719 SL09
Sheet : /
Made by : SR
Date : 19 January 2016 / Ver. 2015.06
Checked : AR
Approved :

MasterKey : Timber Design
Axial Load With Moment Design to BS 5268 : Part 2
Member 1 (N.1-N.2) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	b = 47, h 150 Regularized Section in Strength Class C18
Section Properties (cm²,cm³,cm)	Area 70.5, Zx 176.3, Zy 55.2, rx 4.33, ry 1.36
Specification	3 : External uses fully exposed, Short Term loading
Integrated Design	Critical Case 2
Member Details	F = 0.801 kN, Lx = 2.0 m, Ly = 2.0 m, Lex = 1.0 Lx, Ley = 1.0 Ly Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C18)

$\sigma_{mx.adm} = K_2.K_3.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.08 x 1.00 x 5.80	7.51 N/mm²
$\sigma_{my.adm} = K_2.K_3.K_{7v}.K_8.\sigma_m$	0.80 x 1.50 x 1.17 x 1.00 x 5.80	8.14 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_8.\sigma_c$	0.60 x 1.50 x 1.00 x 7.10	6.39 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.K_9.E_{min}$(Compression)	0.80 x 1.00 x 6000	4800 N/mm²
$E = K_2.E_{mean}$(Deflection)	0.80 x 9100	7280 N/mm²

Compression Resistance

λ = Max(Lex/rx, Ley/ry)	Max(200/4.330, 200/1.357)≤ 180	147.4	OK
K_{12}= fn(λ , $K_3.\sigma_c$, E)	147.41, 6.39, 4800	0.189	
$\sigma_{c.adm} = K_{12}.\sigma_{c.adm}$	0.189 x 6.39	1.20 N/mm²	
$\sigma_{c.a}$ = F/Area	0.801 / 70.5≤ 1.20	0.11 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.980		
$\sigma_{mx.a} = Mx/Zx$	0.530 / 176.25≤ 7.51	3.01 N/mm²	OK
$\sigma_{mx.adm}=\sigma_{mx.adm}(1-1.5\ K_{12}.\sigma_{c.a}/\sigma_e)$	7.51 (1-1.5x0.189x0.11/2.18)	7.40 N/mm²	
$\sigma_c/\sigma_{c.adm}+\sigma_{mx}/\sigma_{mx.adm}$	0.11/1.20+3.01/7.40	0.501	OK

Shear and Bearing Check

Critical Design Location	X = 0.000		
τ_a= 1.5 Fv / Area	1.5 x 1.062 / 70.5≤ 0.90	0.23 N/mm²	OK
$\sigma_{cax} = Fvx / (b.Bx)$	1.062 / (47 x 75)≤ 1.74	0.30 N/mm²	OK

Deflection Check (Shear Deflection NOT Included)

Critical Load Case 002 : Live Only (Serviceability)			
$\delta = \delta_m$	2.30≤ L/333	2.30 mm	OK

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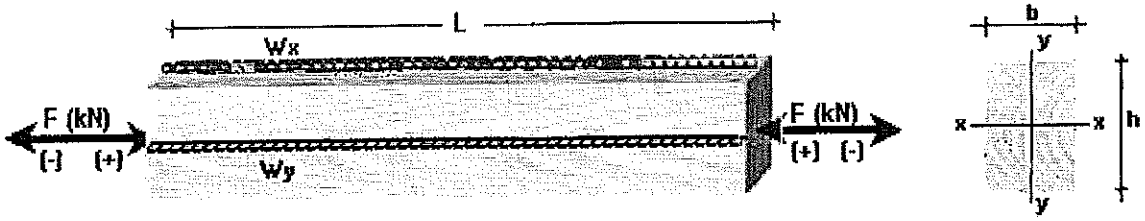
97 King Street Meadowside
Lancaster Shap Road
LA1 1RH Kendal
Tel: (01524) 32548

Job Ref : K32719 SL10
Sheet : /
Made by : SR
Date : 19 January 2016 / Ver. 2015.06
Checked : AR
Approved :

MasterKey : Timber Design
Axial Load With Moment Design to BS 5268 : Part 2
Member 2 (N.1-N.3) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	D = 150 Solid circular section in Strength Class C16
Section Properties (cm²,cm³,cm)	Area 176.7, Zx 331.3, Zy 331.3, rx 3.75, ry 3.75
Specification	3 : External uses fully exposed, Short Term loading Use minimum modulus
Integrated Design	Critical Case 2
Member Details	F = 9.562 kN, Lx = 1.0 m, Ly = 1.0 m, Lex = 1.0 Lx, Ley = 1.0 Ly Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx,adm} = K_2.K_3.K_6.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.18 x 1.08 x 1.00 x 5.30	8.10 N/mm²
$\sigma_{my,adm} = K_2.K_3.K_6.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.18 x 1.08 x 1.00 x 5.30	8.10 N/mm²
$\sigma_{c,adm} = K_2.K_3.K_8.\sigma_c$	0.60 x 1.50 x 1.00 x 6.80	6.12 N/mm²
$\sigma_{c,adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.K_9.E_{min}$	0.80 x 1.00 x 5800	4640 N/mm²

Compression Resistance

λ = Max(Lex/rx, Ley/ry)	Max(100/3.750, 100/3.750)≤ 180	26.7	OK
$K_{12} = fn(\lambda, K_3.\sigma_c, E)$	26.67, 6.12, 4640	0.868	
$\sigma_{c,adm} = K_{12}.\sigma_{c,adm}$	0.868 x 6.12	5.31 N/mm²	
$\sigma_{c,a}$ = F/Area	9.562 / 176.7≤ 5.31	0.54 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.000		
$\sigma_c/\sigma_{c,adm}$	0.54/5.31	0.102	OK

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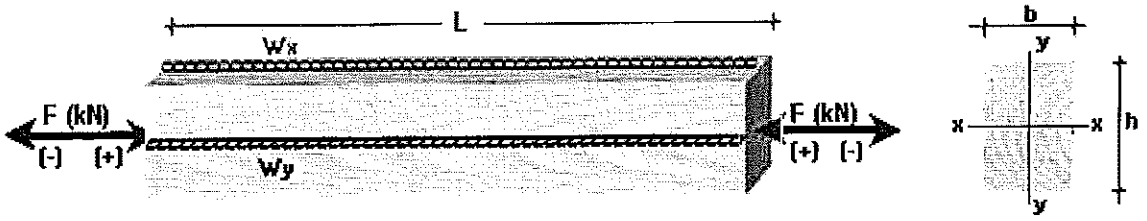
Date : 19 January 2016 / Ver. 2015.06
Checked : AR
Approved :

MasterKey : Timber Design
Axial Load With Moment Design to BS 5268 : Part 2
Member 3 (N.2-N.4) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	D = 150 Solid circular section in Strength Class C16
Section Properties (cm²,cm³,cm)	Area 176.7, Zx 331.3, Zy 331.3, rx 3.75, ry 3.75
Specification	3 : External uses fully exposed, Short Term loading Use minimum modulus
Integrated Design	Critical Case 2
Member Details	F = 11.262 kN, Lx = 1.0 m, Ly = 1.0 m, Lex = 1.0 Lx, Ley = 1.0 Ly Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx.adm} = K_2.K_3.K_6.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.18 x 1.08 x 1.00 x 5.30	8.10 N/mm²
$\sigma_{my.adm} = K_2.K_3.K_6.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.18 x 1.08 x 1.00 x 5.30	8.10 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_8.\sigma_c$	0.60 x 1.50 x 1.00 x 6.80	6.12 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.K_9.E_{min}$	0.80 x 1.00 x 5800	4640 N/mm²

Compression Resistance

λ = Max(Lex/rx, Ley/ry)	Max(100/3.750, 100/3.750)≤ 180	26.7	OK
$K_{12} = fn(\lambda, K_3.\sigma_c, E)$	26.67, 6.12, 4640	0.868	
$\sigma_{c.adm} = K_{12}.\sigma_{c.adm}$	0.868 x 6.12	5.31 N/mm²	
$\sigma_{c.a}$ = F/Area	11.262 / 176.7≤ 5.31	0.64 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.000		
$\sigma_c/\sigma_{c.adm}$	0.64/5.31	0.120	OK

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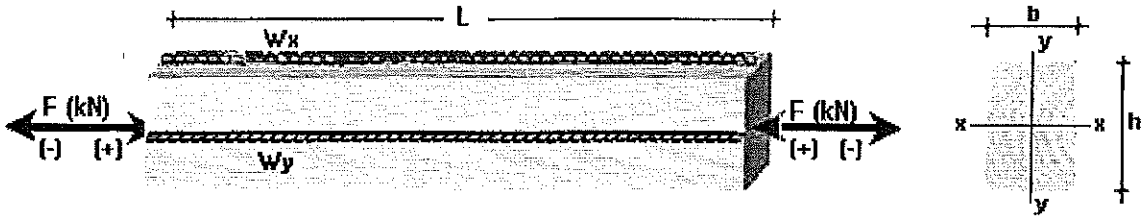
Axial Load With Moment Design to BS 5268 : Part 2
Member 4 (N.2-N.3) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	b = 47, h 150 Basic Section in Strength Class C16
Section Properties (cm^2,cm^3,cm)	Area 70.5, Zx 176.3, Zy 55.2, rx 4.33, ry 1.36
Specification	3 : External uses fully exposed, Short Term loading Use minimum modulus
Integrated Design	Critical Case 2
Member Details	F = -0.895 kN, Lx = 2.236 m, Ly = 2.236 m, Lex = 1.0 Lx, Ley = 1.0 Ly Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx.adm} = K_2.K_3.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.08 x 1.00 x 5.30	6.86 N/mm²
$\sigma_{my.adm} = K_2.K_3.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.17 x 1.00 x 5.30	7.44 N/mm²
$\sigma_{t.adm} = K_2.K_3.K_8.K_{14}.\sigma_t$	0.80 x 1.50 x 1.00 x 1.08 x 3.20	4.14 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.K_9.E_{min}$	0.80 x 1.00 x 5800	4640 N/mm²

