Seabed Minerals Authority
Runanga Takere Moana
COOK ISLANDS

EXPLORATION LICENCE

Licence Contents

Note each section in this compendium has its own table of contents.

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Exploration Licence

Seabed Minerals Authority
Runanga Takere Moana
COOK ISLANDS

Licence number— EL1

1. Introduction

This is a Licence granted by the responsible Minister on behalf of the Crown authorising the Licence Holder to carry out exploration activities for which a Licence is required under Part 4 of the Act.

1.1 Licence number

The licence number for this Licence is **EL1**

1.2 Licence Holder

The Licence Holder is the company set out below:

Company name	CIC Ltd
Company registration number	C3864
Registered address	PO Box 429, Avarua, Rarotonga
E-mail address	shiprexx@gmail.com
Designated representative	Greg P Stemm
Position within company	Managing Director

1.3 Licence Term

Version	EL1
Licence start date	23 February 2022
Licence end date	23 February 2027
Date of original issue	23 February 2022
Date of variation issue	

1.4 Licence validity

(a) This version of this Licence is valid from this Licence's start date until this Licence's end date.

(b) This version of this Licence supersedes any earlier version of this Licence.

1.5 Licence Holder rights

During the term of this Licence, the Licence Holder, subject to the Act and the Regulations, has the exclusive right to:

(a) conduct exploration over the Licensed Area;

(b) apply for successive renewals of the Licence;

(c) request a retention in respect of specified blocks; and

(d) apply for a mining licence over the Licensed Area.

1.6 Specified seabed minerals covered by this Licence

This Licence authorises exploration for polymetallic nodules in the Licensed Area.

2. General

2.1 Interpretation

(a) In this Licence, terms are as defined in section 6 of the Act and the Regulations and—

Act means the Seabed Minerals Act 2019.

Annexures means the documents listed at clause 12 of this Licence.

Application means the application submitted to and approved by the Authority on 8 February 2022 and/or as varied with the Authority's approval in writing.

Approved Work Plan means the summary work plan annexed to this Licence. If any inconsistency arises between the terms of the Licence Holder's Application and its Approved Work Plan, the terms of the Licence Holder's Application prevail.

Licence means this Licence.

Licensed Activities means the exploration activities and associated regulated activities set out in the Annexures to this Licence and the terms of the Licence Holder's Application. If any inconsistency arises between the terms of the Licence Holder's Application and the Annexures to this Licence, the terms of the Licence Holder's Application prevail.

Licensed Area means the area allocated to the Licence Holder under this Licence, i.e., the area defined by the coordinates listed in Annexure 1 to this Licence but excluding all Relinquished Areas.

Licence Holder means the company named in clause 1.2 above to whom this Licence is granted.

Regulations means the Seabed Minerals (Exploration) Regulations 2020.

Relinquished Areas means all areas relinquished in accordance with the schedule set out in Annexure 7 to this Licence.

(b) All geographical co-ordinates in this Licence are in WGS84 format (latitude and longitude degrees and minutes to three decimal places) unless stated otherwise.

3. Authority contact

Except where otherwise indicated, the Authority's address for email and postal correspondence and the serving of notices under the Act and the Regulations is:

Attention— Seabed Minerals Commissioner

The Cook Islands Seabed Minerals Authority

Avarua, Rarotonga, Cook Islands PO Box 733

Tel— (+682) 29 193

Email— sbma@cookislands.gov.ck

4. Licensed Activities

4.1 Licensed Activities authorised

The Licensed Activities under this Licence must be carried out in accordance with this Licence, and only in the Licensed Area.

5. General Licence conditions

5.1 General duties and responsibilities of Licence Holders

(a) The general duties of Licence Holders set out in Schedule 2 of the Act are incorporated by reference in this Licence.

(b) The Licence Holder, its employees and agents, and its affiliates and associates must comply with:

(i) the Act, Regulations and all applicable laws of the Cook Islands;

(ii) the terms and conditions of this Licence, including all Annexures;

(iii) all standards the Authority has issued or issues during the term of this Licence;

(iv) the Licence Holder's Application in all respects.

(c) With respect to all of the Licence Holder's obligations in paragraphs (a) and (b) above, the Licence Holder is responsible for:

(i) all of its affiliates' and associates' compliance with their obligations; and

(ii) all acts and/or omissions of its affiliates and associates.

(d) The Licence Holder is not discharged from any obligation arising under this Licence by contracting a third party to perform the relevant obligation.

5.2 Commencement of activities

Unless a variation is applied for and agreed in writing with the Authority, the Licence Holder must:

(a) commence exploration in accordance with the time schedule stipulated in the Approved Work Plan annexed to this Licence, and

(b) adhere to any time periods or modifications to time periods provided for by this Licence.

5.3 Implementation of Approved Work Plan

(a) The Licence Holder must continuously and actively conduct exploration in accordance with the Approved Work Plan, the Licence Holder's Application and good industry practice.

(b) The Licence Holder must also comply with the following documents annexed to this Licence:

(i) the incident response and management plan;

(ii) the occupational health and safety plan;

(iii) the environmental management programme; and

(iv) the local engagement, training and business development plan.

5.4 Expenditure commitments

In carrying out the Approved Work Plan and its activities, the Licence Holder must, in each Licence year, spend at least the amount specified in the Approved Work Plan in actual and direct exploration spending, unless otherwise approved by the Authority.

5.5 Notification of commencement

(a) The Licence Holder must notify the Authority before any Licensed Activities commence.

(b) The Authority must receive notice under paragraph (a) above at least twenty (20) days before any Licensed Activities commence.

5.6 Security deposit or financial guarantee

(a) The Authority may require the Licence Holder to lodge a security deposit or financial guarantee at any time during the term of this Licence.

(b) The form, amount, subject-matter, timing of lodgement, terms of release, and other conditions of the security deposit or financial guarantee will be recorded in a separate document as appropriate but will form a specific condition of this Licence.

(c) Where applicable, no Licensed Activities may commence or continue unless the Licence Holder has provided any security deposit or financial guarantee required in accordance with this Licence, the Act and the Regulations.

(d) The Licence Holder must notify the Authority as soon as practicable of any material change in the Licence Holder's financial capacity as submitted in its Application.

5.7 Vessels

(a) The Licence Holder must notify the Authority in writing of any vessel being used to carry out any Licensed Activities under this Licence on behalf of the Licence Holder.

(b) The Authority must receive notice under paragraph (a) above at least twenty (20) days before each cruise commences. Notification must include:

(i) the master's name;

(ii) vessel type;

(iii) vessel IMO number;

(iv) vessel flag;

(v) vessel owner or operating company;

(vi) dates of entry and departure from Cook Island's jurisdiction;

(vii) any scheduled port of call; and

(viii) details of all persons aboard.

(c) The Licence Holder must ensure that a copy of this Licence and any subsequent revision or amendment is read and understood by the master of any vessel being used to carry out any Licensed Activities and that a copy of this Licence is held on board any such vessel.

5.8 Notification of material matters

(a) The Licence Holder must notify the Authority if the Licence Holder becomes aware of any new information or change in circumstances which materially affects or is likely to materially affect:

(i) the basis for granting this Licence;

(ii) the viability and appropriateness of the Approved Work Plan; and/or

(iii) the Licence Holder's ability to comply with the obligations under this Licence.

(b) Further to paragraph (a) above, the Licence Holder must notify the Authority at the earliest opportunity, and within no more than five (5) days of becoming aware of the relevant information or circumstance. Failure to do so may lead to enforcement action, including cancellation or suspension of this Licence.

5.9 Samples: licence quantities

(a) This Licence authorises the removal of material from the seabed or subsoil in the Licensed Area but only in such quantity as is reasonably necessary for the exclusive purpose of sampling, assaying, and analysis of the specified seabed mineral as provided for in the Approved Work Plan or as stipulated in this Licence's conditions.

(b) The Licence Holder must not sell and must ensure that no person with whom it has any connection, sells or attempts to sell, any material that was removed from the seabed or subsoil.

5.10 Project permit or consent under the Environment Act 2003

This Licence, and the conduct of all Licensed Activities under it, is subject to the Licence Holder obtaining and complying with any environmental approval required and granted under the Environment Act 2003, including any condition attached to any environmental approval.

5.11 Surrender, cancellation or expiry of this Licence

Upon any surrender, cancellation or expiry of this Licence, all rights granted to the Licence Holder under this Licence cease, but the Licence Holder will remain subject to any continuing obligations arising out of this Licence at the date of surrender, cancellation or expiry.

5.12 Review of Approved Work Plan

Subject to the Act and Regulations, within six (6) months of the Licence Holder's submission of its annual report to the Authority, the Authority and the Licence Holder, will undertake a joint review of the:

(a) Approved Work Plan;

(b) the Licensed Activities conducted under the Approved Work Plan; and

(c) this Licence's conditions.

6. Specific Licence conditions

This clause sets out conditions specific to the Licence Holder and the project.

(a) Within six (6) months of the date this Licence is issued, the Licence Holder must provide to the Authority's satisfaction, confirmation of its committed financial resources to:

(i) undertake the first two (2) years of its Approved Work Plan properly and lawfully;

(ii) respond to any incident; and

(iii) cover the costs of any potential liability arising from accidents, pollution, or serious harm.

(b) In satisfying itself about the Licence Holder's committed financial resources and that the Licence Holder meets the Act's qualification criteria regarding the same, the Authority may require completion of any additional due diligence checks it considers appropriate.

(c) The Licence Holder must ensure that it has appropriate and sufficient insurance for any expedition before the expedition's commencement and that the Licence Holder maintains its insurance throughout the expedition and afterwards as appropriate.

(d) The Licence Holder must comply with all arrangements set out in its Application.

(e) If there is any change or proposed change to the directors, management or control of the Licence Holder:

(i) the Licence Holder must notify, seek and obtain the Authority's approval in writing before any such change is made, insofar as it is practicable to do so;

(ii) if it is not practicable to notify, seek and obtain the Authority's approval in writing before any such change is made, the Licence Holder must notify the Authority as soon as practicable of the relevant change; and

(iii) the Authority may request any further information to determine whether the change affects the Licence Holder's compliance with the qualification criteria and/or evaluation criteria.

(f) If there is any change or proposed change, direct or indirect, to any of the Licence Holder's financing arrangements set out in the Application:

(i) The Licence Holder must notify, seek and obtain the Authority's approval in writing before any such change is made, insofar as it is practicable to do so;

(ii) if it is not practicable to notify, seek and obtain the Authority's approval in writing before any such change is made, the Licence Holder must notify the Authority as soon as practicable of the relevant change; and

(iii) the Authority may request any further information to determine whether the proposed change affects the Licence Holder's compliance with the qualification criteria and/or evaluation criteria.

(g) If there is any change or proposed change of any associate or affiliate who is carrying on Licensed Activities on behalf of the Licence Holder:

(i) the Licence Holder must notify, seek and obtain the Authority's approval in writing before any such change is made, insofar as it is practicable to do so;

(ii) if it is not practicable to notify, seek and obtain the Authority's approval in writing before any such change is made, the Licence Holder must notify the Authority as soon as practicable of the relevant change; and

(iii) the Authority may request any further information to determine whether the proposed change affects the Licence Holder's compliance with the qualification criteria and/or evaluation criteria.

(h) If there is any change or proposed change to the directors, management or control of any associate or affiliate who is carrying on Licensed Activities on behalf of the Licence Holder:

(i) The Licence Holder must notify, seek and obtain the Authority's approval in writing before any such change is made, insofar as it is practicable to do so;

(ii) if it is not practicable to notify, seek and obtain the Authority's approval in writing before any such change is made, the Licence Holder must notify the Authority as soon as practicable of the relevant change; and

(iii) the Authority may request any further information to determine whether the proposed change affects the Licence Holder's compliance with the qualification criteria and/or evaluation criteria.

(i) None of the above conditions in any way limit or negate the Licence Holder's requirement to satisfy all qualification criteria and evaluation criteria on a continuous basis throughout the term of this Licence and/or to comply with all requirements under the Act and Regulations.

7. Relinquishment conditions

(a) The Licence Holder will relinquish blocks in the Licensed Area according to section 78 of the Act and the terms and schedule of relinquishment annexed to this Licence.

(b) The schedule of relinquishment may be varied from time to time with the approval of the Authority. Any variation to the schedule of relinquishment must be annexed to this Licence.

8. Compliance and enforcement

(a) This Licence and its terms and conditions are issued under and subject at all times to the Act and the Regulations, as amended from time to time.

(b) Any breach of the Act, the Regulations and/or this Licence's terms and conditions may lead to enforcement action being taken by the Authority. This may include the issuing of written warnings or directions by the Authority under the Act, the variation, suspension or cancellation of this Licence under section 117 of the Act, the imposition of penalties, and/or criminal proceedings.

9. Force majeure

(a) If the Licence Holder or the Authority is prevented from complying with this Licence, in whole or in part, by an event or circumstance of force majeure, it must give written notice to the other as soon as practicable after its occurrence.

(b) Any notice issued further to paragraph (a) above must specify:

(i) the nature of the event or circumstance;

(ii) what is required to remedy the event or circumstance – if remedy is possible;

(iii) the estimated time to cure or overcome the event or circumstance; and

(iv) the obligation(s) that cannot be performed in a properly or timely manner due to the event or circumstance.

(c) If for any reason the party which receives a force majeure notice under paragraph (a) above disagrees with any aspect of the notice, the receiving party must notify the other party in writing within ten (10) days of receiving the notice.

(d) The Licence Holder and Authority must attempt to resolve any dispute about the occurrence of a force majeure event or circumstance by mutual agreement before either party commences Court proceedings.

(e) Apart from any payment of money due, the Licence Holder's performance of any obligation prevented by the force majeure event or circumstance is suspended during the continuance of any force majeure event or circumstance.

(f) The term of this Licence will be automatically extended for the period of the force majeure.

(g) If an obligation is suspended by reason of force majeure for more than one (1) year, the Licence Holder and the Authority will enter into good faith negotiations to vary the terms and conditions of this Licence to reflect the changed circumstances.

10. Governing language

This Licence is provided and executed in the English language only.

11. Governing law

The Cook Islands' laws govern this Licence. This Licence is to be construed in accordance with the laws of the Cook Islands in all respects.

12. Annexures to this Licence

(a) The Annexures to this Licence may be varied from time to time with the Authority's approval.

(b) The Annexures to this Licence are:

Annexure 1: coordinates and illustrative chart of the Licensed Area:

Annexure 2: the approved work plan reflecting the current five (5)-year programme of activities:

Annexure 3: the approved environmental management programme:

Annexure 4: the approved incident response and management plan:

Annexure 5: the approved occupational health and safety plan:

Annexure 6: the approved local engagement, training and business development plan:

Annexure 7: the approved terms and schedule of relinquishment

IN WITNESS WHEREOF the undersigned, being duly authorised thereto by the respective parties, have signed this Licence in two (2) originals, at Rarotonga, Cook Islands, on 23 February 2022.

FOR AND ON BEHALF OF THE CROWN	**FOR AND ON BEHALF OF CIC LIMITED**
_____	_____
Honourable Mark Brown Prime Minister, Minister for Seabed Minerals	**Shona Lynch** Country Manager, for and on behalf of **Greg Stemm** Managing Director and Chairman of the Board

Legend

- CBG
- 1° x 1° Blocks
- 50nm Island Buffer
- EEZ

CIC

N

B6 B7 B8 B9 B10
C6 C7 C8 C9 C10
D6 D7 D8 D9 D10 160w5s D11 159w5s
E6 E7 163w6s E8 162w6s E9 161w6s E10 160w6s E11 159w6s E12 158w6s
F2 168w7s F3 167w7s F4 166w7s F5 165w7s F6 164w7s F7 163w7s F8 162w7s F9 161w7s F10 160w7s F11 159w7s F12 158w7s F13 157w7s F14 156w7s
H1 169w8s H2 168w8s H3 167w8s H4 166w8s H5 165w8s H6 164w8s H7 163w8s H8 162w8s H9 161w8s H10 160w8s H11 159w8s H12 158w8s H13 157w8s H14 156w8s H15 155w8s
I1 169w9s I2 168w9s I3 167w9s I4 166w9s I5 165w9s I6 164w9s I7 163w9s I8 162w9s I11 159w9s I12 158w9s I13 157w9s I14 156w9s
J1 169w10s J2 168w10s J3 167w10s J4 166w10s J5 165w10s J6 164w10s J7 163w10s J8 162w10s J9 161w10s J10 160w10s J11 159w10s J12 158w10s J13 157w10s J14 156w10s
K1 169w11s K2 168w11s K3 167w11s K4 166w11s K5 165w11s K6 164w11s K7 163w11s K8 162w K9 K10 160w11s K11 159w11s K12 158w11s K13 157w11s K14 156w11s
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N4 166w14s N5 165w14s N6 164w14s N7 163w14s N8 162w14s N9 161w14s N10 160w14s N11 159w14s
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Y10 160w25s Y11 159w25s Y12 158w25s Y13 157w25s

CBG 9
CBG 6
CBG 7
CBG 5
CBG 8
CBG 3
CBG 4
CBG 10
CBG 2
CBG 1

1:6,000,000

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

0 75 150 300 450 600 Km

Date Saved: 11/8/2020

Legend

CBG

1° x 1° Blocks

50nm Island Buffer

EEZ

CIC

N

B6 B7 B8 B9 B10

C6 C7 C8 C9 C10

D6 D7 D8 D9 D10 160w5s D11 159w5s

E6 E7 163w6s E8 162w6s E9 161w6s E10 160w6s E11 159w6s E12 158w6s

F2 168w7s F3 167w7s F4 166w7s F5 165w7s F6 164w7s F7 163w7s F8 162w7s F9 161w7s F10 160w7s F11 159w7s F12 158w7s F13 157w7s F14 156w7s

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O4 166w15s O5 165w15s O6 164w15s O7 163w15s O8 162w15s O9 161w15s O10 160w15s O11 159w15s

P3 167w16s P4 166w16s P5 165w16s P6 164w16s P7 163w16s P8 162w16s P9 161w16s P10 160w16s P11 159w16s P12 158w16s

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U4 166w21s U5 165w21s U6 164w21s U7 163w21s U8 162w21s U9 161w21s U10 160w21s U11 159w21s U12 158w21s U13 157w21s

V6 164w22s V7 163w22s V8 162w22s V9 161w22s V10 160w22s V11 159w22s V12 158w22s V13 157w22s