Tensile Resistance

$\sigma_{t.a}$ = F/Area	0.895 / 70.5 ≤ 4.14	0.13 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.000		
$\sigma_t/\sigma_{t.adm}$	0.13/4.14	0.031	OK

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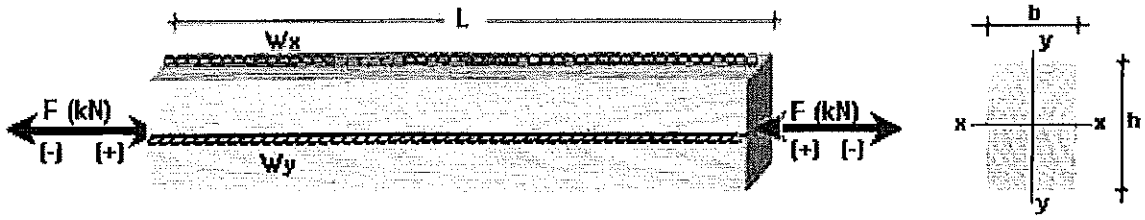
Approved :

MasterKey : Timber Design
Axial Load With Moment Design to BS 5268 : Part 2
Member 5 (N.1-N.4) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	b = 47, h 147 Regularized Section in Strength Class C16
Section Properties (cm²,cm³,cm)	Area 69.1, Zx 169.3, Zy 54.1, rx 4.24, ry 1.36
Specification	3 : External uses fully exposed, Short Term loading
	Use minimum modulus
Integrated Design	Critical Case 2
Member Details	F = 2.906 kN, Lx = 2.236 m, Ly = 2.236 m, Lex = 1.0 Lx, Ley = 1.0 Ly
	Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx.adm} = K_2.K_3.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.08 x 1.00 x 5.30	6.88 N/mm²
$\sigma_{my.adm} = K_2.K_3.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.17 x 1.00 x 5.30	7.44 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_8.\sigma_c$	0.60 x 1.50 x 1.00 x 6.80	6.12 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.K_9.E_{min}$	0.80 x 1.00 x 5800	4640 N/mm²

Compression Resistance

λ = Max(Lex/rx, Ley/ry)	Max(224/4.244, 224/1.357)≤ 180	164.8	OK
$K_{12} = fn(\lambda, K_3.\sigma_c, E)$	164.80, 6.12, 4640	0.156	
$\sigma_{c.adm} = K_{12}.\sigma_{c.adm}$	0.156 x 6.12	0.95 N/mm²	
$\sigma_{c.a}$ = F/Area	2.906 / 69.1≤ 0.95	0.42 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.000		
$\sigma_c/\sigma_{c.adm}$	0.42/0.95	0.441	OK

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☐ LANCASTER — 97 King Street		REVIS		INITIAL	SC
	TITLE BEAR WALKWAY	CHECKED			

CHECK [illegible]

F_v = 2.906 kN

MEMBER SIZE = 47 x 150 C16 TIMBER

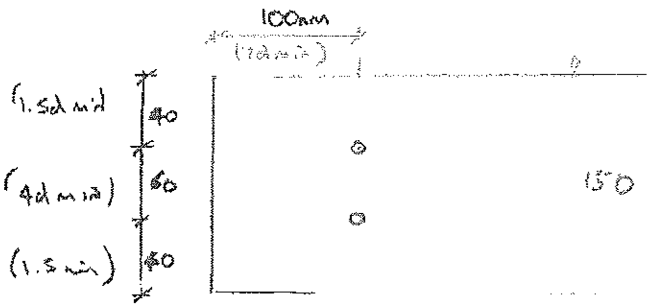
Fadm = F x K_{56} x K_{57} — clause 6.6.6

TRY 2No M12

F = 2.61 — TABLE 70 SHORT TERM THROUGH 47mm PARALLEL TO GRAIN
K_{56} = 0.70 — SERVICE CLASS 3
K_{57} = 1.00

M12 – Fadm = 2.61 x 0.7 x 1 = 1.827 kN

∴ 2 M12 = 1.827 x 2 = 3.654 kN > 2.906 kN ∴ OK



PROVIDE 2 No M12 BOLTS

R. G. PARKINS & PARTNERS LTD CONSULTING CIVIL & STRUCTURAL ENGINEERS	CALCULATION	JOB no	K327/9	PAGE	SL.15
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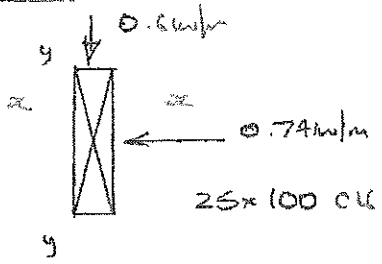
☐ LANCASTER 97 King Street		REVIS		INITIAL	SL
	TITLE SNOW LEOPARD WALKWAY	CHECKED			

CHECK HANDRAIL



BENDING MOMENT

$x\text{-}x = 0.6 \times 2^2 \times 0.125 = 0.3\,kNm$

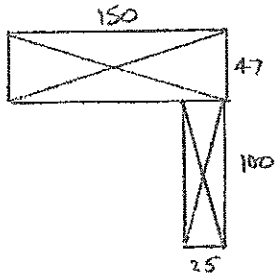
$y\text{-}y = 0.74 \times 2^2 \times 0.125 = 0.37\,kNm$

$\sigma_{adm,11} = 5.3 \times 0.8(k_2) \times 1.5(k_3) \times 1.08(k_7) = 6.87\,N/mm^2$

$\sigma_{a,11xx} = \frac{0.3 \times 10^6 \times 6}{25 \times 100^2} = 7.2\,N/mm^2$

$\sigma_{a,11yy} = \frac{0.37 \times 10^6 \times 6}{100 \times 25^2} = 34.56\,N/mm^2$ FAIL

TRY



$\sigma_{a,11,xx} = \frac{0.3 \times 10^6 \times 6}{25 \times 147^2} = 3.3\,N/mm^2$

$\sigma_{a,11,yy} = \frac{0.37 \times 10^6 \times 6}{47 \times 150^2} = 2\,N/mm^2$

$\text{UNITY} = \frac{\sigma_{a,11,xx}}{\sigma_{adm,11}} + \frac{\sigma_{a,11yy}}{\sigma_{adm11}} \leq 1$

$= \frac{3.3}{6.87} + \frac{2}{6.87} = 0.48 + 0.29 = 0.77$ OK!

DEFLECTION

$x\text{-}x = \frac{5}{384} \times \frac{0.6 \times 2000^4 \times 12}{5200 \times 25 \times 147^3 \times 0.8} = 4.2\,mm$ $\quad y\text{-}y = \frac{5}{384} \times \frac{0.74 \times 2000^4 \times 12}{5200 \times 47 \times 150^3 \times 0.8} = 2.5\,mm$

$d_{max} = \sqrt{4.2^2 + 2.5^2} = 4.9\,mm$

$d_{perm} = 2000 \times 0.005 = 6\,mm$ $\therefore$ OK!

$\therefore$ A00 47x150 C16 TIMBER TOP HORIZONTAL RAIL

R G PARKINS & PARTNERS LTD
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CALCULATIONS

JOB NUMBER	**K32719**
DATE	**18/01/16**
DESIGNED	**SR**

RELEVANT INFORMATION

R G Parkins & Partners Ltd – Calculations K32719-BW01 to BW20 and drawing K32719/A3/SK01A Bear walkway Strengthening Sections and Elevations .

Architects – None

Others - None

BEAR WALKWAY

SAFARI ZOO
DALTON IN FURNESS

DESIGN INFORMATION

Timber Design to	BS 6399	✓
Masonry Design to	EC6	
Steel Design to	EC3	
RC Design to	EC2	

Others

MATERIALS

Steel Grade	S275		
	S355		
Concrete Grade			
Reinforcement fy	250		
	500		

R. G. PARKINS & PARTNERS LTD CONSULTING CIVIL & STRUCTURAL ENGINEERS	CALCULATION	JOB no	K32719	PAGE	BW 01
☑ KENDAL Meadowside Shap Road	JOB SAFARI ZOO DALTON-IN-FURNESS	DRG no		DATE	JAN '16
☐ LANCASTER 97 King Street		REVIS		INITIAL	SL
	TITLE BEAR WALKWAY	CHECKED			

BEAR WALKWAY — LOADING WIDE SAFARI

CHECK EXISTING WALKWAY FOR IMPOSED LOAD OF 5kN/m² (GENERAL DUTY WALKWAY - (REGULAR TWO-WAY PEDESTRIAN TRAFFIC)) TO BS 6399-1 : 1996 TABLE 1 - C3 OR A CONCENTRATED LOAD OF 3.6kN.

MINIMUM HORIZONTAL LOAD AT PARAPET 0.74 kN/m (TABLE 4 - C3) AND VERTICAL LOAD 0.6kN/m (CLAUSE 10).

ALSO A 10% HORIZONTAL NOTIONAL LOADING OF THE IMPOSED LOAD FOR USE OF LARGE GROUPS HAS BEEN STATED TO BE CHECKED BY THE LOCAL AUTHORITY.