W7 163w23s W8 162w23s W9 161w23s W10 160w23s W11 159w23s W12 158w23s W13 157w23s

X8 162w24s X9 161w24s X10 160w24s X11 159w24s X12 158w24s X13 157w24s

Y10 160w25s Y11 159w25s Y12 158w25s Y13 157w25s

1:6,000,000

Coordinate System: GCS WGS 1984

Datum: WGS 1984

Units: Degree

0 75 150 300 450 600

Km

Date Saved: 11/8/2020

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
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024S160W-73	CBG01	160.00 W 24.35 S	77.9	-24.5417	-159.9580
024S160W-74	CBG01	159.55 W 24.35 S	77.9	-24.5417	-159.8750
024S160W-75	CBG01	159.50 W 24.35 S	77.9	-24.5417	-159.7920
024S160W-76	CBG01	159.45 W 24.35 S	77.9	-24.5417	-159.7080
024S160W-77	CBG01	159.40 W 24.35 S	77.9	-24.5417	-159.6250
024S161W-67	CBG01	160.30 W 24.30 S	78.0	-24.4583	-160.4580
024S161W-68	CBG01	160.25 W 24.30 S	78.0	-24.4583	-160.3750
024S161W-69	CBG01	160.20 W 24.30 S	78.0	-24.4583	-160.2920
024S161W-70	CBG01	160.15 W 24.30 S	78.0	-24.4583	-160.2080
024S161W-71	CBG01	160.10 W 24.30 S	78.0	-24.4583	-160.1250
024S161W-72	CBG01	160.05 W 24.30 S	78.0	-24.4583	-160.0420
024S160W-61	CBG01	160.00 W 24.30 S	78.0	-24.4583	-159.9580
024S160W-62	CBG01	159.55 W 24.30 S	78.0	-24.4583	-159.8750
024S160W-63	CBG01	159.50 W 24.30 S	78.0	-24.4583	-159.7920
024S160W-64	CBG01	159.45 W 24.30 S	78.0	-24.4583	-159.7080
024S160W-65	CBG01	159.40 W 24.30 S	78.0	-24.4583	-159.6250
024S161W-55	CBG01	160.30 W 24.25 S	78.0	-24.3750	-160.4580
024S161W-56	CBG01	160.25 W 24.25 S	78.0	-24.3750	-160.3750
024S161W-57	CBG01	160.20 W 24.25 S	78.0	-24.3750	-160.2920
024S161W-58	CBG01	160.15 W 24.25 S	78.0	-24.3750	-160.2080
024S161W-59	CBG01	160.10 W 24.25 S	78.0	-24.3750	-160.1250
024S161W-60	CBG01	160.05 W 24.25 S	78.0	-24.3750	-160.0420
024S160W-49	CBG01	160.00 W 24.25 S	78.0	-24.3750	-159.9580
024S160W-50	CBG01	159.55 W 24.25 S	78.0	-24.3750	-159.8750
024S160W-51	CBG01	159.50 W 24.25 S	78.0	-24.3750	-159.7920
024S160W-52	CBG01	159.45 W 24.25 S	78.0	-24.3750	-159.7080
024S160W-53	CBG01	159.40 W 24.25 S	78.0	-24.3750	-159.6250
024S161W-43	CBG01	160.30 W 24.20 S	78.1	-24.2917	-160.4580
024S161W-44	CBG01	160.25 W 24.20 S	78.1	-24.2917	-160.3750
024S161W-45	CBG01	160.20 W 24.20 S	78.1	-24.2917	-160.2920
024S161W-46	CBG01	160.15 W 24.20 S	78.1	-24.2917	-160.2080
024S161W-47	CBG01	160.10 W 24.20 S	78.1	-24.2917	-160.1250
024S161W-48	CBG01	160.05 W 24.20 S	78.1	-24.2917	-160.0420
024S160W-37	CBG01	160.00 W 24.20 S	78.1	-24.2917	-159.9580
024S160W-38	CBG01	159.55 W 24.20 S	78.1	-24.2917	-159.8750
024S160W-39	CBG01	159.50 W 24.20 S	78.1	-24.2917	-159.7920
024S160W-40	CBG01	159.45 W 24.20 S	78.1	-24.2917	-159.7080
024S160W-41	CBG01	159.40 W 24.20 S	78.1	-24.2917	-159.6250
024S161W-31	CBG01	160.30 W 24.15 S	78.1	-24.2083	-160.4580
024S161W-32	CBG01	160.25 W 24.15 S	78.1	-24.2083	-160.3750
024S161W-33	CBG01	160.20 W 24.15 S	78.1	-24.2083	-160.2920
024S161W-34	CBG01	160.15 W 24.15 S	78.1	-24.2083	-160.2080
024S161W-35	CBG01	160.10 W 24.15 S	78.1	-24.2083	-160.1250
024S161W-36	CBG01	160.05 W 24.15 S	78.1	-24.2083	-160.0420
024S160W-25	CBG01	160.00 W 24.15 S	78.1	-24.2083	-159.9580
024S160W-26	CBG01	159.55 W 24.15 S	78.1	-24.2083	-159.8750
024S160W-27	CBG01	159.50 W 24.15 S	78.1	-24.2083	-159.7920
024S160W-28	CBG01	159.45 W 24.15 S	78.1	-24.2083	-159.7080
024S160W-29	CBG01	159.40 W 24.15 S	78.1	-24.2083	-159.6250
024S161W-19	CBG01	160.30 W 24.10 S	78.2	-24.1250	-160.4580
024S161W-20	CBG01	160.25 W 24.10 S	78.2	-24.1250	-160.3750
024S161W-21	CBG01	160.20 W 24.10 S	78.2	-24.1250	-160.2920
024S161W-22	CBG01	160.15 W 24.10 S	78.2	-24.1250	-160.2080
024S161W-23	CBG01	160.10 W 24.10 S	78.2	-24.1250	-160.1250
024S161W-24	CBG01	160.05 W 24.10 S	78.2	-24.1250	-160.0420
024S160W-13	CBG01	160.00 W 24.10 S	78.2	-24.1250	-159.9580
024S160W-14	CBG01	159.55 W 24.10 S	78.2	-24.1250	-159.8750
024S160W-15	CBG01	159.50 W 24.10 S	78.2	-24.1250	-159.7920
024S160W-16	CBG01	159.45 W 24.10 S	78.2	-24.1250	-159.7080
024S160W-17	CBG01	159.40 W 24.10 S	78.2	-24.1250	-159.6250
024S161W-7	CBG01	160.30 W 24.05 S	78.2	-24.0417	-160.4580
024S161W-8	CBG01	160.25 W 24.05 S	78.2	-24.0417	-160.3750
024S161W-9	CBG01	160.20 W 24.05 S	78.2	-24.0417	-160.2920
024S161W-10	CBG01	160.15 W 24.05 S	78.2	-24.0417	-160.2080
024S161W-11	CBG01	160.10 W 24.05 S	78.2	-24.0417	-160.1250
024S161W-12	CBG01	160.05 W 24.05 S	78.2	-24.0417	-160.0420
024S160W-1	CBG01	160.00 W 24.05 S	78.2	-24.0417	-159.9580
024S160W-2	CBG01	159.55 W 24.05 S	78.2	-24.0417	-159.8750
024S160W-3	CBG01	159.50 W 24.05 S	78.2	-24.0417	-159.7920
024S160W-4	CBG01	159.45 W 24.05 S	78.2	-24.0417	-159.7080
024S160W-5	CBG01	159.40 W 24.05 S	78.2	-24.0417	-159.6250
023S161W-139	CBG01	160.30 W 23.60 S	78.3	-23.9583	-160.4580
023S161W-140	CBG01	160.25 W 23.60 S	78.3	-23.9583	-160.3750
023S161W-141	CBG01	160.20 W 23.60 S	78.3	-23.9583	-160.2920
023S161W-142	CBG01	160.15 W 23.60 S	78.3	-23.9583	-160.2080
023S161W-143	CBG01	160.10 W 23.60 S	78.3	-23.9583	-160.1250
023S161W-144	CBG01	160.05 W 23.60 S	78.3	-23.9583	-160.0420
023S160W-133	CBG01	160.00 W 23.60 S	78.3	-23.9583	-159.9580
023S160W-134	CBG01	159.55 W 23.60 S	78.3	-23.9583	-159.8750
023S160W-135	CBG01	159.50 W 23.60 S	78.3	-23.9583	-159.7920
023S160W-136	CBG01	159.45 W 23.60 S	78.3	-23.9583	-159.7080
023S160W-137	CBG01	159.40 W 23.60 S	78.3	-23.9583	-159.6250
023S161W-127	CBG01	160.30 W 23.55 S	78.3	-23.8750	-160.4580
023S161W-128	CBG01	160.25 W 23.55 S	78.3	-23.8750	-160.3750
023S161W-129	CBG01	160.20 W 23.55 S	78.3	-23.8750	-160.2920
023S161W-130	CBG01	160.15 W 23.55 S	78.3	-23.8750	-160.2080
023S161W-131	CBG01	160.10 W 23.55 S	78.3	-23.8750	-160.1250
023S161W-132	CBG01	160.05 W 23.55 S	78.3	-23.8750	-160.0420
023S160W-121	CBG01	160.00 W 23.55 S	78.3	-23.8750	-159.9580
023S160W-122	CBG01	159.55 W 23.55 S	78.3	-23.8750	-159.8750
023S160W-123	CBG01	159.50 W 23.55 S	78.3	-23.8750	-159.7920
023S160W-124	CBG01	159.45 W 23.55 S	78.3	-23.8750	-159.7080
023S160W-125	CBG01	159.40 W 23.55 S	78.3	-23.8750	-159.6250
023S161W-115	CBG01	160.30 W 23.50 S	78.4	-23.7917	-160.4580
023S161W-116	CBG01	160.25 W 23.50 S	78.4	-23.7917	-160.3750
023S161W-117	CBG01	160.20 W 23.50 S	78.4	-23.7917	-160.2920
023S161W-118	CBG01	160.15 W 23.50 S	78.4	-23.7917	-160.2080
023S161W-119	CBG01	160.10 W 23.50 S	78.4	-23.7917	-160.1250
023S161W-120	CBG01	160.05 W 23.50 S	78.4	-23.7917	-160.0420
023S160W-109	CBG01	160.00 W 23.50 S	78.4	-23.7917	-159.9580
023S160W-110	CBG01	159.55 W 23.50 S	78.4	-23.7917	-159.8750
023S160W-111	CBG01	159.50 W 23.50 S	78.4	-23.7917	-159.7920
023S160W-112	CBG01	159.45 W 23.50 S	78.4	-23.7917	-159.7080
023S160W-113	CBG01	159.40 W 23.50 S	78.4	-23.7917	-159.6250
023S161W-103	CBG01	160.30 W 23.45 S	78.4	-23.7083	-160.4580
023S161W-104	CBG01	160.25 W 23.45 S	78.4	-23.7083	-160.3750
023S161W-105	CBG01	160.20 W 23.45 S	78.4	-23.7083	-160.2920
023S161W-106	CBG01	160.15 W 23.45 S	78.4	-23.7083	-160.2080
023S161W-107	CBG01	160.10 W 23.45 S	78.4	-23.7083	-160.1250
023S161W-108	CBG01	160.05 W 23.45 S	78.4	-23.7083	-160.0420
023S160W-97	CBG01	160.00 W 23.45 S	78.4	-23.7083	-159.9580
023S160W-98	CBG01	159.55 W 23.45 S	78.4	-23.7083	-159.8750
023S160W-99	CBG01	159.50 W 23.45 S	78.4	-23.7083	-159.7920
023S160W-100	CBG01	159.45 W 23.45 S	78.4	-23.7083	-159.7080
023S160W-101	CBG01	159.40 W 23.45 S	78.4	-23.7083	-159.6250
023S158W-56	CBG02	157.25 W 23.25 S	78.6	-23.3750	-157.3750
023S158W-57	CBG02	157.20 W 23.25 S	78.6	-23.3750	-157.2920
023S158W-58	CBG02	157.15 W 23.25 S	78.6	-23.3750	-157.2080
023S158W-59	CBG02	157.10 W 23.25 S	78.6	-23.3750	-157.1250
023S158W-60	CBG02	157.05 W 23.25 S	78.6	-23.3750	-157.0420
023S157W-49	CBG02	157.00 W 23.25 S	78.6	-23.3750	-156.9580
023S157W-50	CBG02	156.55 W 23.25 S	78.6	-23.3750	-156.8750
023S157W-51	CBG02	156.50 W 23.25 S	78.6	-23.3750	-156.7920
023S157W-52	CBG02	156.45 W 23.25 S	78.6	-23.3750	-156.7080
023S157W-53	CBG02	156.40 W 23.25 S	78.6	-23.3750	-156.6250
023S157W-54	CBG02	156.35 W 23.25 S	78.6	-23.3750	-156.5420
023S157W-55	CBG02	156.30 W 23.25 S	78.6	-23.3750	-156.4580
023S158W-44	CBG02	157.25 W 23.20 S	78.7	-23.2917	-157.3750
023S158W-45	CBG02	157.20 W 23.20 S	78.7	-23.2917	-157.2920
023S158W-46	CBG02	157.15 W 23.20 S	78.7	-23.2917	-157.2080
023S158W-47	CBG02	157.10 W 23.20 S	78.7	-23.2917	-157.1250
023S158W-48	CBG02	157.05 W 23.20 S	78.7	-23.2917	-157.0420
023S157W-37	CBG02	157.00 W 23.20 S	78.7	-23.2917	-156.9580
023S157W-38	CBG02	156.55 W 23.20 S	78.7	-23.2917	-156.8750
023S157W-39	CBG02	156.50 W 23.20 S	78.7	-23.2917	-156.7920
023S157W-40	CBG02	156.45 W 23.20 S	78.7	-23.2917	-156.7080
023S157W-41	CBG02	156.40 W 23.20 S	78.7	-23.2917	-156.6250
023S157W-42	CBG02	156.35 W 23.20 S	78.7	-23.2917	-156.5420
023S157W-43	CBG02	156.30 W 23.20 S	78.7	-23.2917	-156.4580
023S158W-32	CBG02	157.25 W 23.15 S	78.7	-23.2083	-157.3750
023S158W-33	CBG02	157.20 W 23.15 S	78.7	-23.2083	-157.2920
023S158W-34	CBG02	157.15 W 23.15 S	78.7	-23.2083	-157.2080
023S158W-35	CBG02	157.10 W 23.15 S	78.7	-23.2083	-157.1250
023S158W-36	CBG02	157.05 W 23.15 S	78.7	-23.2083	-157.0420
023S157W-25	CBG02	157.00 W 23.15 S	78.7	-23.2083	-156.9580
023S157W-26	CBG02	156.55 W 23.15 S	78.7	-23.2083	-156.8750
023S157W-27	CBG02	156.50 W 23.15 S	78.7	-23.2083	-156.7920
023S157W-28	CBG02	156.45 W 23.15 S	78.7	-23.2083	-156.7080
023S157W-29	CBG02	156.40 W 23.15 S	78.7	-23.2083	-156.6250
023S157W-30	CBG02	156.35 W 23.15 S	78.7	-23.2083	-156.5420
023S157W-31	CBG02	156.30 W 23.15 S	78.7	-23.2083	-156.4580
023S158W-20	CBG02	157.25 W 23.10 S	78.8	-23.1250	-157.3750
023S158W-21	CBG02	157.20 W 23.10 S	78.8	-23.1250	-157.2920
023S158W-22	CBG02	157.15 W 23.10 S	78.8	-23.1250	-157.2080
023S158W-23	CBG02	157.10 W 23.10 S	78.8	-23.1250	-157.1250
023S158W-24	CBG02	157.05 W 23.10 S	78.8	-23.1250	-157.0420
023S157W-13	CBG02	157.00 W 23.10 S	78.8	-23.1250	-156.9580
023S157W-14	CBG02	156.55 W 23.10 S	78.8	-23.1250	-156.8750
023S157W-15	CBG02	156.50 W 23.10 S	78.8	-23.1250	-156.7920
023S157W-16	CBG02	156.45 W 23.10 S	78.8	-23.1250	-156.7080
023S157W-17	CBG02	156.40 W 23.10 S	78.8	-23.1250	-156.6250
023S157W-18	CBG02	156.35 W 23.10 S	78.8	-23.1250	-156.5420
023S157W-19	CBG02	156.30 W 23.10 S	78.8	-23.1250	-156.4580
023S158W-8	CBG02	157.25 W 23.05 S	78.8	-23.0417	-157.3750
023S158W-9	CBG02	157.20 W 23.05 S	78.8	-23.0417	-157.2920
023S158W-10	CBG02	157.15 W 23.05 S	78.8	-23.0417	-157.2080
023S158W-11	CBG02	157.10 W 23.05 S	78.8	-23.0417	-157.1250
023S158W-12	CBG02	157.05 W 23.05 S	78.8	-23.0417	-157.0420
023S157W-1	CBG02	157.00 W 23.05 S	78.8	-23.0417	-156.9580
023S157W-2	CBG02	156.55 W 23.05 S	78.8	-23.0417	-156.8750
023S157W-3	CBG02	156.50 W 23.05 S	78.8	-23.0417	-156.7920
023S157W-4	CBG02	156.45 W 23.05 S	78.8	-23.0417	-156.7080
023S157W-5	CBG02	156.40 W 23.05 S	78.8	-23.0417	-156.6250
023S157W-6	CBG02	156.35 W 23.05 S	78.8	-23.0417	-156.5420
023S157W-7	CBG02	156.30 W 23.05 S	78.8	-23.0417	-156.4580
022S158W-140	CBG02	157.25 W 22.60 S	78.9	-22.9583	-157.3750
022S158W-141	CBG02	157.20 W 22.60 S	78.9	-22.9583	-157.2920
022S158W-142	CBG02	157.15 W 22.60 S	78.9	-22.9583	-157.2080
022S158W-143	CBG02	157.10 W 22.60 S	78.9	-22.9583	-157.1250
022S158W-144	CBG02	157.05 W 22.60 S	78.9	-22.9583	-157.0420
022S157W-133	CBG02	157.00 W 22.60 S	78.9	-22.9583	-156.9580
022S157W-134	CBG02	156.55 W 22.60 S	78.9	-22.9583	-156.8750
022S157W-135	CBG02	156.50 W 22.60 S	78.9	-22.9583	-156.7920
022S157W-136	CBG02	156.45 W 22.60 S	78.9	-22.9583	-156.7080
022S157W-137	CBG02	156.40 W 22.60 S	78.9	-22.9583	-156.6250
022S157W-138	CBG02	156.35 W 22.60 S	78.9	-22.9583	-156.5420
022S157W-139	CBG02	156.30 W 22.60 S	78.9	-22.9583	-156.4580
022S158W-128	CBG02	157.25 W 22.55 S	78.9	-22.8750	-157.3750
022S158W-129	CBG02	157.20 W 22.55 S	78.9	-22.8750	-157.2920
022S158W-130	CBG02	157.15 W 22.55 S	78.9	-22.8750	-157.2080
022S158W-131	CBG02	157.10 W 22.55 S	78.9	-22.8750	-157.1250
022S158W-132	CBG02	157.05 W 22.55 S	78.9	-22.8750	-157.0420
022S157W-121	CBG02	157.00 W 22.55 S	78.9	-22.8750	-156.9580
022S157W-122	CBG02	156.55 W 22.55 S	78.9	-22.8750	-156.8750
022S157W-123	CBG02	156.50 W 22.55 S	78.9	-22.8750	-156.7920
022S157W-124	CBG02	156.45 W 22.55 S	78.9	-22.8750	-156.7080
022S157W-125	CBG02	156.40 W 22.55 S	78.9	-22.8750	-156.6250
022S157W-126	CBG02	156.35 W 22.55 S	78.9	-22.8750	-156.5420
022S157W-127	CBG02	156.30 W 22.55 S	78.9	-22.8750	-156.4580
022S158W-116	CBG02	157.25 W 22.50 S	79.0	-22.7917	-157.3750
022S158W-117	CBG02	157.20 W 22.50 S	79.0	-22.7917	-157.2920
022S158W-118	CBG02	157.15 W 22.50 S	79.0	-22.7917	-157.2080
022S158W-119	CBG02	157.10 W 22.50 S	79.0	-22.7917	-157.1250
022S158W-120	CBG02	157.05 W 22.50 S	79.0	-22.7917	-157.0420
022S157W-109	CBG02	157.00 W 22.50 S	79.0	-22.7917	-156.9580
022S157W-110	CBG02	156.55 W 22.50 S	79.0	-22.7917	-156.8750
022S157W-111	CBG02	156.50 W 22.50 S	79.0	-22.7917	-156.7920
022S157W-112	CBG02	156.45 W 22.50 S	79.0	-22.7917	-156.7080
022S157W-113	CBG02	156.40 W 22.50 S	79.0	-22.7917	-156.6250
022S157W-114	CBG02	156.35 W 22.50 S	79.0	-22.7917	-156.5420
022S157W-115	CBG02	156.30 W 22.50 S	79.0	-22.7917	-156.4580
022S158W-105	CBG02	157.20 W 22.45 S	79.0	-22.7083	-157.2920
022S158W-106	CBG02	157.15 W 22.45 S	79.0	-22.7083	-157.2080
022S158W-107	CBG02	157.10 W 22.45 S	79.0	-22.7083	-157.1250
022S158W-108	CBG02	157.05 W 22.45 S	79.0	-22.7083	-157.0420
022S157W-97	CBG02	157.00 W 22.45 S	79.0	-22.7083	-156.9580
022S157W-98	CBG02	156.55 W 22.45 S	79.0	-22.7083	-156.8750
022S157W-99	CBG02	156.50 W 22.45 S	79.0	-22.7083	-156.7920
022S157W-100	CBG02	156.45 W 22.45 S	79.0	-22.7083	-156.7080
022S157W-101	CBG02	156.40 W 22.45 S	79.0	-22.7083	-156.6250
022S157W-102	CBG02	156.35 W 22.45 S	79.0	-22.7083	-156.5420
022S157W-103	CBG02	156.30 W 22.45 S	79.0	-22.7083	-156.4580
022S158W-94	CBG02	157.15 W 22.40 S	79.1	-22.6250	-157.2080
022S158W-95	CBG02	157.10 W 22.40 S	79.1	-22.6250	-157.1250
022S158W-96	CBG02	157.05 W 22.40 S	79.1	-22.6250	-157.0420
022S157W-85	CBG02	157.00 W 22.40 S	79.1	-22.6250	-156.9580
022S157W-86	CBG02	156.55 W 22.40 S	79.1	-22.6250	-156.8750
022S157W-87	CBG02	156.50 W 22.40 S	79.1	-22.6250	-156.7920
022S157W-88	CBG02	156.45 W 22.40 S	79.1	-22.6250	-156.7080
022S157W-89	CBG02	156.40 W 22.40 S	79.1	-22.6250	-156.6250
022S157W-90	CBG02	156.35 W 22.40 S	79.1	-22.6250	-156.5420
022S157W-91	CBG02	156.30 W 22.40 S	79.1	-22.6250	-156.4580
022S158W-83	CBG02	157.10 W 22.35 S	79.1	-22.5417	-157.1250
022S158W-84	CBG02	157.05 W 22.35 S	79.1	-22.5417	-157.0420
022S157W-73	CBG02	157.00 W 22.35 S	79.1	-22.5417	-156.9580

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
022S157W-74	CBG02	156.55 W 22.35 S	79.1	-22.5417	-156.8750
022S157W-75	CBG02	156.50 W 22.35 S	79.1	-22.5417	-156.7920
022S157W-76	CBG02	156.45 W 22.35 S	79.1	-22.5417	-156.7080
022S157W-77	CBG02	156.40 W 22.35 S	79.1	-22.5417	-156.6250
022S157W-78	CBG02	156.35 W 22.35 S	79.1	-22.5417	-156.5420
022S157W-79	CBG02	156.30 W 22.35 S	79.1	-22.5417	-156.4580
022S158W-72	CBG02	157.05 W 22.30 S	79.2	-22.4583	-157.0420
022S157W-61	CBG02	157.00 W 22.30 S	79.2	-22.4583	-156.9580
022S157W-62	CBG02	156.55 W 22.30 S	79.2	-22.4583	-156.8750
022S157W-63	CBG02	156.50 W 22.30 S	79.2	-22.4583	-156.7920
022S157W-64	CBG02	156.45 W 22.30 S	79.2	-22.4583	-156.7080
022S157W-65	CBG02	156.40 W 22.30 S	79.2	-22.4583	-156.6250
022S157W-66	CBG02	156.35 W 22.30 S	79.2	-22.4583	-156.5420
022S157W-67	CBG02	156.30 W 22.30 S	79.2	-22.4583	-156.4580
020S164W-8	CBG03	163.25 W 20.00 S	80.4	-20.0417	-163.3750
020S164W-9	CBG03	163.20 W 20.00 S	80.4	-20.0417	-163.2920
020S164W-10	CBG03	163.15 W 20.00 S	80.4	-20.0417	-163.2080
020S164W-11	CBG03	163.10 W 20.00 S	80.4	-20.0417	-163.1250
020S164W-12	CBG03	163.05 W 20.00 S	80.4	-20.0417	-163.0420
020S163W-1	CBG03	163.00 W 20.00 S	80.4	-20.0417	-162.9580
020S163W-2	CBG03	162.55 W 20.00 S	80.4	-20.0417	-162.8750
020S163W-3	CBG03	162.50 W 20.00 S	80.4	-20.0417	-162.7920
020S163W-4	CBG03	162.45 W 20.00 S	80.4	-20.0417	-162.7080
020S163W-5	CBG03	162.40 W 20.00 S	80.4	-20.0417	-162.6250
020S163W-6	CBG03	162.35 W 20.00 S	80.4	-20.0417	-162.5420
019S164W-140	CBG03	163.25 W 19.55 S	80.5	-19.9583	-163.3750
019S164W-141	CBG03	163.20 W 19.55 S	80.5	-19.9583	-163.2920
019S164W-142	CBG03	163.15 W 19.55 S	80.5	-19.9583	-163.2080
019S164W-143	CBG03	163.10 W 19.55 S	80.5	-19.9583	-163.1250
019S164W-144	CBG03	163.05 W 19.55 S	80.5	-19.9583	-163.0420
019S163W-133	CBG03	163.00 W 19.55 S	80.5	-19.9583	-162.9580
019S163W-134	CBG03	162.55 W 19.55 S	80.5	-19.9583	-162.8750
019S163W-135	CBG03	162.50 W 19.55 S	80.5	-19.9583	-162.7920
019S163W-136	CBG03	162.45 W 19.55 S	80.5	-19.9583	-162.7080
019S163W-137	CBG03	162.40 W 19.55 S	80.5	-19.9583	-162.6250
019S163W-138	CBG03	162.35 W 19.55 S	80.5	-19.9583	-162.5420
019S164W-128	CBG03	163.25 W 19.50 S	80.5	-19.8750	-163.3750
019S164W-129	CBG03	163.20 W 19.50 S	80.5	-19.8750	-163.2920
019S164W-130	CBG03	163.15 W 19.50 S	80.5	-19.8750	-163.2080
019S164W-131	CBG03	163.10 W 19.50 S	80.5	-19.8750	-163.1250
019S164W-132	CBG03	163.05 W 19.50 S	80.5	-19.8750	-163.0420
019S163W-121	CBG03	163.00 W 19.50 S	80.5	-19.8750	-162.9580
019S163W-122	CBG03	162.55 W 19.50 S	80.5	-19.8750	-162.8750
019S163W-123	CBG03	162.50 W 19.50 S	80.5	-19.8750	-162.7920
019S163W-124	CBG03	162.45 W 19.50 S	80.5	-19.8750	-162.7080
019S163W-125	CBG03	162.40 W 19.50 S	80.5	-19.8750	-162.6250
019S163W-126	CBG03	162.35 W 19.50 S	80.5	-19.8750	-162.5420
019S164W-116	CBG03	163.25 W 19.45 S	80.6	-19.7917	-163.3750
019S164W-117	CBG03	163.20 W 19.45 S	80.6	-19.7917	-163.2920
019S164W-118	CBG03	163.15 W 19.45 S	80.6	-19.7917	-163.2080
019S164W-119	CBG03	163.10 W 19.45 S	80.6	-19.7917	-163.1250
019S164W-120	CBG03	163.05 W 19.45 S	80.6	-19.7917	-163.0420
019S163W-109	CBG03	163.00 W 19.45 S	80.6	-19.7917	-162.9580
019S163W-110	CBG03	162.55 W 19.45 S	80.6	-19.7917	-162.8750
019S163W-111	CBG03	162.50 W 19.45 S	80.6	-19.7917	-162.7920
019S163W-112	CBG03	162.45 W 19.45 S	80.6	-19.7917	-162.7080
019S163W-113	CBG03	162.40 W 19.45 S	80.6	-19.7917	-162.6250
019S163W-114	CBG03	162.35 W 19.45 S	80.6	-19.7917	-162.5420
019S164W-104	CBG03	163.25 W 19.40 S	80.6	-19.7083	-163.3750
019S164W-105	CBG03	163.20 W 19.40 S	80.6	-19.7083	-163.2920
019S164W-106	CBG03	163.15 W 19.40 S	80.6	-19.7083	-163.2080
019S164W-107	CBG03	163.10 W 19.40 S	80.6	-19.7083	-163.1250
019S164W-108	CBG03	163.05 W 19.40 S	80.6	-19.7083	-163.0420
019S163W-97	CBG03	163.00 W 19.40 S	80.6	-19.7083	-162.9580
019S163W-98	CBG03	162.55 W 19.40 S	80.6	-19.7083	-162.8750
019S163W-99	CBG03	162.50 W 19.40 S	80.6	-19.7083	-162.7920
019S163W-100	CBG03	162.45 W 19.40 S	80.6	-19.7083	-162.7080
019S163W-101	CBG03	162.40 W 19.40 S	80.6	-19.7083	-162.6250
019S163W-102	CBG03	162.35 W 19.40 S	80.6	-19.7083	-162.5420
019S164W-92	CBG03	163.25 W 19.35 S	80.6	-19.6250	-163.3750
019S164W-93	CBG03	163.20 W 19.35 S	80.6	-19.6250	-163.2920
019S164W-94	CBG03	163.15 W 19.35 S	80.6	-19.6250	-163.2080
019S164W-95	CBG03	163.10 W 19.35 S	80.6	-19.6250	-163.1250
019S164W-96	CBG03	163.05 W 19.35 S	80.6	-19.6250	-163.0420
019S163W-85	CBG03	163.00 W 19.35 S	80.6	-19.6250	-162.9580
019S163W-86	CBG03	162.55 W 19.35 S	80.6	-19.6250	-162.8750
019S163W-87	CBG03	162.50 W 19.35 S	80.6	-19.6250	-162.7920
019S163W-88	CBG03	162.45 W 19.35 S	80.6	-19.6250	-162.7080
019S163W-89	CBG03	162.40 W 19.35 S	80.6	-19.6250	-162.6250
019S163W-90	CBG03	162.35 W 19.35 S	80.6	-19.6250	-162.5420
019S164W-80	CBG03	163.25 W 19.30 S	80.7	-19.5417	-163.3750
019S164W-81	CBG03	163.20 W 19.30 S	80.7	-19.5417	-163.2920
019S164W-82	CBG03	163.15 W 19.30 S	80.7	-19.5417	-163.2080
019S164W-83	CBG03	163.10 W 19.30 S	80.7	-19.5417	-163.1250
019S164W-84	CBG03	163.05 W 19.30 S	80.7	-19.5417	-163.0420
019S163W-73	CBG03	163.00 W 19.30 S	80.7	-19.5417	-162.9580
019S163W-74	CBG03	162.55 W 19.30 S	80.7	-19.5417	-162.8750
019S163W-75	CBG03	162.50 W 19.30 S	80.7	-19.5417	-162.7920
019S163W-76	CBG03	162.45 W 19.30 S	80.7	-19.5417	-162.7080
019S163W-77	CBG03	162.40 W 19.30 S	80.7	-19.5417	-162.6250
019S163W-78	CBG03	162.35 W 19.30 S	80.7	-19.5417	-162.5420
019S164W-68	CBG03	163.25 W 19.25 S	80.7	-19.4583	-163.3750
019S164W-69	CBG03	163.20 W 19.25 S	80.7	-19.4583	-163.2920
019S164W-70	CBG03	163.15 W 19.25 S	80.7	-19.4583	-163.2080
019S164W-71	CBG03	163.10 W 19.25 S	80.7	-19.4583	-163.1250
019S164W-72	CBG03	163.05 W 19.25 S	80.7	-19.4583	-163.0420
019S163W-61	CBG03	163.00 W 19.25 S	80.7	-19.4583	-162.9580
019S163W-62	CBG03	162.55 W 19.25 S	80.7	-19.4583	-162.8750
019S163W-63	CBG03	162.50 W 19.25 S	80.7	-19.4583	-162.7920
019S163W-64	CBG03	162.45 W 19.25 S	80.7	-19.4583	-162.7080
019S163W-65	CBG03	162.40 W 19.25 S	80.7	-19.4583	-162.6250
019S163W-66	CBG03	162.35 W 19.25 S	80.7	-19.4583	-162.5420
019S164W-57	CBG03	163.20 W 19.20 S	80.8	-19.3750	-163.2920
019S164W-58	CBG03	163.15 W 19.20 S	80.8	-19.3750	-163.2080
019S164W-59	CBG03	163.10 W 19.20 S	80.8	-19.3750	-163.1250
019S164W-60	CBG03	163.05 W 19.20 S	80.8	-19.3750	-163.0420
019S163W-49	CBG03	163.00 W 19.20 S	80.8	-19.3750	-162.9580
019S163W-50	CBG03	162.55 W 19.20 S	80.8	-19.3750	-162.8750
019S163W-51	CBG03	162.50 W 19.20 S	80.8	-19.3750	-162.7920
019S163W-52	CBG03	162.45 W 19.20 S	80.8	-19.3750	-162.7080
019S163W-53	CBG03	162.40 W 19.20 S	80.8	-19.3750	-162.6250
019S163W-54	CBG03	162.35 W 19.20 S	80.8	-19.3750	-162.5420
019S163W-55	CBG03	162.30 W 19.20 S	80.8	-19.3750	-162.4580
019S163W-56	CBG03	162.25 W 19.20 S	80.8	-19.3750	-162.3750
019S163W-57	CBG03	162.20 W 19.20 S	80.8	-19.3750	-162.2920
019S163W-58	CBG03	162.15 W 19.20 S	80.8	-19.3750	-162.2080
019S163W-59	CBG03	162.10 W 19.20 S	80.8	-19.3750	-162.1250
019S163W-60	CBG03	162.05 W 19.20 S	80.8	-19.3750	-162.0420