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	TITLE BEAR WALKWAY	CHECKED			

WORLD WIDE SAFARI – BEAR WALKWAY

LOADINGS

DEAD = 0.31 kN/m²
LIVE = 5.00 kN/m²

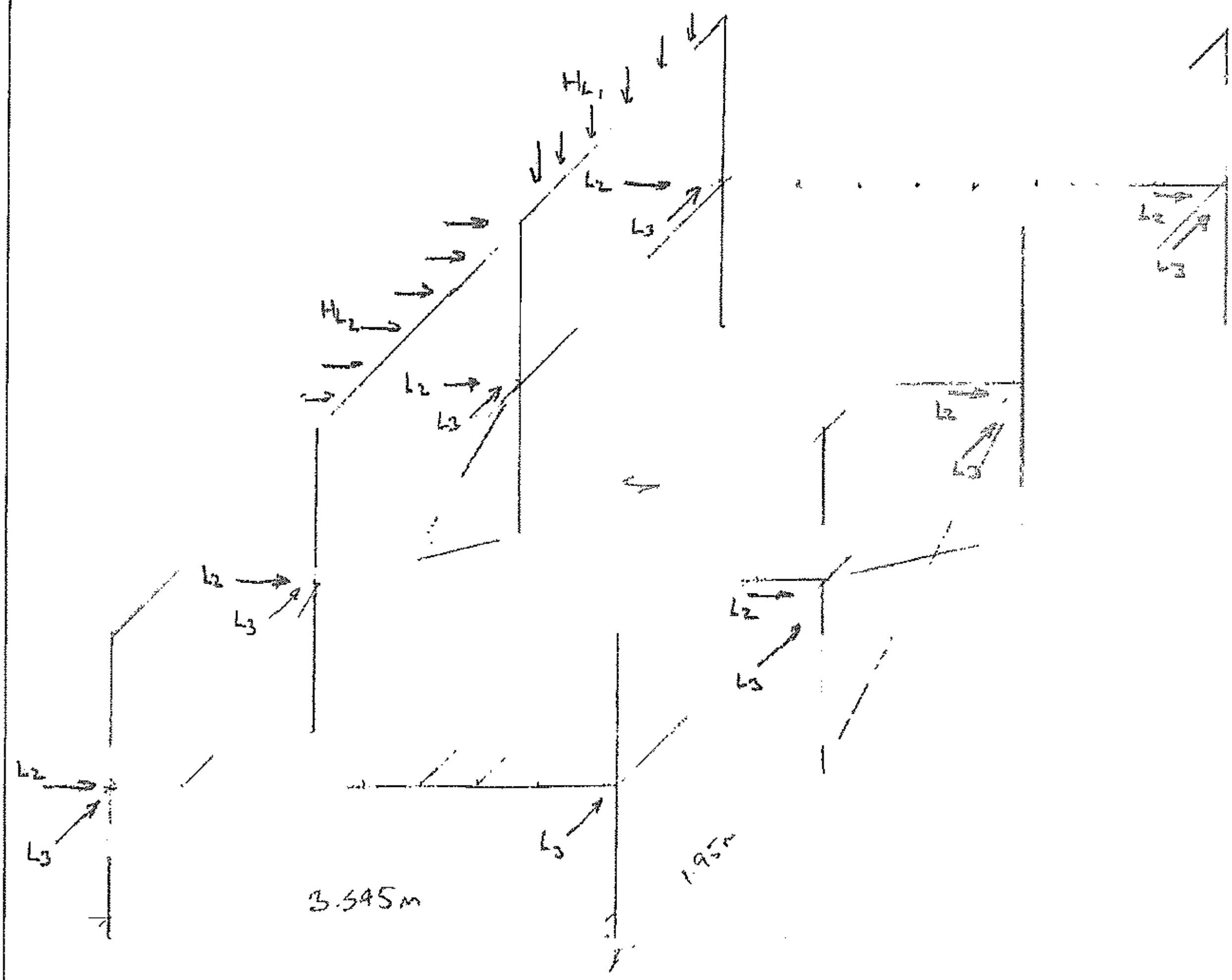
HAND RAIL LOAD 1 = VERTICAL LOAD – 0.6 kN/m²
HAND RAIL LOAD 2 = HORIZONTAL LOAD – 0.74 kN/m²

10% NOTIONAL LIVE LOAD

BAY AREA = 3.595 × 1.95 = 6.91 m²

∴ NOTIONAL LOAD AT POSTS = (6.91 × 5)/4 = 8.64 kN

10% = 8.64 × 0.1 = 0.864 kN ÷ 2 = 1.728 kN (L_2 & L_3)



R. G. PARKINS & PARTNERS LTD CONSULTING CIVIL & STRUCTURAL ENGINEERS	CALCULATION	JOB no	K32719	PAGE	BW03
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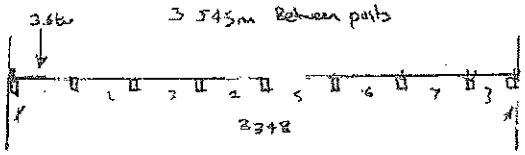
☐ LANCASTER 97 King Street	DALTON - IN - FURNESS	REVIS		INITIAL	
	TITLE	CHECKED			
	BEAR WALKWAY				

CHECK CHECKING WITH ADDITIONAL JOISTS



Joist camber = 3348/8 = 418.5mm

M = Coefficient 0.2 × 3.6 × 0.4185 = 0.3kNm

BENDING

$\sigma_{m,adm,11} = 5.3 \times 0.8(k_2) \times 1.5(k_3) \times 1.17(k_7) = 7.44\ N/mm^2$

$\sigma_{m,a,11} = \frac{0.3 \times 10^6 \times 6}{150 \times 38^2} = 8.31\ N/mm^2$ FAIL

CHAPTER 3 - LOADINGS (TIMBER DESIGNERS MANUAL) CLAUSE 3.3, STATES CONCENTRATED LOADS ARE ASSUMED TO ACT OVER AN AREA "APPROPRIATE TO THEIR CAUSE" TYPICALLY THIS HAS BEEN TAKEN AS 125mm SQUARE FOR FOOTFALL LOADS.

M = 0.242kNm

$\sigma = \frac{0.242 \times 10^6 \times 6}{150 \times 38^2} = 6.7\ N/mm^2 < 7.44\ N/mm^2$ ∴ OK!

∴ 150 × 38mm THICK TIMBER DECKING BOARDS SATISFACTORY WITH JOISTS SPACED EQUALLY AT 418mm CENTRES

NOTE CHECK LATERAL SUPPORT

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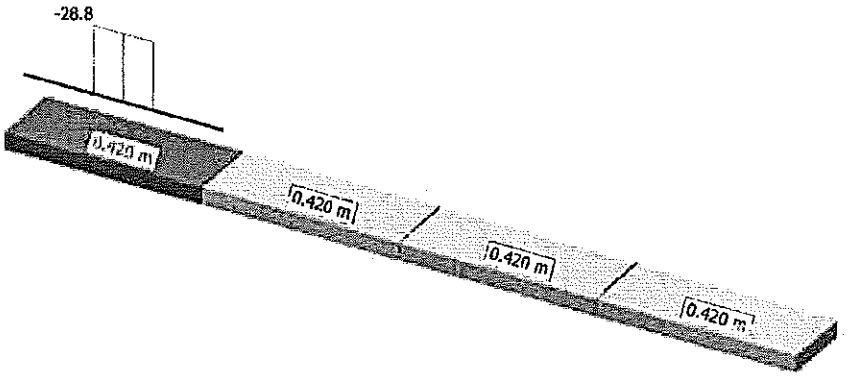

Load Diagram - Load Case 002 - All Groups - XYZ Loads
Frame Geometry - (Full Frame) - 3D Front View

Not to Scale

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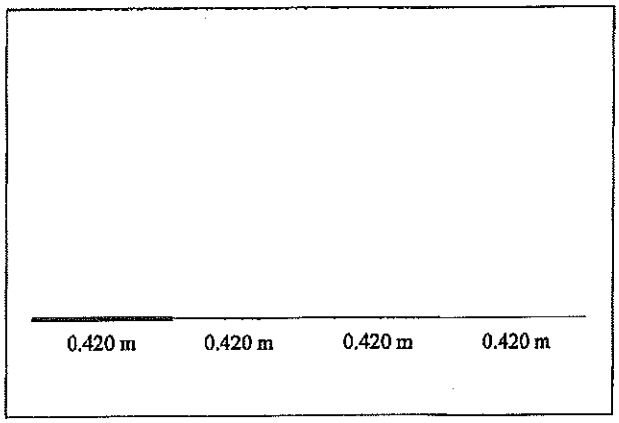
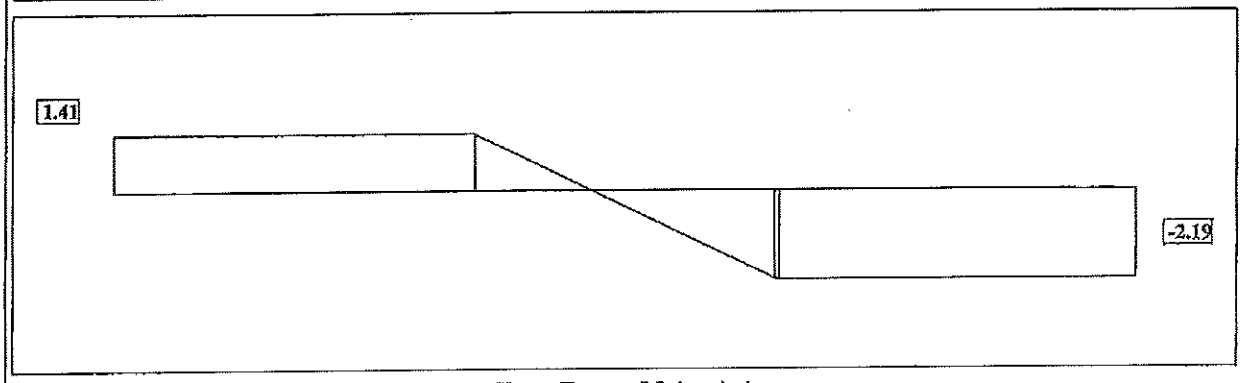
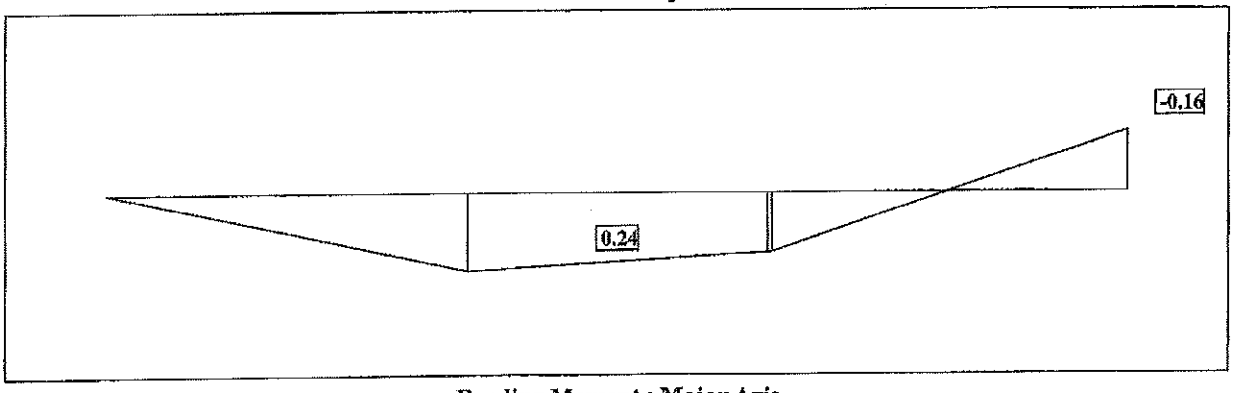
Member M 0001
Section : 150x38 C16
Load Case 002
Live Only (Serviceability)

Axial Force (kN)		Torque (kN.m)	
Fmax	0.00	Tmax	0.00
Fmin	0.00	Tmin	0.00

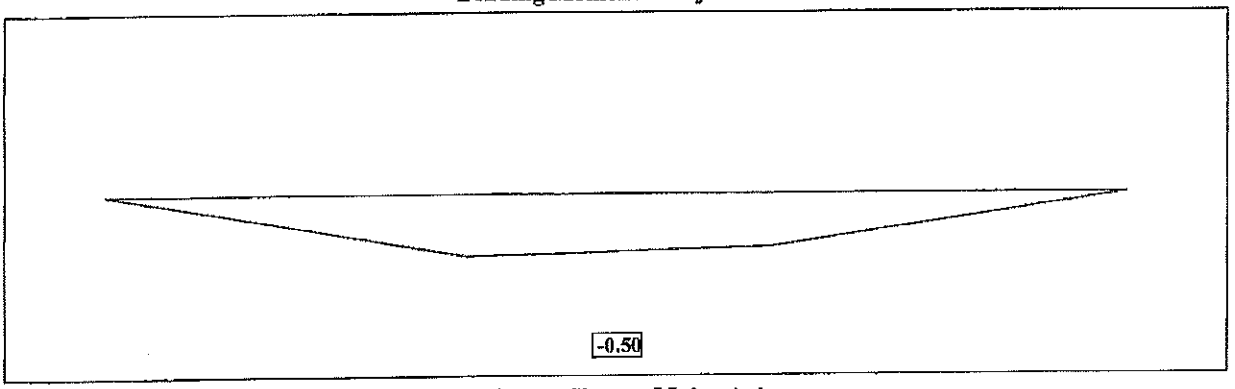




Shear Force : Major Axis



Bending Moment : Major Axis



Deflected Shape : Major Axis

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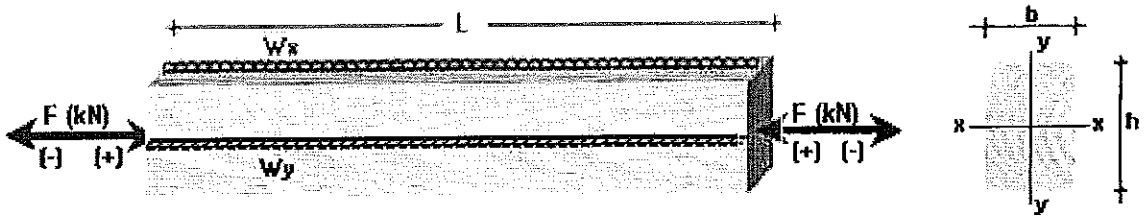
Bw06

MasterKey : Timber Design
Axial Load With Moment Design to BS 5268 : Part 2
Member 1 (N.1-N.2) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	b = 150, h 38 Regularized Section in Strength Class C16
Section Properties (cm²,cm³,cm)	Area 57, Zx 36.1, Zy 142.5, rx 1.1, ry 4.33
Specification	3 : External uses fully exposed, Short Term loading
Integrated Design	Critical Case 2
Member Details	F = 0.0 kN, Lx = 0.42 m, Ly = 0.42 m, Lex = 1.0 Lx, Ley = 1.0 Ly Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx.adm} = K_2.K_3.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.17 x 1.00 x 5.30	7.44 N/mm²
$\sigma_{my.adm} = K_2.K_3.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.08 x 1.00 x 5.30	6.86 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.E_{mean}$	0.80 x 8800	7040 N/mm²

Axial Load with Moments Check

Critical Design Location	X = 0.193		
$\sigma_{mx.a} = Mx/Zx$	0.242 / 36.1≤ 7.44	6.70 N/mm²	OK
$\sigma_{mx}/\sigma_{mx.adm}$	6.70/7.44	0.900	OK

Shear and Bearing Check

Critical Design Location	X = 0.420		
$\tau_a = 1.5\ Fv / Area$	1.5 x 2.191 / 57≤ 0.90	0.58 N/mm²	OK
$\sigma_{cax} = Fvx / (b.Bx)$	2.191 / (150 x 75)≤ 1.74	0.19 N/mm²	OK

Deflection Check (Shear Deflection NOT Included)

Critical Load Case 002 : Live Only (Serviceability)

$\delta = \delta_m$	0.74≤ L/333	0.74 mm	OK

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KENDAL — Meadowside, Shap Road	JOB Safari Zoo Dalton-in-Furness	DRG no		DATE	Jan '16
LANCASTER — 97 King Street		REVIS		INITIAL	SR
	TITLE Bear Walkway	CHECKED			

CHECK JOISTS

C14 150 x 47 @ 418 c/c Effective Span = 1.8m Between Bearers

LOADING

UDL = (0.71 + 5) x 0.418 = 2.22 kN/m

MOMENT

M = WL²/8 = 2.22 x 1.8² x 0.125 = 0.9 kNm

REACTIONS

F_v = wL/2 = 2.22 x 1.8 x 0.5 = 2 kN

BENDING PARALLEL TO GRAIN

$\sigma_{m,adm,\parallel}$ = 4.1 N/mm² (C14) x K_2 x K_3 x K_7 x K_8

K_2 = 0.8 Table 16 (Service Class 3)
K_3 = 1.5 Table 17 (Short-Term Loading)
K_7 = $(300/150)^{0.11}$ = 1.08 Clause 2.10.6
K_8 = 1.1 Clause 2.9

$\sigma_{m,adm,\parallel}$ = 4.1 x 0.8 x 1.5 x 1.08 x 1.1 = 5.84 N/mm²

$\sigma_{m,a,\parallel}$ = $\frac{M}{Z}$ = $\frac{0.9 \times 10^6 \times 6}{47 \times 150^2}$ = 5.1 N/mm² . OK!

DEFLECTION

Bending = $\frac{5}{384} \times \frac{2.22 \times 1800^4 \times 12}{6800 \times 0.8(K_2) \times 47 \times 150^3}$ = 4.22 mm

Shear = $\frac{K_{form} \times M_o}{A_G}$ = $\frac{1.2 \times 0.9 \times 10^6}{47 \times 150 \times 850 \times 0.8(K_2)}$ = 0.23 mm

= 4.45 mm

Limiting Deflection = 1800 x 0.003 = 5.4 mm ∴ OK!

47 x 150 C14 TIMBER JOISTS AT 418 CENTRES SATISFACTORY

R. G. PARKINS & PARTNERS LTD
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CALCULATION	JOB no	K32709	PAGE	BW08
JOB SAFARI ZOO DALTON-IN-FURNESS	DRG no		DATE	JAN'16
	REVIS		INITIAL	SR
TITLE BEAR WALKWAY	CHECKED			

JOIST CONT

CLAUSE 2.10.8 LATERAL SUPPORT - STATES THE DEPTH TO BREADTH RATIO OF SOLID RECTANGULAR SECTIONS SHOULD BE CHECKED TO ENSURE THAT THERE IS NO RISK OF BUCKLING UNDER DESIGN LOAD.

TABLE 4.3 (TIMBER DESIGNERS MANUAL)

$I_x = \frac{47 \times 150^3}{12} = 13218750 mm^2$ $I_y = \frac{150 \times 47^3}{12} = 1297787.5 mm^3$

RATIO $\frac{I_x}{I_y} = \frac{13218750}{1297787.5} = 10.2$ DEGREE OF RESTRAINT

10 - 20 = BEAMS SHOULD BE HELD IN LINE AT THE ENDS

∴ TIMBER NOGGINS REQUIRED AT EACH END BETWEEN JOISTS

SUMMARY

PROVIDE 4 NO ADDITIONAL 47 x 150 C14 TIMBER JOISTS, AS SO SPACED AT 418mm CENTRES. PROVIDE TIMBER NOGGINS AT EACH END BETWEEN THE JOISTS TO PROVIDE LATERAL RESTRAINT

R. G. PARKINS & PARTNERS LTD
CONSULTING CIVIL & STRUCTURAL ENGINEERS
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☐ LANCASTER 97 King Street

CALCULATION

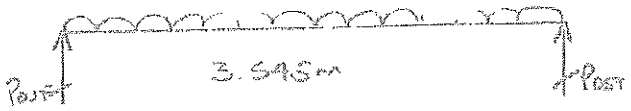
JOB no	K32 719	PAGE	BW09
DRG no		DATE	Jan '16
REVIS		INITIAL	SL
CHECKED			

JOB SAGAR 1 200
DALTON - IN - FURNESS

TITLE
BEAR WALKWAY

CHECK TIMBER BEARER

EXISTING MEMBER = 47 x 250 C14



LOADING = (0.31 + 5) x 0.975 = 5.18 kN/m

MOMENT = $WL^2/8$ = $5.18 \times 3.595^2 \times 0.125$ = 8.14 kNm

REACTION = $WL/2$ = $5.31 \times 3.545 \times 0.5$ = 9.41 kN.

BENDING PARALLEL TO GRAIN

$\sigma_{m,adm,II} = 4.1 \times k_2 \times k_3$

$= 4.1 \times 0.8 \times 1.5$ = 4.92 N/mm²

TRY ADDITIONAL 47 x 250 BELOW EXISTING

$\sigma_{m,a,II} = \frac{8.14 \times 10^6 \times 6}{47 \times 500^2}$ = 4.16 N/mm² ∴ OK.