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
019S162W-49	CBG03	162.00 W 19.20 S	80.8	-19.3750	-161.9580
019S164W-46	CBG03	163.15 W 19.15 S	80.8	-19.2917	-163.2080
019S164W-47	CBG03	163.10 W 19.15 S	80.8	-19.2917	-163.1250
019S164W-48	CBG03	163.05 W 19.15 S	80.8	-19.2917	-163.0420
019S163W-37	CBG03	163.00 W 19.15 S	80.8	-19.2917	-162.9580
019S163W-38	CBG03	162.55 W 19.15 S	80.8	-19.2917	-162.8750
019S163W-39	CBG03	162.50 W 19.15 S	80.8	-19.2917	-162.7920
019S163W-40	CBG03	162.45 W 19.15 S	80.8	-19.2917	-162.7080
019S163W-41	CBG03	162.40 W 19.15 S	80.8	-19.2917	-162.6250
019S163W-42	CBG03	162.35 W 19.15 S	80.8	-19.2917	-162.5420
019S163W-43	CBG03	162.30 W 19.15 S	80.8	-19.2917	-162.4580
019S163W-44	CBG03	162.25 W 19.15 S	80.8	-19.2917	-162.3750
019S163W-45	CBG03	162.20 W 19.15 S	80.8	-19.2917	-162.2920
019S163W-46	CBG03	162.15 W 19.15 S	80.8	-19.2917	-162.2080
019S163W-47	CBG03	162.10 W 19.15 S	80.8	-19.2917	-162.1250
019S163W-48	CBG03	162.05 W 19.15 S	80.8	-19.2917	-162.0420
019S162W-37	CBG03	162.00 W 19.15 S	80.8	-19.2917	-161.9580
019S162W-38	CBG03	161.55 W 19.15 S	80.8	-19.2917	-161.8750
019S162W-39	CBG03	161.50 W 19.15 S	80.8	-19.2917	-161.7920
019S164W-34	CBG03	163.15 W 19.10 S	80.8	-19.2083	-163.2080
019S164W-35	CBG03	163.10 W 19.10 S	80.8	-19.2083	-163.1250
019S164W-36	CBG03	163.05 W 19.10 S	80.8	-19.2083	-163.0420
019S163W-25	CBG03	163.00 W 19.10 S	80.8	-19.2083	-162.9580
019S163W-26	CBG03	162.55 W 19.10 S	80.8	-19.2083	-162.8750
019S163W-27	CBG03	162.50 W 19.10 S	80.8	-19.2083	-162.7920
019S163W-28	CBG03	162.45 W 19.10 S	80.8	-19.2083	-162.7080
019S163W-29	CBG03	162.40 W 19.10 S	80.8	-19.2083	-162.6250
019S163W-30	CBG03	162.35 W 19.10 S	80.8	-19.2083	-162.5420
019S163W-31	CBG03	162.30 W 19.10 S	80.8	-19.2083	-162.4580
019S163W-32	CBG03	162.25 W 19.10 S	80.8	-19.2083	-162.3750
019S163W-33	CBG03	162.20 W 19.10 S	80.8	-19.2083	-162.2920
019S163W-34	CBG03	162.15 W 19.10 S	80.8	-19.2083	-162.2080
019S163W-35	CBG03	162.10 W 19.10 S	80.8	-19.2083	-162.1250
019S163W-36	CBG03	162.05 W 19.10 S	80.8	-19.2083	-162.0420
019S162W-25	CBG03	162.00 W 19.10 S	80.8	-19.2083	-161.9580
019S162W-26	CBG03	161.55 W 19.10 S	80.8	-19.2083	-161.8750
019S162W-27	CBG03	161.50 W 19.10 S	80.8	-19.2083	-161.7920
019S164W-23	CBG03	163.10 W 19.05 S	80.9	-19.1250	-163.1250
019S164W-24	CBG03	163.05 W 19.05 S	80.9	-19.1250	-163.0420
019S163W-13	CBG03	163.00 W 19.05 S	80.9	-19.1250	-162.9580
019S163W-14	CBG03	162.55 W 19.05 S	80.9	-19.1250	-162.8750
019S163W-15	CBG03	162.50 W 19.05 S	80.9	-19.1250	-162.7920
019S163W-16	CBG03	162.45 W 19.05 S	80.9	-19.1250	-162.7080
019S163W-17	CBG03	162.40 W 19.05 S	80.9	-19.1250	-162.6250
019S163W-18	CBG03	162.35 W 19.05 S	80.9	-19.1250	-162.5420
019S163W-19	CBG03	162.30 W 19.05 S	80.9	-19.1250	-162.4580
019S163W-20	CBG03	162.25 W 19.05 S	80.9	-19.1250	-162.3750
019S163W-21	CBG03	162.20 W 19.05 S	80.9	-19.1250	-162.2920
019S163W-22	CBG03	162.15 W 19.05 S	80.9	-19.1250	-162.2080
019S163W-23	CBG03	162.10 W 19.05 S	80.9	-19.1250	-162.1250
019S163W-24	CBG03	162.05 W 19.05 S	80.9	-19.1250	-162.0420
019S162W-13	CBG03	162.00 W 19.05 S	80.9	-19.1250	-161.9580
019S162W-14	CBG03	161.55 W 19.05 S	80.9	-19.1250	-161.8750
019S162W-15	CBG03	161.50 W 19.05 S	80.9	-19.1250	-161.7920
019S162W-16	CBG03	161.45 W 19.05 S	80.9	-19.1250	-161.7080
019S163W-2	CBG03	162.55 W 19.00 S	80.9	-19.0417	-162.8750
019S163W-3	CBG03	162.50 W 19.00 S	80.9	-19.0417	-162.7920
019S163W-4	CBG03	162.45 W 19.00 S	80.9	-19.0417	-162.7080
019S163W-5	CBG03	162.40 W 19.00 S	80.9	-19.0417	-162.6250
019S163W-6	CBG03	162.35 W 19.00 S	80.9	-19.0417	-162.5420
019S163W-7	CBG03	162.30 W 19.00 S	80.9	-19.0417	-162.4580
019S163W-8	CBG03	162.25 W 19.00 S	80.9	-19.0417	-162.3750
019S163W-9	CBG03	162.20 W 19.00 S	80.9	-19.0417	-162.2920
019S163W-10	CBG03	162.15 W 19.00 S	80.9	-19.0417	-162.2080
019S163W-11	CBG03	162.10 W 19.00 S	80.9	-19.0417	-162.1250
019S163W-12	CBG03	162.05 W 19.00 S	80.9	-19.0417	-162.0420
019S162W-1	CBG03	162.00 W 19.00 S	80.9	-19.0417	-161.9580
019S162W-2	CBG03	161.55 W 19.00 S	80.9	-19.0417	-161.8750
019S162W-3	CBG03	161.50 W 19.00 S	80.9	-19.0417	-161.7920
019S162W-4	CBG03	161.45 W 19.00 S	80.9	-19.0417	-161.7080
019S162W-5	CBG03	161.40 W 19.00 S	80.9	-19.0417	-161.6250
019S162W-6	CBG03	161.35 W 19.00 S	80.9	-19.0417	-161.5420
019S162W-7	CBG03	161.30 W 19.00 S	80.9	-19.0417	-161.4580
018S163W-134	CBG03	162.55 W 18.55 S	81.0	-18.9583	-162.8750
018S163W-135	CBG03	162.50 W 18.55 S	81.0	-18.9583	-162.7920
018S163W-136	CBG03	162.45 W 18.55 S	81.0	-18.9583	-162.7080
018S163W-137	CBG03	162.40 W 18.55 S	81.0	-18.9583	-162.6250
018S163W-138	CBG03	162.35 W 18.55 S	81.0	-18.9583	-162.5420
018S163W-139	CBG03	162.30 W 18.55 S	81.0	-18.9583	-162.4580
018S163W-140	CBG03	162.25 W 18.55 S	81.0	-18.9583	-162.3750
018S163W-141	CBG03	162.20 W 18.55 S	81.0	-18.9583	-162.2920
018S163W-142	CBG03	162.15 W 18.55 S	81.0	-18.9583	-162.2080
018S163W-143	CBG03	162.10 W 18.55 S	81.0	-18.9583	-162.1250
018S163W-144	CBG03	162.05 W 18.55 S	81.0	-18.9583	-162.0420
018S162W-133	CBG03	162.00 W 18.55 S	81.0	-18.9583	-161.9580
018S162W-134	CBG03	161.55 W 18.55 S	81.0	-18.9583	-161.8750
018S162W-135	CBG03	161.50 W 18.55 S	81.0	-18.9583	-161.7920
018S162W-136	CBG03	161.45 W 18.55 S	81.0	-18.9583	-161.7080
018S162W-137	CBG03	161.40 W 18.55 S	81.0	-18.9583	-161.6250
018S162W-138	CBG03	161.35 W 18.55 S	81.0	-18.9583	-161.5420
018S162W-139	CBG03	161.30 W 18.55 S	81.0	-18.9583	-161.4580
018S162W-140	CBG03	161.25 W 18.55 S	81.0	-18.9583	-161.3750
018S163W-125	CBG03	162.40 W 18.50 S	81.0	-18.8750	-162.6250
018S163W-126	CBG03	162.35 W 18.50 S	81.0	-18.8750	-162.5420
018S163W-127	CBG03	162.30 W 18.50 S	81.0	-18.8750	-162.4580
018S163W-128	CBG03	162.25 W 18.50 S	81.0	-18.8750	-162.3750
018S163W-129	CBG03	162.20 W 18.50 S	81.0	-18.8750	-162.2920
018S163W-130	CBG03	162.15 W 18.50 S	81.0	-18.8750	-162.2080
018S163W-131	CBG03	162.10 W 18.50 S	81.0	-18.8750	-162.1250
018S163W-132	CBG03	162.05 W 18.50 S	81.0	-18.8750	-162.0420
018S162W-121	CBG03	162.00 W 18.50 S	81.0	-18.8750	-161.9580
018S162W-122	CBG03	161.55 W 18.50 S	81.0	-18.8750	-161.8750
018S162W-123	CBG03	161.50 W 18.50 S	81.0	-18.8750	-161.7920
018S162W-124	CBG03	161.45 W 18.50 S	81.0	-18.8750	-161.7080
018S162W-125	CBG03	161.40 W 18.50 S	81.0	-18.8750	-161.6250
018S162W-126	CBG03	161.35 W 18.50 S	81.0	-18.8750	-161.5420
018S162W-127	CBG03	161.30 W 18.50 S	81.0	-18.8750	-161.4580
018S162W-128	CBG03	161.25 W 18.50 S	81.0	-18.8750	-161.3750
018S162W-129	CBG03	161.20 W 18.50 S	81.0	-18.8750	-161.2920
018S163W-114	CBG03	162.35 W 18.45 S	81.0	-18.7917	-162.5420
018S163W-115	CBG03	162.30 W 18.45 S	81.0	-18.7917	-162.4580
018S163W-116	CBG03	162.25 W 18.45 S	81.0	-18.7917	-162.3750
018S163W-117	CBG03	162.20 W 18.45 S	81.0	-18.7917	-162.2920
018S163W-118	CBG03	162.15 W 18.45 S	81.0	-18.7917	-162.2080
018S163W-119	CBG03	162.10 W 18.45 S	81.0	-18.7917	-162.1250
018S163W-120	CBG03	162.05 W 18.45 S	81.0	-18.7917	-162.0420
018S162W-109	CBG03	162.00 W 18.45 S	81.0	-18.7917	-161.9580
018S162W-110	CBG03	161.55 W 18.45 S	81.0	-18.7917	-161.8750