DEFLECTION

BENDING = $\frac{5}{384} \times \frac{5.18 \times 3545^4 \times 12}{4600 \times 47 \times 500^3 \times 0.8}$ = 5.9 mm

SHEAR = $\frac{k_{form} \times M_0}{A_6} = \frac{1.2 \times 8.14 \times 10^6}{47 \times 500 \times 850 \times 0.8}$ = 0.6 mm

6.5 mm

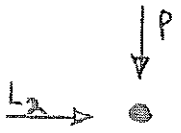
LIMITING DEFLECTION = 3545 x 0.003 = 10.6 mm ∴ OK.

∴ ADD ADDITIONAL 47 x 250 C14 TIMBER BEARER BENEATH EXISTING 47 x 250 C14 TIMBER BEARER TO FORM 500 mm DEEP MEMBER

R. G. PARKINS & PARTNERS LTD CONSULTING CIVIL & STRUCTURAL ENGINEERS	CALCULATION	JOB no	K327/19	PAGE	BW 10
☑ KENDAL Meadowside, Shap Road	JOB SAFARI 200 DALTON-IN-FURNESS	DRG no		DATE	JAN '16
☐ LANCASTER 97 King Street		REVIS		INITIAL	SR
	TITLE BEAR WALKWAY	CHECKED			

CHECK BOLTED BRACE CONNECTION

TIMBER TO TIMBER JOINT IN BASIC SINGLE SHEAR



P = 9.41kN TIMBER BRACE

L_2 = 1.728kN NOTIONAL LIVE LOAD :

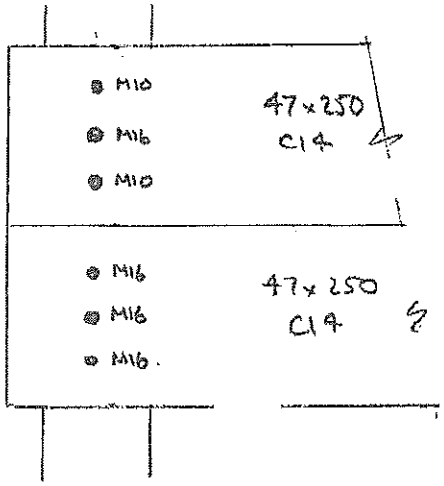


Table 6.9 - C14

Fadm perpendicular to grain

M10 = 1.83 x 0.7 x 2NO = 2.562

M16 = 2.58 x 0.7 x 4NO = 7.224

9.786 kN

Fadm Parallel to grain

M10 = 2.08 x 0.7 x 2 NO = 2.912

M16 = 3.11 x 0.7 x 4 NO = 8.708

11.62 kN

∴ $F_{adm,perp}$ = 9.786 > 9.41 kN ∴ OK!

$F_{adm,par}$ = 11.62 > 1.728kN ∴ OK!

UNITY = $\frac{9.41}{9.780} + \frac{1.728}{11.62}$ = 0.962 + 0.149 = 1.11 FAIL

REPLACE EXISTING M10 WITH M16.

∴ $F_{adm,\perp}$ = 2.58 x 0.7 x 6 = 10.836 kN

$F_{adm,\parallel}$ = 3.11 x 0.7 x 6 = 13.062 kN

UNITY = $\frac{9.41}{10.836} + \frac{1.728}{13.062} \leq 1$ = 0.868 + 0.132 = 1 ∴ OK.

USE 6 NO M16 BOLTS

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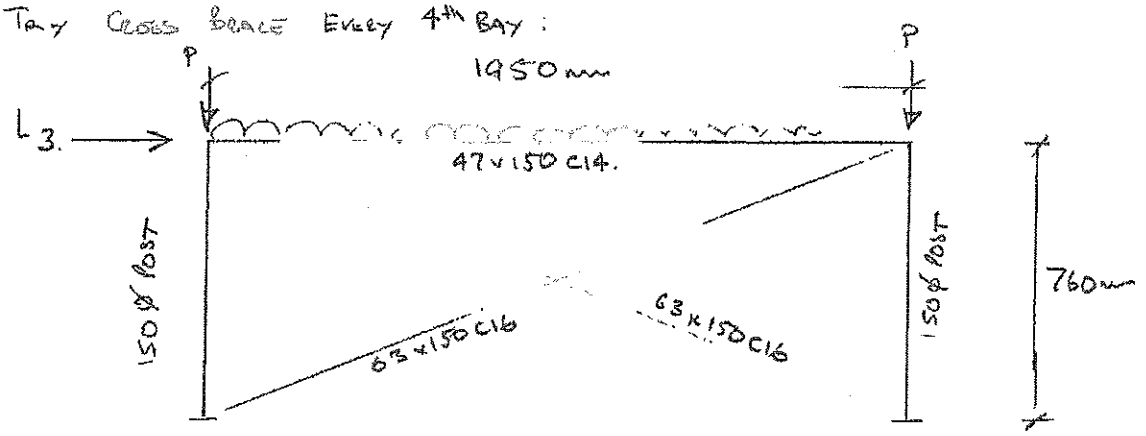
☒ KENDAL Meadowside Shap Road	JOB SAFARI ZOO DALTON-IN-FURNESS	DRG no		DATE	JAN '16
☐ LANCASTER 97 King Street		REVIS		INITIAL	SE
	TITLE BEAR WALKWAY	CHECKED			

LONGITUDINAL BRACING.

CHECK FRAME WITH OUT OF PLANE FORCES.

TRY CROSS BRACE EVERY 4th BAY:



P = TIMBER BEAMS = 9.41 x 2 = 18.82 kN.

L_3 = NOTIONAL LIVE LOAD = 1.728 x 4 = 6.912 kN

UDL = FLOOR = 5.31 x 0.2 = 1.062 kN/M

REFER TO FOLLOWING COMPUTER ANALYSIS

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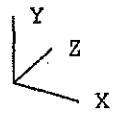

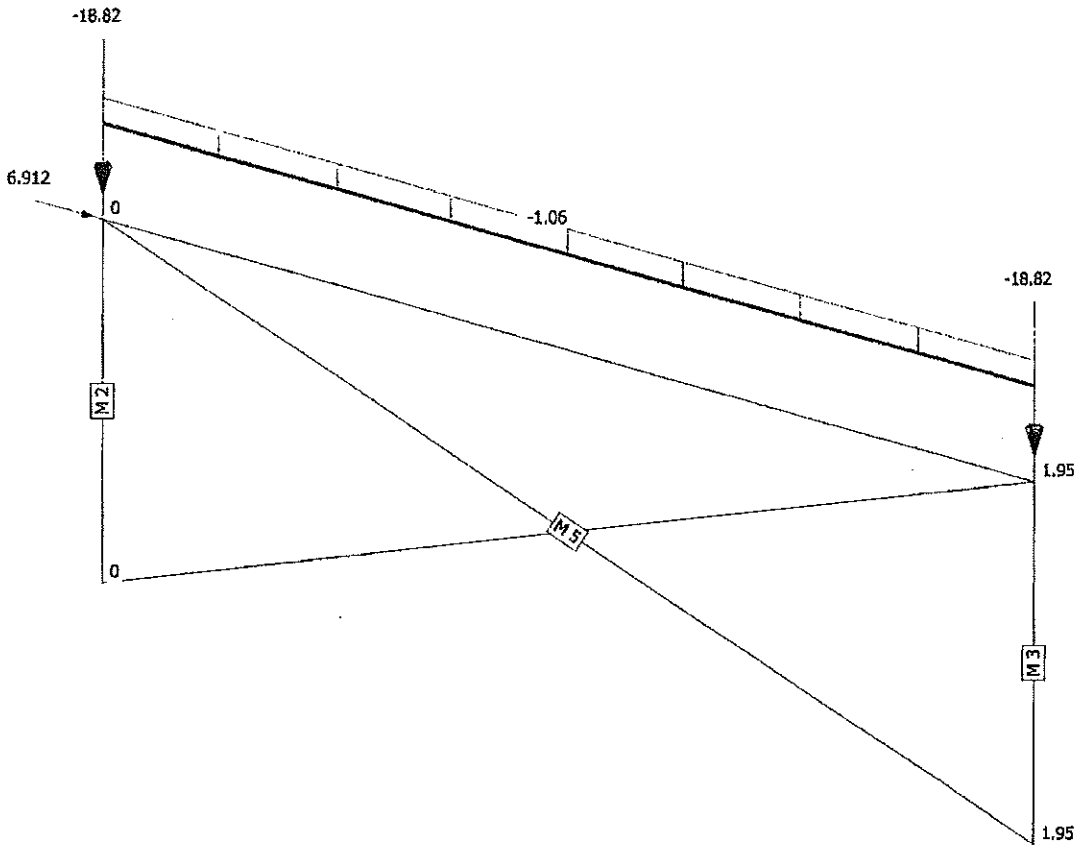

Load Diagram - Load Case 002 - All Groups - XYZ Loads
Frame Geometry - () - 3D Front View

Not to Scale

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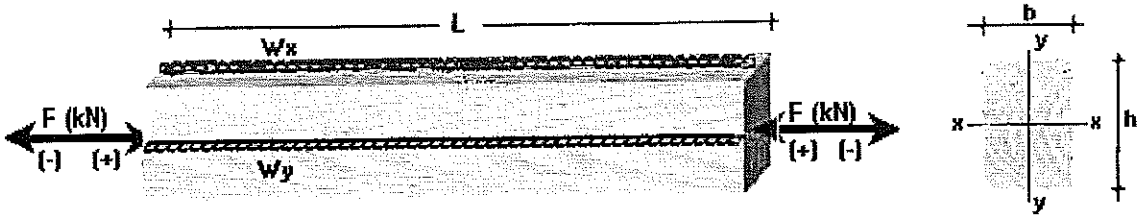
Axial Load With Moment Design to BS 5268 : Part 2
Member 1 (N.1-N.2) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	b = 47, h 150 Regularized Section in Strength Class C14
Section Properties (cm²,cm³,cm)	Area 70.5, Zx 176.3, Zy 55.2, rx 4.33, ry 1.36
Specification	3 : External uses fully exposed, Short Term loading
Integrated Design	Critical Case 2
Member Details	F = 1.542 kN, Lx = 1.95 m, Ly = 1.95 m, Lex = 1.0 Lx, Ley = 1.0 Ly Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C14)

$\sigma_{mx,adm} = K_2.K_3.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.08 x 1.00 x 4.10	5.31 N/mm²
$\sigma_{my,adm} = K_2.K_3.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.17 x 1.00 x 4.10	5.76 N/mm²
$\sigma_{c,adm} = K_2.K_3.K_8.\sigma_c$	0.60 x 1.50 x 1.00 x 5.20	4.68 N/mm²
$\sigma_{c,adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.60	1.64 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.60	0.81 N/mm²
$E = K_2.K_9.E_{min}$(Compression)	0.80 x 1.00 x 4600	3680 N/mm²
$E = K_2.E_{mean}$(Deflection)	0.80 x 6800	5440 N/mm²

Compression Resistance

λ = Max(Lex/rx, Ley/ry)	Max(195/4.330, 195/1.357)≤ 180	143.7	OK
K_{12}= fn(λ , $K_3.\sigma_c$, E)	143.72, 4.68, 3680	0.204	
$\sigma_{c,adm} = K_{12}.\sigma_{c,adm}$	0.204 x 4.68	0.96 N/mm²	
$\sigma_{c,a}$ = F/Area	1.542 / 70.5≤ 0.96	0.22 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.955		
$\sigma_{mx,a}$ = Mx/Zx	0.503 / 176.25≤ 5.31	2.85 N/mm²	OK
$\sigma_{mx,adm}=\sigma_{mx,adm}(1-1.5\ K_{12}.\sigma_{c,a}/\sigma_c)$	5.31 (1-1.5x0.204x0.22/1.76)	5.11 N/mm²	
$\sigma_c/\sigma_{c,adm}+\sigma_{mx}/\sigma_{mx,adm}$	0.22/0.96+2.85/5.11	0.787	OK

Shear and Bearing Check

Critical Design Location	X = 0.000		
τ_a= 1.5 Fv / Area	1.5 x 1.035 / 70.5≤ 0.81	0.22 N/mm²	OK
σ_{cax} = Fvx / (b.Bx)	1.035 / (47 x 75)≤ 1.64	0.29 N/mm²	OK

Deflection Check (Shear Deflection NOT Included)

Critical Load Case 002 : Live Only (Serviceability)			
$\delta = \delta_m$	2.78≤ L/333	2.78 mm	OK

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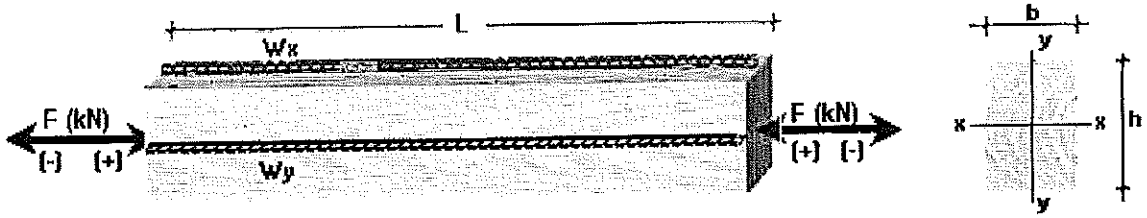
Axial Load With Moment Design to BS 5268 : Part 2
Member 2 (N.1-N.3) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	D = 150 Solid circular section in Strength Class C16
Section Properties (cm²,cm³,cm)	Area 176.7, Zx 331.3, Zy 331.3, rx 3.75, ry 3.75
Specification	3 : External uses fully exposed, Short Term loading
	Use minimum modulus
Integrated Design	Critical Case 2
Member Details	F = 17.763 kN, Lx = 0.76 m, Ly = 0.76 m, Lex = 1.0 Lx, Ley = 1.0 Ly
	Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx.adm} = K_2.K_3.K_6.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.18 x 1.08 x 1.00 x 5.30	8.10 N/mm²
$\sigma_{my.adm} = K_2.K_3.K_6.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.18 x 1.08 x 1.00 x 5.30	8.10 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_8.\sigma_c$	0.60 x 1.50 x 1.00 x 6.80	6.12 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.K_9.E_{min}$	0.80 x 1.00 x 5800	4640 N/mm²

Compression Resistance

λ = Max(Lex/rx, Ley/ry)	Max(76/3.750, 76/3.750)≤ 180	20.3	OK
$K_{12} = fn(\lambda, K_3.\sigma_c, E)$	20.27, 6.12, 4640	0.901	
$\sigma_{c.adm} = K_{12}.\sigma_{c.adm}$	0.901 x 6.12	5.52 N/mm²	
$\sigma_{c.a} = F/Area$	17.763 / 176.7≤ 5.52	1.01 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.000		
$\sigma_c/\sigma_{c.adm}$	1.01/5.52	0.182	OK

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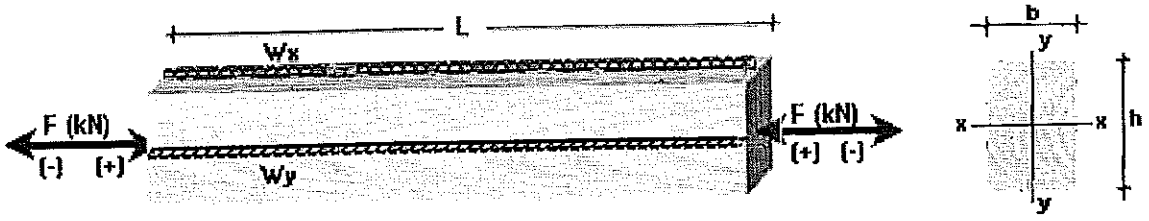
Axial Load With Moment Design to BS 5268 : Part 2
Member 3 (N.2-N.4) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	D = 150 Solid circular section in Strength Class C16
Section Properties (cm²,cm³,cm)	Area 176.7, Zx 331.3, Zy 331.3, rx 3.75, ry 3.75
Specification	3 : External uses fully exposed, Short Term loading
	Use minimum modulus
Integrated Design	Critical Case 2
Member Details	F = 20.456 kN, Lx = 0.76 m, Ly = 0.76 m, Lex = 1.0 Lx, Ley = 1.0 Ly
	Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx.adm} = K_2.K_3.K_6.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.18 x 1.08 x 1.00 x 5.30	8.10 N/mm²
$\sigma_{my.adm} = K_2.K_3.K_6.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.18 x 1.08 x 1.00 x 5.30	8.10 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_8.\sigma_c$	0.60 x 1.50 x 1.00 x 6.80	6.12 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.K_9.E_{min}$	0.80 x 1.00 x 5800	4640 N/mm²

Compression Resistance

λ = Max(Lex/rx, Ley/ry)	Max(76/3.750, 76/3.750)≤ 180	20.3	OK
K_{12} = fn(λ , $K_3.\sigma_c$, E)	20.27, 6.12, 4640	0.901	
$\sigma_{c,adm} = K_{12}.\sigma_{c.adm}$	0.901 x 6.12	5.52 N/mm²	
$\sigma_{c.a}$ = F/Area	20.456 / 176.7≤ 5.52	1.16 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.000		
$\sigma_c/\sigma_{c.adm}$	1.16/5.52	0.210	OK

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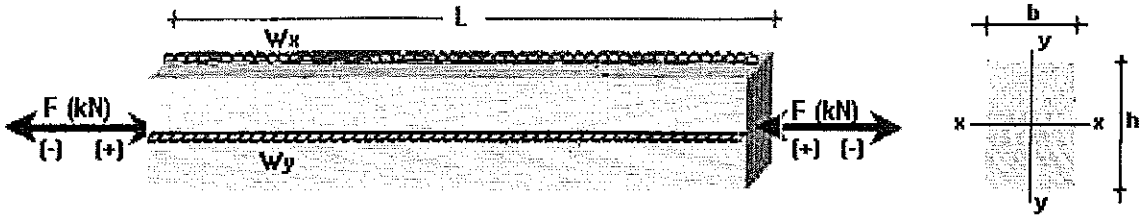
Axial Load With Moment Design to BS 5268 : Part 2
Member 4 (N.2-N.3) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	b = 63, h 150 Basic Section in Strength Class C16
Section Properties (cm²,cm³,cm)	Area 94.5, Zx 236.3, Zy 99.2, rx 4.33, ry 1.82
Specification	3 : External uses fully exposed, Short Term loading Use minimum modulus
Integrated Design	Critical Case 2
Member Details	F = -1.655 kN, Lx = 2.093 m, Ly = 2.093 m, Lex = 1.0 Lx, Ley = 1.0 Ly Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx.adm} = K_2.K_3.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.08 x 1.00 x 5.30	6.86 N/mm²
$\sigma_{my.adm} = K_2.K_3.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.17 x 1.00 x 5.30	7.44 N/mm²
$\sigma_{t.adm} = K_2.K_3.K_8.K_{14}.\sigma_t$	0.80 x 1.50 x 1.00 x 1.08 x 3.20	4.14 N/mm²
$\sigma_{c.adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²
$E = K_2.K_9.E_{min}$	0.80 x 1.00 x 5800	4640 N/mm²

Tensile Resistance

$\sigma_{t.a} = F/Area$	1.655 / 94.5 ≤ 4.14	0.18 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.000		
$\sigma_t/\sigma_{t.adm}$	0.18/4.14	0.042	OK

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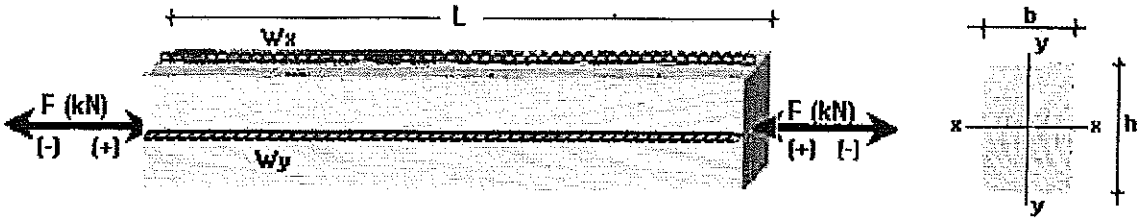
Axial Load With Moment Design to BS 5268 : Part 2
Member 5 (N.1-N.4) @ Level 1