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
018S162W-111	CBG03	161.50 W 18.45 S	81.0	-18.7917	-161.7920
018S162W-112	CBG03	161.45 W 18.45 S	81.0	-18.7917	-161.7080
018S162W-113	CBG03	161.40 W 18.45 S	81.0	-18.7917	-161.6250
018S162W-114	CBG03	161.35 W 18.45 S	81.0	-18.7917	-161.5420
018S162W-115	CBG03	161.30 W 18.45 S	81.0	-18.7917	-161.4580
018S162W-116	CBG03	161.25 W 18.45 S	81.0	-18.7917	-161.3750
018S162W-117	CBG03	161.20 W 18.45 S	81.0	-18.7917	-161.2920
018S162W-118	CBG03	161.15 W 18.45 S	81.0	-18.7917	-161.2080
018S163W-103	CBG03	162.30 W 18.40 S	81.1	-18.7083	-162.4580
018S163W-104	CBG03	162.25 W 18.40 S	81.1	-18.7083	-162.3750
018S163W-105	CBG03	162.20 W 18.40 S	81.1	-18.7083	-162.2920
018S163W-106	CBG03	162.15 W 18.40 S	81.1	-18.7083	-162.2080
018S163W-107	CBG03	162.10 W 18.40 S	81.1	-18.7083	-162.1250
018S163W-108	CBG03	162.05 W 18.40 S	81.1	-18.7083	-162.0420
018S162W-97	CBG03	162.00 W 18.40 S	81.1	-18.7083	-161.9580
018S162W-98	CBG03	161.55 W 18.40 S	81.1	-18.7083	-161.8750
018S162W-99	CBG03	161.50 W 18.40 S	81.1	-18.7083	-161.7920
018S162W-100	CBG03	161.45 W 18.40 S	81.1	-18.7083	-161.7080
018S162W-101	CBG03	161.40 W 18.40 S	81.1	-18.7083	-161.6250
018S162W-102	CBG03	161.35 W 18.40 S	81.1	-18.7083	-161.5420
018S162W-103	CBG03	161.30 W 18.40 S	81.1	-18.7083	-161.4580
018S162W-104	CBG03	161.25 W 18.40 S	81.1	-18.7083	-161.3750
018S162W-105	CBG03	161.20 W 18.40 S	81.1	-18.7083	-161.2920
018S162W-106	CBG03	161.15 W 18.40 S	81.1	-18.7083	-161.2080
018S162W-107	CBG03	161.10 W 18.40 S	81.1	-18.7083	-161.1250
018S162W-108	CBG03	161.05 W 18.40 S	81.1	-18.7083	-161.0420
018S163W-92	CBG03	162.25 W 18.35 S	81.1	-18.6250	-162.3750
018S163W-93	CBG03	162.20 W 18.35 S	81.1	-18.6250	-162.2920
018S163W-94	CBG03	162.15 W 18.35 S	81.1	-18.6250	-162.2080
018S163W-95	CBG03	162.10 W 18.35 S	81.1	-18.6250	-162.1250
018S163W-96	CBG03	162.05 W 18.35 S	81.1	-18.6250	-162.0420
018S162W-85	CBG03	162.00 W 18.35 S	81.1	-18.6250	-161.9580
018S162W-86	CBG03	161.55 W 18.35 S	81.1	-18.6250	-161.8750
018S162W-87	CBG03	161.50 W 18.35 S	81.1	-18.6250	-161.7920
018S162W-88	CBG03	161.45 W 18.35 S	81.1	-18.6250	-161.7080
018S162W-89	CBG03	161.40 W 18.35 S	81.1	-18.6250	-161.6250
018S162W-90	CBG03	161.35 W 18.35 S	81.1	-18.6250	-161.5420
018S162W-91	CBG03	161.30 W 18.35 S	81.1	-18.6250	-161.4580
018S162W-92	CBG03	161.25 W 18.35 S	81.1	-18.6250	-161.3750
018S162W-93	CBG03	161.20 W 18.35 S	81.1	-18.6250	-161.2920
018S162W-94	CBG03	161.15 W 18.35 S	81.1	-18.6250	-161.2080
018S162W-95	CBG03	161.10 W 18.35 S	81.1	-18.6250	-161.1250
018S162W-96	CBG03	161.05 W 18.35 S	81.1	-18.6250	-161.0420
018S163W-81	CBG03	162.20 W 18.30 S	81.2	-18.5417	-162.2920
018S163W-82	CBG03	162.15 W 18.30 S	81.2	-18.5417	-162.2080
018S163W-83	CBG03	162.10 W 18.30 S	81.2	-18.5417	-162.1250
018S163W-84	CBG03	162.05 W 18.30 S	81.2	-18.5417	-162.0420
018S162W-73	CBG03	162.00 W 18.30 S	81.2	-18.5417	-161.9580
018S162W-74	CBG03	161.55 W 18.30 S	81.2	-18.5417	-161.8750
018S162W-75	CBG03	161.50 W 18.30 S	81.2	-18.5417	-161.7920
018S162W-76	CBG03	161.45 W 18.30 S	81.2	-18.5417	-161.7080
018S162W-77	CBG03	161.40 W 18.30 S	81.2	-18.5417	-161.6250
018S162W-78	CBG03	161.35 W 18.30 S	81.2	-18.5417	-161.5420
018S162W-79	CBG03	161.30 W 18.30 S	81.2	-18.5417	-161.4580
018S162W-80	CBG03	161.25 W 18.30 S	81.2	-18.5417	-161.3750
018S162W-81	CBG03	161.20 W 18.30 S	81.2	-18.5417	-161.2920
018S162W-82	CBG03	161.15 W 18.30 S	81.2	-18.5417	-161.2080
018S162W-83	CBG03	161.10 W 18.30 S	81.2	-18.5417	-161.1250
018S162W-84	CBG03	161.05 W 18.30 S	81.2	-18.5417	-161.0420
018S163W-70	CBG03	162.15 W 18.25 S	81.2	-18.4583	-162.2080
018S163W-71	CBG03	162.10 W 18.25 S	81.2	-18.4583	-162.1250
018S163W-72	CBG03	162.05 W 18.25 S	81.2	-18.4583	-162.0420
018S162W-61	CBG03	162.00 W 18.25 S	81.2	-18.4583	-161.9580
018S162W-62	CBG03	161.55 W 18.25 S	81.2	-18.4583	-161.8750
018S162W-63	CBG03	161.50 W 18.25 S	81.2	-18.4583	-161.7920
018S162W-64	CBG03	161.45 W 18.25 S	81.2	-18.4583	-161.7080
018S162W-65	CBG03	161.40 W 18.25 S	81.2	-18.4583	-161.6250
018S162W-66	CBG03	161.35 W 18.25 S	81.2	-18.4583	-161.5420
018S162W-67	CBG03	161.30 W 18.25 S	81.2	-18.4583	-161.4580
018S162W-68	CBG03	161.25 W 18.25 S	81.2	-18.4583	-161.3750
018S162W-69	CBG03	161.20 W 18.25 S	81.2	-18.4583	-161.2920
018S162W-70	CBG03	161.15 W 18.25 S	81.2	-18.4583	-161.2080
018S162W-71	CBG03	161.10 W 18.25 S	81.2	-18.4583	-161.1250
018S162W-72	CBG03	161.05 W 18.25 S	81.2	-18.4583	-161.0420
018S163W-58	CBG03	162.15 W 18.20 S	81.2	-18.3750	-162.2080
018S163W-59	CBG03	162.10 W 18.20 S	81.2	-18.3750	-162.1250
018S163W-60	CBG03	162.05 W 18.20 S	81.2	-18.3750	-162.0420
018S162W-49	CBG03	162.00 W 18.20 S	81.2	-18.3750	-161.9580
018S162W-50	CBG03	161.55 W 18.20 S	81.2	-18.3750	-161.8750
018S162W-51	CBG03	161.50 W 18.20 S	81.2	-18.3750	-161.7920
018S162W-52	CBG03	161.45 W 18.20 S	81.2	-18.3750	-161.7080
018S162W-53	CBG03	161.40 W 18.20 S	81.2	-18.3750	-161.6250
018S162W-54	CBG03	161.35 W 18.20 S	81.2	-18.3750	-161.5420
018S162W-55	CBG03	161.30 W 18.20 S	81.2	-18.3750	-161.4580
018S162W-56	CBG03	161.25 W 18.20 S	81.2	-18.3750	-161.3750
018S162W-57	CBG03	161.20 W 18.20 S	81.2	-18.3750	-161.2920
018S162W-58	CBG03	161.15 W 18.20 S	81.2	-18.3750	-161.2080
018S162W-59	CBG03	161.10 W 18.20 S	81.2	-18.3750	-161.1250
018S162W-60	CBG03	161.05 W 18.20 S	81.2	-18.3750	-161.0420
018S163W-46	CBG03	162.15 W 18.15 S	81.3	-18.2917	-162.2080
018S163W-47	CBG03	162.10 W 18.15 S	81.3	-18.2917	-162.1250
018S163W-48	CBG03	162.05 W 18.15 S	81.3	-18.2917	-162.0420
018S162W-37	CBG03	162.00 W 18.15 S	81.3	-18.2917	-161.9580
018S162W-38	CBG03	161.55 W 18.15 S	81.3	-18.2917	-161.8750
018S162W-39	CBG03	161.50 W 18.15 S	81.3	-18.2917	-161.7920
018S162W-40	CBG03	161.45 W 18.15 S	81.3	-18.2917	-161.7080
018S162W-41	CBG03	161.40 W 18.15 S	81.3	-18.2917	-161.6250
018S162W-42	CBG03	161.35 W 18.15 S	81.3	-18.2917	-161.5420
018S162W-43	CBG03	161.30 W 18.15 S	81.3	-18.2917	-161.4580
018S162W-44	CBG03	161.25 W 18.15 S	81.3	-18.2917	-161.3750
018S162W-45	CBG03	161.20 W 18.15 S	81.3	-18.2917	-161.2920
018S162W-46	CBG03	161.15 W 18.15 S	81.3	-18.2917	-161.2080
018S162W-47	CBG03	161.10 W 18.15 S	81.3	-18.2917	-161.1250
018S162W-48	CBG03	161.05 W 18.15 S	81.3	-18.2917	-161.0420
018S163W-35	CBG03	162.10 W 18.10 S	81.3	-18.2083	-162.1250
018S163W-36	CBG03	162.05 W 18.10 S	81.3	-18.2083	-162.0420
018S162W-25	CBG03	162.00 W 18.10 S	81.3	-18.2083	-161.9580
018S162W-26	CBG03	161.55 W 18.10 S	81.3	-18.2083	-161.8750
018S162W-27	CBG03	161.50 W 18.10 S	81.3	-18.2083	-161.7920
018S162W-28	CBG03	161.45 W 18.10 S	81.3	-18.2083	-161.7080
018S162W-29	CBG03	161.40 W 18.10 S	81.3	-18.2083	-161.6250
018S162W-30	CBG03	161.35 W 18.10 S	81.3	-18.2083	-161.5420
018S162W-31	CBG03	161.30 W 18.10 S	81.3	-18.2083	-161.4580
018S162W-32	CBG03	161.25 W 18.10 S	81.3	-18.2083	-161.3750
018S162W-33	CBG03	161.20 W 18.10 S	81.3	-18.2083	-161.2920
018S162W-34	CBG03	161.15 W 18.10 S	81.3	-18.2083	-161.2080
018S162W-35	CBG03	161.10 W 18.10 S	81.3	-18.2083	-161.1250
018S162W-36	CBG03	161.05 W 18.10 S	81.3	-18.2083	-161.0420

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
018S163W-23	CBG03	162.10 W 18.05 S	81.3	-18.1250	-162.1250
018S163W-24	CBG03	162.05 W 18.05 S	81.3	-18.1250	-162.0420
018S162W-13	CBG03	162.00 W 18.05 S	81.3	-18.1250	-161.9580
018S162W-14	CBG03	161.55 W 18.05 S	81.3	-18.1250	-161.8750
018S162W-15	CBG03	161.50 W 18.05 S	81.3	-18.1250	-161.7920
018S162W-16	CBG03	161.45 W 18.05 S	81.3	-18.1250	-161.7080
018S162W-17	CBG03	161.40 W 18.05 S	81.3	-18.1250	-161.6250
018S162W-18	CBG03	161.35 W 18.05 S	81.3	-18.1250	-161.5420
018S162W-19	CBG03	161.30 W 18.05 S	81.3	-18.1250	-161.4580
018S162W-20	CBG03	161.25 W 18.05 S	81.3	-18.1250	-161.3750
018S162W-21	CBG03	161.20 W 18.05 S	81.3	-18.1250	-161.2920
018S162W-22	CBG03	161.15 W 18.05 S	81.3	-18.1250	-161.2080
018S162W-23	CBG03	161.10 W 18.05 S	81.3	-18.1250	-161.1250
018S162W-24	CBG03	161.05 W 18.05 S	81.3	-18.1250	-161.0420
018S163W-11	CBG03	162.10 W 18.00 S	81.4	-18.0417	-162.1250
018S163W-12	CBG03	162.05 W 18.00 S	81.4	-18.0417	-162.0420
018S162W-1	CBG03	162.00 W 18.00 S	81.4	-18.0417	-161.9580
018S162W-2	CBG03	161.55 W 18.00 S	81.4	-18.0417	-161.8750
018S162W-3	CBG03	161.50 W 18.00 S	81.4	-18.0417	-161.7920
018S162W-4	CBG03	161.45 W 18.00 S	81.4	-18.0417	-161.7080
018S162W-5	CBG03	161.40 W 18.00 S	81.4	-18.0417	-161.6250
018S162W-6	CBG03	161.35 W 18.00 S	81.4	-18.0417	-161.5420
018S162W-7	CBG03	161.30 W 18.00 S	81.4	-18.0417	-161.4580
018S162W-8	CBG03	161.25 W 18.00 S	81.4	-18.0417	-161.3750
018S162W-9	CBG03	161.20 W 18.00 S	81.4	-18.0417	-161.2920
018S162W-10	CBG03	161.15 W 18.00 S	81.4	-18.0417	-161.2080
018S162W-11	CBG03	161.10 W 18.00 S	81.4	-18.0417	-161.1250
018S162W-12	CBG03	161.05 W 18.00 S	81.4	-18.0417	-161.0420
017S163W-143	CBG03	162.10 W 17.55 S	81.4	-17.9583	-162.1250
017S163W-144	CBG03	162.05 W 17.55 S	81.4	-17.9583	-162.0420
017S162W-133	CBG03	162.00 W 17.55 S	81.4	-17.9583	-161.9580
017S162W-134	CBG03	161.55 W 17.55 S	81.4	-17.9583	-161.8750
017S162W-135	CBG03	161.50 W 17.55 S	81.4	-17.9583	-161.7920
017S162W-136	CBG03	161.45 W 17.55 S	81.4	-17.9583	-161.7080
017S162W-137	CBG03	161.40 W 17.55 S	81.4	-17.9583	-161.6250
017S162W-138	CBG03	161.35 W 17.55 S	81.4	-17.9583	-161.5420
017S162W-139	CBG03	161.30 W 17.55 S	81.4	-17.9583	-161.4580
017S162W-140	CBG03	161.25 W 17.55 S	81.4	-17.9583	-161.3750
017S162W-141	CBG03	161.20 W 17.55 S	81.4	-17.9583	-161.2920
017S162W-142	CBG03	161.15 W 17.55 S	81.4	-17.9583	-161.2080
017S162W-143	CBG03	161.10 W 17.55 S	81.4	-17.9583	-161.1250
017S162W-144	CBG03	161.05 W 17.55 S	81.4	-17.9583	-161.0420
017S163W-131	CBG03	162.10 W 17.50 S	81.5	-17.8750	-162.1250
017S163W-132	CBG03	162.05 W 17.50 S	81.5	-17.8750	-162.0420
017S162W-121	CBG03	162.00 W 17.50 S	81.5	-17.8750	-161.9580
017S162W-122	CBG03	161.55 W 17.50 S	81.5	-17.8750	-161.8750
017S162W-123	CBG03	161.50 W 17.50 S	81.5	-17.8750	-161.7920
017S162W-124	CBG03	161.45 W 17.50 S	81.5	-17.8750	-161.7080
017S162W-125	CBG03	161.40 W 17.50 S	81.5	-17.8750	-161.6250
017S162W-126	CBG03	161.35 W 17.50 S	81.5	-17.8750	-161.5420
017S162W-127	CBG03	161.30 W 17.50 S	81.5	-17.8750	-161.4580
017S162W-128	CBG03	161.25 W 17.50 S	81.5	-17.8750	-161.3750
017S162W-129	CBG03	161.20 W 17.50 S	81.5	-17.8750	-161.2920
017S162W-130	CBG03	161.15 W 17.50 S	81.5	-17.8750	-161.2080
017S162W-131	CBG03	161.10 W 17.50 S	81.5	-17.8750	-161.1250
017S162W-132	CBG03	161.05 W 17.50 S	81.5	-17.8750	-161.0420
017S163W-118	CBG03	162.15 W 17.45 S	81.5	-17.7917	-162.2080
017S163W-119	CBG03	162.10 W 17.45 S	81.5	-17.7917	-162.1250
017S163W-120	CBG03	162.05 W 17.45 S	81.5	-17.7917	-162.0420
017S162W-109	CBG03	162.00 W 17.45 S	81.5	-17.7917	-161.9580
017S162W-110	CBG03	161.55 W 17.45 S	81.5	-17.7917	-161.8750
017S162W-111	CBG03	161.50 W 17.45 S	81.5	-17.7917	-161.7920
017S162W-112	CBG03	161.45 W 17.45 S	81.5	-17.7917	-161.7080
017S162W-113	CBG03	161.40 W 17.45 S	81.5	-17.7917	-161.6250
017S162W-114	CBG03	161.35 W 17.45 S	81.5	-17.7917	-161.5420
017S162W-115	CBG03	161.30 W 17.45 S	81.5	-17.7917	-161.4580
017S162W-116	CBG03	161.25 W 17.45 S	81.5	-17.7917	-161.3750
017S162W-117	CBG03	161.20 W 17.45 S	81.5	-17.7917	-161.2920
017S162W-118	CBG03	161.15 W 17.45 S	81.5	-17.7917	-161.2080
017S162W-119	CBG03	161.10 W 17.45 S	81.5	-17.7917	-161.1250
017S162W-120	CBG03	161.05 W 17.45 S	81.5	-17.7917	-161.0420
017S163W-106	CBG03	162.15 W 17.40 S	81.5	-17.7083	-162.2080
017S163W-107	CBG03	162.10 W 17.40 S	81.5	-17.7083	-162.1250
017S163W-108	CBG03	162.05 W 17.40 S	81.5	-17.7083	-162.0420
017S162W-97	CBG03	162.00 W 17.40 S	81.5	-17.7083	-161.9580
017S162W-98	CBG03	161.55 W 17.40 S	81.5	-17.7083	-161.8750
017S162W-99	CBG03	161.50 W 17.40 S	81.5	-17.7083	-161.7920
017S162W-100	CBG03	161.45 W 17.40 S	81.5	-17.7083	-161.7080
017S162W-101	CBG03	161.40 W 17.40 S	81.5	-17.7083	-161.6250
017S162W-102	CBG03	161.35 W 17.40 S	81.5	-17.7083	-161.5420
017S162W-103	CBG03	161.30 W 17.40 S	81.5	-17.7083	-161.4580
017S162W-104	CBG03	161.25 W 17.40 S	81.5	-17.7083	-161.3750
017S162W-105	CBG03	161.20 W 17.40 S	81.5	-17.7083	-161.2920
017S162W-106	CBG03	161.15 W 17.40 S	81.5	-17.7083	-161.2080
017S162W-107	CBG03	161.10 W 17.40 S	81.5	-17.7083	-161.1250
017S162W-108	CBG03	161.05 W 17.40 S	81.5	-17.7083	-161.0420
017S163W-94	CBG03	162.15 W 17.35 S	81.6	-17.6250	-162.2080
017S163W-95	CBG03	162.10 W 17.35 S	81.6	-17.6250	-162.1250
017S163W-96	CBG03	162.05 W 17.35 S	81.6	-17.6250	-162.0420
017S162W-85	CBG03	162.00 W 17.35 S	81.6	-17.6250	-161.9580
017S162W-86	CBG03	161.55 W 17.35 S	81.6	-17.6250	-161.8750
017S162W-87	CBG03	161.50 W 17.35 S	81.6	-17.6250	-161.7920
017S162W-88	CBG03	161.45 W 17.35 S	81.6	-17.6250	-161.7080
017S162W-89	CBG03	161.40 W 17.35 S	81.6	-17.6250	-161.6250
017S162W-90	CBG03	161.35 W 17.35 S	81.6	-17.6250	-161.5420
017S162W-91	CBG03	161.30 W 17.35 S	81.6	-17.6250	-161.4580
017S162W-92	CBG03	161.25 W 17.35 S	81.6	-17.6250	-161.3750
017S162W-93	CBG03	161.20 W 17.35 S	81.6	-17.6250	-161.2920
017S162W-94	CBG03	161.15 W 17.35 S	81.6	-17.6250	-161.2080
017S162W-95	CBG03	161.10 W 17.35 S	81.6	-17.6250	-161.1250
017S162W-96	CBG03	161.05 W 17.35 S	81.6	-17.6250	-161.0420
017S163W-81	CBG03	162.20 W 17.30 S	81.6	-17.5417	-162.2920
017S163W-82	CBG03	162.15 W 17.30 S	81.6	-17.5417	-162.2080
017S163W-83	CBG03	162.10 W 17.30 S	81.6	-17.5417	-162.1250
017S163W-84	CBG03	162.05 W 17.30 S	81.6	-17.5417	-162.0420
017S162W-73	CBG03	162.00 W 17.30 S	81.6	-17.5417	-161.9580
017S162W-74	CBG03	161.55 W 17.30 S	81.6	-17.5417	-161.8750
017S162W-75	CBG03	161.50 W 17.30 S	81.6	-17.5417	-161.7920
017S162W-76	CBG03	161.45 W 17.30 S	81.6	-17.5417	-161.7080
017S162W-77	CBG03	161.40 W 17.30 S	81.6	-17.5417	-161.6250
017S162W-78	CBG03	161.35 W 17.30 S	81.6	-17.5417	-161.5420
017S162W-79	CBG03	161.30 W 17.30 S	81.6	-17.5417	-161.4580
017S162W-80	CBG03	161.25 W 17.30 S	81.6	-17.5417	-161.3750
017S162W-81	CBG03	161.20 W 17.30 S	81.6	-17.5417	-161.2920
017S162W-82	CBG03	161.15 W 17.30 S	81.6	-17.5417	-161.2080
017S162W-83	CBG03	161.10 W 17.30 S	81.6	-17.5417	-161.1250
017S162W-84	CBG03	161.05 W 17.30 S	81.6	-17.5417	-161.0420
017S163W-68	CBG03	162.25 W 17.25 S	81.6	-17.4583	-162.3750