Summary Design Data

Design Cases Covered	1.0 L1
Deflection Cases Covered	1.0 L1
Section Size	b = 63, h 147 Regularized Section in Strength Class C16
Section Properties (cm²,cm³,cm)	Area 92.6, Zx 226.9, Zy 97.2, rx 4.24, ry 1.82
Specification	3 : External uses fully exposed, Short Term loading Use minimum modulus
Integrated Design	Critical Case 2
Member Details	F = 5.763 kN, Lx = 2.093 m, Ly = 2.093 m, Lex = 1.0 Lx, Ley = 1.0 Ly Bearing length B 75, Distance to Bearing 150 mm

Grade and Admissible Stresses (Strength Class C16)

$\sigma_{mx,adm} = K_2.K_3.K_{7x}.K_8.\sigma_m$	0.80 x 1.50 x 1.08 x 1.00 x 5.30	6.88 N/mm²	
$\sigma_{my,adm} = K_2.K_3.K_{7y}.K_8.\sigma_m$	0.80 x 1.50 x 1.17 x 1.00 x 5.30	7.44 N/mm²	
$\sigma_{o,adm} = K_2.K_3.K_8.\sigma_o$	0.60 x 1.50 x 1.00 x 6.80	6.12 N/mm²	
$\sigma_{c,adm} = K_2.K_3.K_4.K_8.\sigma_c$	0.60 x 1.50 x 1.14 x 1.00 x 1.70	1.74 N/mm²	
$\tau_{adm} = K_2.K_3.K_8.\tau$	0.90 x 1.50 x 1.00 x 0.67	0.90 N/mm²	
$E = K_2.K_9.E_{min}$	0.80 x 1.00 x 5800	4640 N/mm²	

Compression Resistance

λ = Max(Lex/rx, Ley/ry)	Max(209/4.244, 209/1.819)≤ 180	115.1	OK
$K_{12} = fn(\lambda, K_3.\sigma_c, E)$	115.09, 6.12, 4640	0.289	
$\sigma_{c,adm} = K_{12}.\sigma_{c,adm}$	0.289 x 6.12	1.77 N/mm²	
$\sigma_{c,a}$ = F/Area	5.763 / 92.6≤ 1.77	0.62 N/mm²	OK

Axial Load with Moments Check

Critical Design Location	X = 0.000		
$\sigma_o/\sigma_{o,adm}$	0.62/1.77	0.352	OK

CHECK LONGITUDINAL BRACING BOLTS.

F_v = 5.763 kN.

MEMBER SIZE 63 x 147 C16 TIMBER

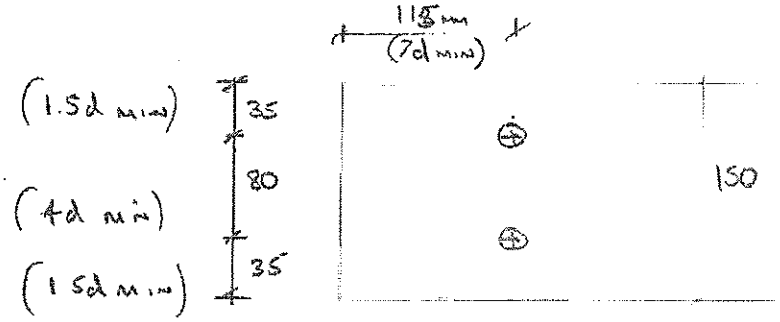
$F_{adm} = f \times K_{56} \times K_{57}$ clause 6.5.6

TRY 2 No M16

f = 4.24 TABLE 70 SHORT TERM THROUGH 60mm
K_{56} = 0.70 SERVICE CLASS 3
K_{57} = 1.00

M16 - F_{adm} = 4.24 x 0.7 x 1 = 2.968

∴ 2 No M16 = 2.968 x 2 = 5.936 kN > 5.763 kN ∴ OK!



PROVIDE 2 No M16 BOLTS.

R. G. PARKINS & PARTNERS LTD
CONSULTING CIVIL & STRUCTURAL ENGINEERS
☑ KENDAL Meadowside Shap Road
☐ LANCASTER 97 King Street

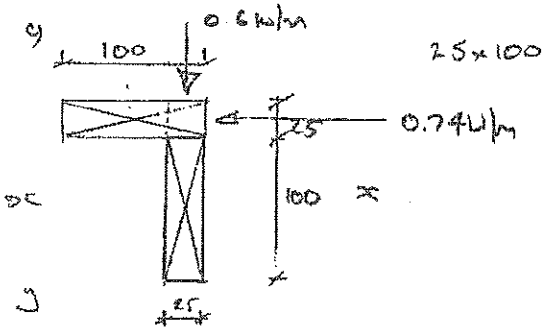
CALCULATION

JOB no	K32719	PAGE	BW 19
DRG no		DATE	JAN '16
REVIS		INITIAL	SR
CHECKED			

JOB SAFARI ZOO
DALTON-IN-FURNESS

TITLE
BEAR WALKWAY

CHECK HANDRAILS



BEND. MO MOMENTS

$$x\text{-}x = \frac{0.6 \times 1.95^2}{8} = 0.28\ kNm$$

$$y\text{-}y = \frac{0.74 \times 1.95^2}{8} = 0.35\ kNm$$

$$Z_{xx} = \frac{25 \times 125^2}{6} = 65104.167\ cm^3 \qquad I_{xx} = \frac{25 \times 125^3}{12} = 4069010.417\ cm^4$$

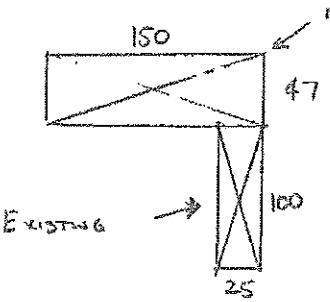
$$Z_{y\text{-}y} = \frac{25 \times 100^2}{6} = 41666.667\ cm^3 \qquad I_{yy} = \frac{125 \times 100^3}{12} = 2083333.3\ cm^4$$

$$\sigma_{adm\ 11} = 4.1\ (C14) \times 0.8\ k_7 \times 1.5\ k_3 \times 1.1\ k_7 = 5.4\ N/mm^2$$

$$\sigma_{a,11\,xx} = \frac{0.28 \times 10^6}{65104.167} = 4.3 \qquad \sigma_{a,11\,yy} = \frac{0.35 \times 10^6}{41666.667} = 8.4$$

$$\text{UNITY} = \frac{\sigma_{a,11,xx}}{\sigma_{adm,11}} + \frac{\sigma_{a,11\,y\text{-}y}}{\sigma_{adm\ 11}} = \frac{4.3}{5.4} + \frac{8.4}{5.4} = 2.35 \therefore \text{FAIL !!}$$

Try



$$\sigma_{a,11\,xx} = \frac{0.28 \times 10^6 \times 6}{25 \times 147^2} = 3.1\ N/mm^2$$

$$\sigma_{a,11\,yy} = \frac{0.35 \times 10^6 \times 6}{47 \times 150^2} = 1.99\ N/mm^2$$

$$\text{UNITY} = \frac{\sigma_{a,11\,xx}}{\sigma_{adm\ 11}} + \frac{\sigma_{a,11\,yy}}{\sigma_{adm\ 11}} = \frac{3.1}{5.4} + \frac{1.99}{5.4} = 0.94 < 1 \therefore \text{Ok!}$$

R. G. PARKINS & PARTNERS LTD CONSULTING CIVIL & STRUCTURAL ENGINEERS	CALCULATION	JOB no	K32719	PAGE	8 of 20
☑ KENDAL Meadowside Shap Road	JOB SARAH 200 DALTON-IN-FURNESS	DRG no		DATE	Jan '16
☐ LANCASTER 97 King Street		REVIS		INITIAL	SR
	TITLE BEAR WALKWAY	CHECKED			

HANDRAIL CHK,

DEFLECTIONS

$$x\text{-}x = \frac{5}{384} \times \frac{0.6 \times 1950^4 \times 12}{4600 \times 25 \times 147^3 \times 0.8} = 4.6\text{mm}$$

$$y\text{-}y = \frac{5}{384} \times \frac{0.74 \times 1950^4 \times 12}{4600 \times 47 \times 150^3 \times 0.8} = 2.86\text{mm}$$

$$d_{res} = \sqrt{4.6^2 + 2.86^2} = 5.4\text{mm}$$

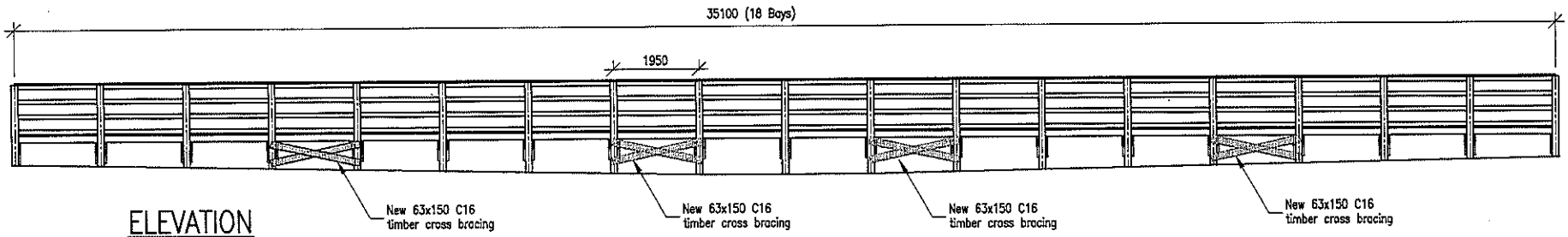
LIMITING DEFLECTION = 1950×0.003 = 5.85mm ∴ OK!

∴ REPLACE EXISTING TOP HANDRAIL AND REPLACE WITH 47 x 150 C14 TIMBER.