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
017S163W-69	CBG03	162.20 W 17.25 S	81.6	-17.4583	-162.2920
017S163W-70	CBG03	162.15 W 17.25 S	81.6	-17.4583	-162.2080
017S163W-71	CBG03	162.10 W 17.25 S	81.6	-17.4583	-162.1250
017S163W-72	CBG03	162.05 W 17.25 S	81.6	-17.4583	-162.0420
017S162W-61	CBG03	162.00 W 17.25 S	81.6	-17.4583	-161.9580
017S162W-62	CBG03	161.55 W 17.25 S	81.6	-17.4583	-161.8750
017S162W-63	CBG03	161.50 W 17.25 S	81.6	-17.4583	-161.7920
017S162W-64	CBG03	161.45 W 17.25 S	81.6	-17.4583	-161.7080
017S162W-65	CBG03	161.40 W 17.25 S	81.6	-17.4583	-161.6250
017S162W-66	CBG03	161.35 W 17.25 S	81.6	-17.4583	-161.5420
017S162W-67	CBG03	161.30 W 17.25 S	81.6	-17.4583	-161.4580
017S162W-68	CBG03	161.25 W 17.25 S	81.6	-17.4583	-161.3750
017S162W-69	CBG03	161.20 W 17.25 S	81.6	-17.4583	-161.2920
017S162W-70	CBG03	161.15 W 17.25 S	81.6	-17.4583	-161.2080
017S162W-71	CBG03	161.10 W 17.25 S	81.6	-17.4583	-161.1250
017S162W-72	CBG03	161.05 W 17.25 S	81.6	-17.4583	-161.0420
017S163W-55	CBG03	162.30 W 17.20 S	81.7	-17.3750	-162.4580
017S163W-56	CBG03	162.25 W 17.20 S	81.7	-17.3750	-162.3750
017S163W-57	CBG03	162.20 W 17.20 S	81.7	-17.3750	-162.2920
017S163W-58	CBG03	162.15 W 17.20 S	81.7	-17.3750	-162.2080
017S163W-59	CBG03	162.10 W 17.20 S	81.7	-17.3750	-162.1250
017S163W-60	CBG03	162.05 W 17.20 S	81.7	-17.3750	-162.0420
017S162W-49	CBG03	162.00 W 17.20 S	81.7	-17.3750	-161.9580
017S162W-50	CBG03	161.55 W 17.20 S	81.7	-17.3750	-161.8750
017S162W-51	CBG03	161.50 W 17.20 S	81.7	-17.3750	-161.7920
017S162W-52	CBG03	161.45 W 17.20 S	81.7	-17.3750	-161.7080
017S162W-53	CBG03	161.40 W 17.20 S	81.7	-17.3750	-161.6250
017S162W-54	CBG03	161.35 W 17.20 S	81.7	-17.3750	-161.5420
017S162W-55	CBG03	161.30 W 17.20 S	81.7	-17.3750	-161.4580
017S162W-56	CBG03	161.25 W 17.20 S	81.7	-17.3750	-161.3750
017S162W-57	CBG03	161.20 W 17.20 S	81.7	-17.3750	-161.2920
017S162W-58	CBG03	161.15 W 17.20 S	81.7	-17.3750	-161.2080
017S162W-59	CBG03	161.10 W 17.20 S	81.7	-17.3750	-161.1250
017S162W-60	CBG03	161.05 W 17.20 S	81.7	-17.3750	-161.0420
017S163W-42	CBG03	162.35 W 17.15 S	81.7	-17.2917	-162.5420
017S163W-43	CBG03	162.30 W 17.15 S	81.7	-17.2917	-162.4580
017S163W-44	CBG03	162.25 W 17.15 S	81.7	-17.2917	-162.3750
017S163W-45	CBG03	162.20 W 17.15 S	81.7	-17.2917	-162.2920
017S163W-46	CBG03	162.15 W 17.15 S	81.7	-17.2917	-162.2080
017S163W-47	CBG03	162.10 W 17.15 S	81.7	-17.2917	-162.1250
017S163W-48	CBG03	162.05 W 17.15 S	81.7	-17.2917	-162.0420
017S162W-37	CBG03	162.00 W 17.15 S	81.7	-17.2917	-161.9580
017S162W-38	CBG03	161.55 W 17.15 S	81.7	-17.2917	-161.8750
017S162W-39	CBG03	161.50 W 17.15 S	81.7	-17.2917	-161.7920
017S162W-40	CBG03	161.45 W 17.15 S	81.7	-17.2917	-161.7080
017S162W-41	CBG03	161.40 W 17.15 S	81.7	-17.2917	-161.6250
017S162W-42	CBG03	161.35 W 17.15 S	81.7	-17.2917	-161.5420
017S162W-43	CBG03	161.30 W 17.15 S	81.7	-17.2917	-161.4580
017S162W-44	CBG03	161.25 W 17.15 S	81.7	-17.2917	-161.3750
017S162W-45	CBG03	161.20 W 17.15 S	81.7	-17.2917	-161.2920
017S162W-46	CBG03	161.15 W 17.15 S	81.7	-17.2917	-161.2080
017S162W-47	CBG03	161.10 W 17.15 S	81.7	-17.2917	-161.1250
017S162W-48	CBG03	161.05 W 17.15 S	81.7	-17.2917	-161.0420
017S163W-28	CBG03	162.45 W 17.10 S	81.7	-17.2083	-162.7080
017S163W-29	CBG03	162.40 W 17.10 S	81.7	-17.2083	-162.6250
017S163W-30	CBG03	162.35 W 17.10 S	81.7	-17.2083	-162.5420
017S163W-31	CBG03	162.30 W 17.10 S	81.7	-17.2083	-162.4580
017S163W-32	CBG03	162.25 W 17.10 S	81.7	-17.2083	-162.3750
017S163W-33	CBG03	162.20 W 17.10 S	81.7	-17.2083	-162.2920
017S163W-34	CBG03	162.15 W 17.10 S	81.7	-17.2083	-162.2080
017S163W-35	CBG03	162.10 W 17.10 S	81.7	-17.2083	-162.1250
017S163W-36	CBG03	162.05 W 17.10 S	81.7	-17.2083	-162.0420
017S162W-25	CBG03	162.00 W 17.10 S	81.7	-17.2083	-161.9580
017S162W-26	CBG03	161.55 W 17.10 S	81.7	-17.2083	-161.8750
017S162W-27	CBG03	161.50 W 17.10 S	81.7	-17.2083	-161.7920
017S162W-28	CBG03	161.45 W 17.10 S	81.7	-17.2083	-161.7080
017S162W-29	CBG03	161.40 W 17.10 S	81.7	-17.2083	-161.6250
017S162W-30	CBG03	161.35 W 17.10 S	81.7	-17.2083	-161.5420
017S162W-31	CBG03	161.30 W 17.10 S	81.7	-17.2083	-161.4580
017S162W-32	CBG03	161.25 W 17.10 S	81.7	-17.2083	-161.3750
017S162W-33	CBG03	161.20 W 17.10 S	81.7	-17.2083	-161.2920
017S162W-34	CBG03	161.15 W 17.10 S	81.7	-17.2083	-161.2080
017S162W-35	CBG03	161.10 W 17.10 S	81.7	-17.2083	-161.1250
017S162W-36	CBG03	161.05 W 17.10 S	81.7	-17.2083	-161.0420
017S163W-16	CBG03	162.45 W 17.05 S	81.8	-17.1250	-162.7080
017S163W-17	CBG03	162.40 W 17.05 S	81.8	-17.1250	-162.6250
017S163W-18	CBG03	162.35 W 17.05 S	81.8	-17.1250	-162.5420
017S163W-19	CBG03	162.30 W 17.05 S	81.8	-17.1250	-162.4580
017S163W-20	CBG03	162.25 W 17.05 S	81.8	-17.1250	-162.3750
017S163W-21	CBG03	162.20 W 17.05 S	81.8	-17.1250	-162.2920
017S163W-22	CBG03	162.15 W 17.05 S	81.8	-17.1250	-162.2080
017S163W-23	CBG03	162.10 W 17.05 S	81.8	-17.1250	-162.1250
017S163W-24	CBG03	162.05 W 17.05 S	81.8	-17.1250	-162.0420
017S162W-13	CBG03	162.00 W 17.05 S	81.8	-17.1250	-161.9580
017S162W-14	CBG03	161.55 W 17.05 S	81.8	-17.1250	-161.8750
017S162W-15	CBG03	161.50 W 17.05 S	81.8	-17.1250	-161.7920
017S162W-16	CBG03	161.45 W 17.05 S	81.8	-17.1250	-161.7080
017S162W-17	CBG03	161.40 W 17.05 S	81.8	-17.1250	-161.6250
017S162W-18	CBG03	161.35 W 17.05 S	81.8	-17.1250	-161.5420
017S162W-19	CBG03	161.30 W 17.05 S	81.8	-17.1250	-161.4580
017S162W-20	CBG03	161.25 W 17.05 S	81.8	-17.1250	-161.3750
017S162W-21	CBG03	161.20 W 17.05 S	81.8	-17.1250	-161.2920
017S162W-22	CBG03	161.15 W 17.05 S	81.8	-17.1250	-161.2080
017S162W-23	CBG03	161.10 W 17.05 S	81.8	-17.1250	-161.1250
017S162W-24	CBG03	161.05 W 17.05 S	81.8	-17.1250	-161.0420
017S163W-4	CBG03	162.45 W 17.00 S	81.8	-17.0417	-162.7080
017S163W-5	CBG03	162.40 W 17.00 S	81.8	-17.0417	-162.6250
017S163W-6	CBG03	162.35 W 17.00 S	81.8	-17.0417	-162.5420
017S163W-7	CBG03	162.30 W 17.00 S	81.8	-17.0417	-162.4580
017S163W-8	CBG03	162.25 W 17.00 S	81.8	-17.0417	-162.3750
017S163W-9	CBG03	162.20 W 17.00 S	81.8	-17.0417	-162.2920
017S163W-10	CBG03	162.15 W 17.00 S	81.8	-17.0417	-162.2080
017S163W-11	CBG03	162.10 W 17.00 S	81.8	-17.0417	-162.1250
017S163W-12	CBG03	162.05 W 17.00 S	81.8	-17.0417	-162.0420
017S162W-1	CBG03	162.00 W 17.00 S	81.8	-17.0417	-161.9580
017S162W-2	CBG03	161.55 W 17.00 S	81.8	-17.0417	-161.8750
017S162W-3	CBG03	161.50 W 17.00 S	81.8	-17.0417	-161.7920
017S162W-4	CBG03	161.45 W 17.00 S	81.8	-17.0417	-161.7080
017S162W-5	CBG03	161.40 W 17.00 S	81.8	-17.0417	-161.6250
017S162W-6	CBG03	161.35 W 17.00 S	81.8	-17.0417	-161.5420
017S162W-7	CBG03	161.30 W 17.00 S	81.8	-17.0417	-161.4580
017S162W-8	CBG03	161.25 W 17.00 S	81.8	-17.0417	-161.3750
017S162W-9	CBG03	161.20 W 17.00 S	81.8	-17.0417	-161.2920
017S162W-10	CBG03	161.15 W 17.00 S	81.8	-17.0417	-161.2080
017S162W-11	CBG03	161.10 W 17.00 S	81.8	-17.0417	-161.1250
017S162W-12	CBG03	161.05 W 17.00 S	81.8	-17.0417	-161.0420
018S161W-97	CBG04	161.00 W 18.45 S	81.1	-18.7083	-160.9580
018S161W-98	CBG04	160.55 W 18.45 S	81.1	-18.7083	-160.8750