APPENDIX D

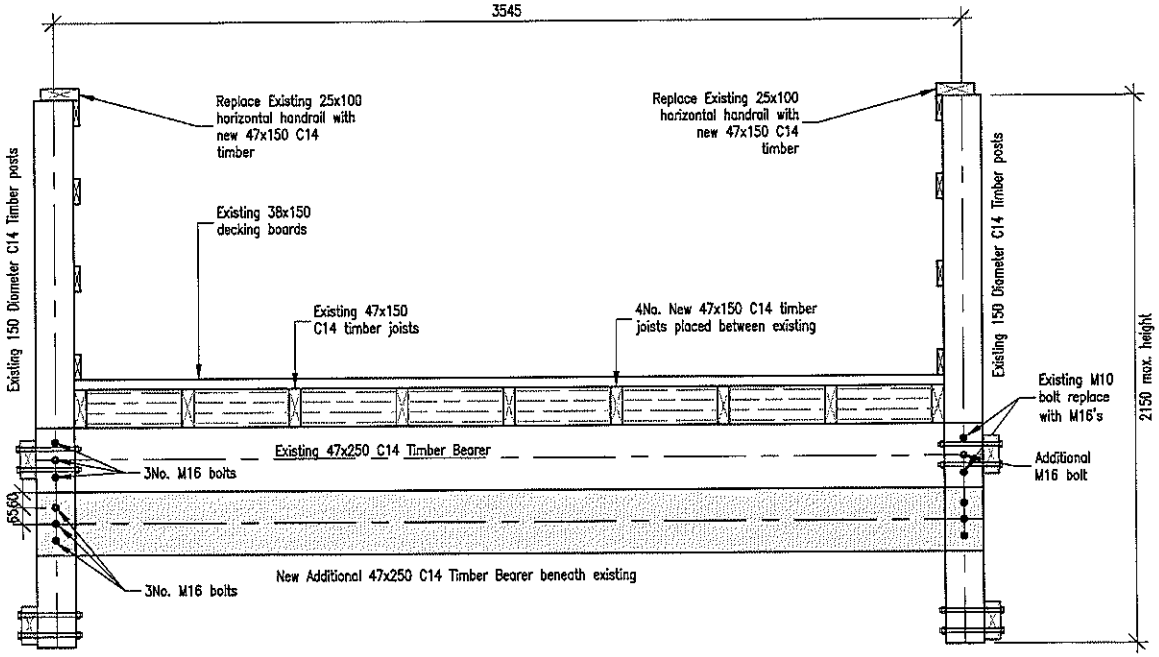
DRAWINGS
RG PARKINS & PARTNERS LTD
REMEDIAL WORKS

DO NOT SCALE – IF IN DOUBT ASK
USE FIGURED DIMENSIONS ONLY

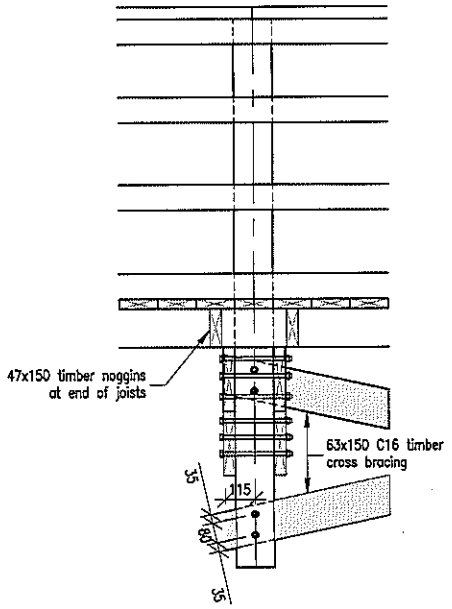


ELEVATION
SCALE 1:100

NOTE: All timbers must be structurally stress graded in accordance with BS EN 338 and should be preservative treated to achieve minimum use class 3.2 (UC3.2) in accordance with BS EN 335.



SECTION A–A
SCALE 1:20



SECTION B–B
SCALE 1:20

Revisions	Date	Initial	Suffix

Client:
SAFARI ZOO
DALTON–IN–FURNESS

Project:
WORLDWIDE SAFARI
BEAR WALKWAY
STRENGTHENING

Drawing Title:
SECTION AND ELEVATION

Drawn by: SR	Checked by: AR
Scale: 1:20 1:100	Date: 07/01/16

Drawing Number:
K32719/A3/SK1 A

Issue Purpose:
CONSTRUCTION

R. G. PARKINS & PARTNERS LTD
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Lancaster
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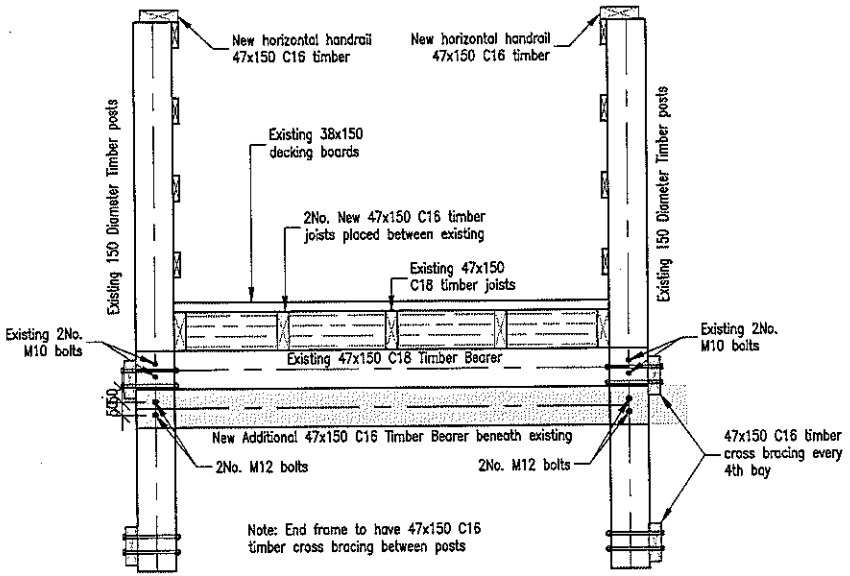
Tel: 01524 32545
Fax: 01524 843998
Email: office@rgparkinslancaster.co.uk

DO NOT SCALE – IF IN DOUBT ASK
USE FIGURED DIMENSIONS ONLY

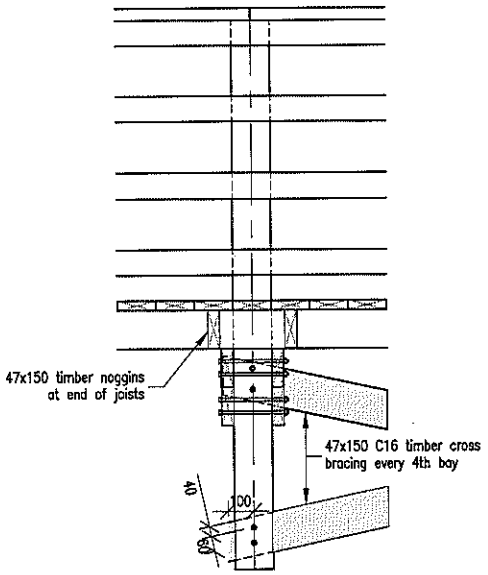
B

NOTE: All timbers must be structurally stress graded in accordance with BS EN 338 and should be preservative treated to achieve minimum use class 3.2 (UC3.2) in accordance with BS EN 335.



B

TYPICAL SECTION
SCALE 1:20



SECTION B–B
SCALE 1:20

Revisions	Date	Initial	Suffix

Client:
SAFARI ZOO
DALTON–IN–FURNESS

Project:
CARNIVORE COUNTRY
SNOW LEOPARD WALKWAY
STRENGTHENING

Drawing Title:
SECTIONS AND DETAILS

Drawn by:	SR	Checked by:	AR
Scale:	1:20 1:100	Date:	07/01/16

Drawing Number:
K32719/A3/SK2

Issue Purpose:
CONSTRUCTION

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Fax: 01524 843696
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APPENDIX No. B

From: [redacted] on behalf of David Gill
To: Richard Garnett
Cc: [redacted]
Subject: Re: FW: Zoo Direction Orders
Date: 19 January 2016 18:20:36

Dear Mr Garnett
This issue was fully delegated to Karen Brewer on receipt of the Direction Order. I have been out of the UK for long periods since that time and am not back in the UK until 24th January.

As I am still the licence holder at this time I am aware of your e mails addressed to me.
However I have not seen a report or instructed any action based on a report .

I can tell you that before any report was received I had already made a long term business decision to remove all the walkways except 2..

This decision was based on the assumption of the inevitable aging of all of the walkways and the potential need for constant maintence and eventual replacement of individual wood elements as need arose.
The economic argument based on the fact we have no funds available to re build the walkways in steel in the short or long term led me to a purely long term financial decision that required a removal of ALL walkways and platforms with immediate effect from your direction Order..

However as we had just opened one walkway in July and the wolf one was essential for viewing I decided to take a proactive approach and have these fully appraised and take whatever remedial action is needed to retain them for the long term.

All the walkways and platforms except the two mentioned above. have been closed for a while now and most are already demolished.

I hope you will work with Karen and the team to ensure the two walkways the zoo intends to use for public are passed as appropriate and reopened when the work suggested is complete.

yiurs sincerely

David S Gill

Dear Mr Gill

As you are aware the Direction Order dated 18th December 2015 in respect of the timber walkways at the Safari Zoo is now effective. This means that from today (19th January 2016) all the timber walkways must be closed until such

time as the Council is in receipt of the required report AND the Direction Order is revoked by the Council. I will inspect the Zoo at 10am on 20th January to ensure that this has been achieved.

I must inform you that the report must cover all the timber walkways as they existed when the Condition was attached to your licence dated 11th September 2015.

To avoid further action the full report must be received by 16th February 2016.

Once in receipt of the report I am very happy to meet with you to discuss an appropriate schedule for repair or replacement prior to consideration by Licensing Regulatory Committee. Please be aware that if any walkways are deemed to be dangerous the Council may take action under the Health and Safety at Work etc. Act 1974 to ensure that they remain closed until the necessary works are completed.

Richard Garnett

Principal Environmental Health Officer

[redacted]

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