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
018S161W-99	CBG04	160.50 W 18.45 S	81.1	-18.7083	-160.7920
018S161W-85	CBG04	161.00 W 18.40 S	81.1	-18.6250	-160.9580
018S161W-86	CBG04	160.55 W 18.40 S	81.1	-18.6250	-160.8750
018S161W-87	CBG04	160.50 W 18.40 S	81.1	-18.6250	-160.7920
018S161W-73	CBG04	161.00 W 18.35 S	81.2	-18.5417	-160.9580
018S161W-74	CBG04	160.55 W 18.35 S	81.2	-18.5417	-160.8750
018S161W-75	CBG04	160.50 W 18.35 S	81.2	-18.5417	-160.7920
018S161W-76	CBG04	160.45 W 18.35 S	81.2	-18.5417	-160.7080
018S161W-61	CBG04	161.00 W 18.30 S	81.2	-18.4583	-160.9580
018S161W-62	CBG04	160.55 W 18.30 S	81.2	-18.4583	-160.8750
018S161W-63	CBG04	160.50 W 18.30 S	81.2	-18.4583	-160.7920
018S161W-64	CBG04	160.45 W 18.30 S	81.2	-18.4583	-160.7080
018S161W-49	CBG04	161.00 W 18.25 S	81.2	-18.3750	-160.9580
018S161W-50	CBG04	160.55 W 18.25 S	81.2	-18.3750	-160.8750
018S161W-51	CBG04	160.50 W 18.25 S	81.2	-18.3750	-160.7920
018S161W-52	CBG04	160.45 W 18.25 S	81.2	-18.3750	-160.7080
018S161W-53	CBG04	160.40 W 18.25 S	81.2	-18.3750	-160.6250
018S161W-37	CBG04	161.00 W 18.20 S	81.3	-18.2917	-160.9580
018S161W-38	CBG04	160.55 W 18.20 S	81.3	-18.2917	-160.8750
018S161W-39	CBG04	160.50 W 18.20 S	81.3	-18.2917	-160.7920
018S161W-40	CBG04	160.45 W 18.20 S	81.3	-18.2917	-160.7080
018S161W-41	CBG04	160.40 W 18.20 S	81.3	-18.2917	-160.6250
018S161W-42	CBG04	160.35 W 18.20 S	81.3	-18.2917	-160.5420
018S159W-37	CBG04	159.00 W 18.20 S	81.3	-18.2917	-158.9580
018S159W-38	CBG04	158.55 W 18.20 S	81.3	-18.2917	-158.8750
018S161W-25	CBG04	161.00 W 18.15 S	81.3	-18.2083	-160.9580
018S161W-26	CBG04	160.55 W 18.15 S	81.3	-18.2083	-160.8750
018S161W-27	CBG04	160.50 W 18.15 S	81.3	-18.2083	-160.7920
018S161W-28	CBG04	160.45 W 18.15 S	81.3	-18.2083	-160.7080
018S161W-29	CBG04	160.40 W 18.15 S	81.3	-18.2083	-160.6250
018S161W-30	CBG04	160.35 W 18.15 S	81.3	-18.2083	-160.5420
018S160W-36	CBG04	159.05 W 18.15 S	81.3	-18.2083	-159.0420
018S159W-25	CBG04	159.00 W 18.15 S	81.3	-18.2083	-158.9580
018S159W-26	CBG04	158.55 W 18.15 S	81.3	-18.2083	-158.8750
018S161W-13	CBG04	161.00 W 18.10 S	81.3	-18.1250	-160.9580
018S161W-14	CBG04	160.55 W 18.10 S	81.3	-18.1250	-160.8750
018S161W-15	CBG04	160.50 W 18.10 S	81.3	-18.1250	-160.7920
018S161W-16	CBG04	160.45 W 18.10 S	81.3	-18.1250	-160.7080
018S161W-17	CBG04	160.40 W 18.10 S	81.3	-18.1250	-160.6250
018S161W-18	CBG04	160.35 W 18.10 S	81.3	-18.1250	-160.5420
018S161W-19	CBG04	160.30 W 18.10 S	81.3	-18.1250	-160.4580
018S161W-20	CBG04	160.25 W 18.10 S	81.3	-18.1250	-160.3750
018S160W-23	CBG04	159.10 W 18.10 S	81.3	-18.1250	-159.1250
018S160W-24	CBG04	159.05 W 18.10 S	81.3	-18.1250	-159.0420
018S159W-13	CBG04	159.00 W 18.10 S	81.3	-18.1250	-158.9580
018S159W-14	CBG04	158.55 W 18.10 S	81.3	-18.1250	-158.8750
018S161W-1	CBG04	161.00 W 18.05 S	81.4	-18.0417	-160.9580
018S161W-2	CBG04	160.55 W 18.05 S	81.4	-18.0417	-160.8750
018S161W-3	CBG04	160.50 W 18.05 S	81.4	-18.0417	-160.7920
018S161W-4	CBG04	160.45 W 18.05 S	81.4	-18.0417	-160.7080
018S161W-5	CBG04	160.40 W 18.05 S	81.4	-18.0417	-160.6250
018S161W-6	CBG04	160.35 W 18.05 S	81.4	-18.0417	-160.5420
018S161W-7	CBG04	160.30 W 18.05 S	81.4	-18.0417	-160.4580
018S161W-8	CBG04	160.25 W 18.05 S	81.4	-18.0417	-160.3750
018S161W-9	CBG04	160.20 W 18.05 S	81.4	-18.0417	-160.2920
018S160W-9	CBG04	159.20 W 18.05 S	81.4	-18.0417	-159.2920
018S160W-10	CBG04	159.15 W 18.05 S	81.4	-18.0417	-159.2080
018S160W-11	CBG04	159.10 W 18.05 S	81.4	-18.0417	-159.1250
018S160W-12	CBG04	159.05 W 18.05 S	81.4	-18.0417	-159.0420
018S159W-1	CBG04	159.00 W 18.05 S	81.4	-18.0417	-158.9580
018S159W-2	CBG04	158.55 W 18.05 S	81.4	-18.0417	-158.8750
017S161W-133	CBG04	161.00 W 18.00 S	81.4	-17.9583	-160.9580
017S161W-134	CBG04	160.55 W 18.00 S	81.4	-17.9583	-160.8750
017S161W-135	CBG04	160.50 W 18.00 S	81.4	-17.9583	-160.7920
017S161W-136	CBG04	160.45 W 18.00 S	81.4	-17.9583	-160.7080
017S161W-137	CBG04	160.40 W 18.00 S	81.4	-17.9583	-160.6250
017S161W-138	CBG04	160.35 W 18.00 S	81.4	-17.9583	-160.5420
017S161W-139	CBG04	160.30 W 18.00 S	81.4	-17.9583	-160.4580
017S161W-140	CBG04	160.25 W 18.00 S	81.4	-17.9583	-160.3750
017S161W-141	CBG04	160.20 W 18.00 S	81.4	-17.9583	-160.2920
017S161W-142	CBG04	160.15 W 18.00 S	81.4	-17.9583	-160.2080
017S161W-143	CBG04	160.10 W 18.00 S	81.4	-17.9583	-160.1250
017S161W-144	CBG04	160.05 W 18.00 S	81.4	-17.9583	-160.0420
017S160W-138	CBG04	159.35 W 18.00 S	81.4	-17.9583	-159.5420
017S160W-139	CBG04	159.30 W 18.00 S	81.4	-17.9583	-159.4580
017S160W-140	CBG04	159.25 W 18.00 S	81.4	-17.9583	-159.3750
017S160W-141	CBG04	159.20 W 18.00 S	81.4	-17.9583	-159.2920
017S160W-142	CBG04	159.15 W 18.00 S	81.4	-17.9583	-159.2080
017S160W-143	CBG04	159.10 W 18.00 S	81.4	-17.9583	-159.1250
017S160W-144	CBG04	159.05 W 18.00 S	81.4	-17.9583	-159.0420
017S159W-133	CBG04	159.00 W 18.00 S	81.4	-17.9583	-158.9580
017S159W-134	CBG04	158.55 W 18.00 S	81.4	-17.9583	-158.8750
017S159W-135	CBG04	158.50 W 18.00 S	81.4	-17.9583	-158.7920
017S159W-136	CBG04	158.45 W 18.00 S	81.4	-17.9583	-158.7080
017S159W-137	CBG04	158.40 W 18.00 S	81.4	-17.9583	-158.6250
017S159W-138	CBG04	158.35 W 18.00 S	81.4	-17.9583	-158.5420
017S161W-121	CBG04	161.00 W 17.55 S	81.5	-17.8750	-160.9580
017S161W-122	CBG04	160.55 W 17.55 S	81.5	-17.8750	-160.8750
017S161W-123	CBG04	160.50 W 17.55 S	81.5	-17.8750	-160.7920
017S161W-124	CBG04	160.45 W 17.55 S	81.5	-17.8750	-160.7080
017S161W-125	CBG04	160.40 W 17.55 S	81.5	-17.8750	-160.6250
017S161W-126	CBG04	160.35 W 17.55 S	81.5	-17.8750	-160.5420
017S161W-127	CBG04	160.30 W 17.55 S	81.5	-17.8750	-160.4580
017S161W-128	CBG04	160.25 W 17.55 S	81.5	-17.8750	-160.3750
017S161W-129	CBG04	160.20 W 17.55 S	81.5	-17.8750	-160.2920
017S161W-130	CBG04	160.15 W 17.55 S	81.5	-17.8750	-160.2080
017S161W-131	CBG04	160.10 W 17.55 S	81.5	-17.8750	-160.1250
017S161W-132	CBG04	160.05 W 17.55 S	81.5	-17.8750	-160.0420
017S160W-121	CBG04	160.00 W 17.55 S	81.5	-17.8750	-159.9580
017S160W-122	CBG04	159.55 W 17.55 S	81.5	-17.8750	-159.8750
017S160W-123	CBG04	159.50 W 17.55 S	81.5	-17.8750	-159.7920
017S160W-124	CBG04	159.45 W 17.55 S	81.5	-17.8750	-159.7080
017S160W-125	CBG04	159.40 W 17.55 S	81.5	-17.8750	-159.6250
017S160W-126	CBG04	159.35 W 17.55 S	81.5	-17.8750	-159.5420
017S160W-127	CBG04	159.30 W 17.55 S	81.5	-17.8750	-159.4580
017S160W-128	CBG04	159.25 W 17.55 S	81.5	-17.8750	-159.3750
017S160W-129	CBG04	159.20 W 17.55 S	81.5	-17.8750	-159.2920
017S160W-130	CBG04	159.15 W 17.55 S	81.5	-17.8750	-159.2080
017S160W-131	CBG04	159.10 W 17.55 S	81.5	-17.8750	-159.1250
017S160W-132	CBG04	159.05 W 17.55 S	81.5	-17.8750	-159.0420
017S159W-121	CBG04	159.00 W 17.55 S	81.5	-17.8750	-158.9580
017S159W-122	CBG04	158.55 W 17.55 S	81.5	-17.8750	-158.8750
017S159W-123	CBG04	158.50 W 17.55 S	81.5	-17.8750	-158.7920
017S159W-124	CBG04	158.45 W 17.55 S	81.5	-17.8750	-158.7080
017S159W-125	CBG04	158.40 W 17.55 S	81.5	-17.8750	-158.6250
017S159W-126	CBG04	158.35 W 17.55 S	81.5	-17.8750	-158.5420
017S161W-109	CBG04	161.00 W 17.50 S	81.5	-17.7917	-160.9580
017S161W-110	CBG04	160.55 W 17.50 S	81.5	-17.7917	-160.8750

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
017S161W-111	CBG04	160.50 W 17.50 S	81.5	-17.7917	-160.7920
017S161W-112	CBG04	160.45 W 17.50 S	81.5	-17.7917	-160.7080
017S161W-113	CBG04	160.40 W 17.50 S	81.5	-17.7917	-160.6250
017S161W-114	CBG04	160.35 W 17.50 S	81.5	-17.7917	-160.5420
017S161W-115	CBG04	160.30 W 17.50 S	81.5	-17.7917	-160.4580
017S161W-116	CBG04	160.25 W 17.50 S	81.5	-17.7917	-160.3750
017S161W-117	CBG04	160.20 W 17.50 S	81.5	-17.7917	-160.2920
017S161W-118	CBG04	160.15 W 17.50 S	81.5	-17.7917	-160.2080
017S161W-119	CBG04	160.10 W 17.50 S	81.5	-17.7917	-160.1250
017S161W-120	CBG04	160.05 W 17.50 S	81.5	-17.7917	-160.0420
017S160W-109	CBG04	160.00 W 17.50 S	81.5	-17.7917	-159.9580
017S160W-110	CBG04	159.55 W 17.50 S	81.5	-17.7917	-159.8750
017S160W-111	CBG04	159.50 W 17.50 S	81.5	-17.7917	-159.7920
017S160W-112	CBG04	159.45 W 17.50 S	81.5	-17.7917	-159.7080
017S160W-113	CBG04	159.40 W 17.50 S	81.5	-17.7917	-159.6250
017S160W-114	CBG04	159.35 W 17.50 S	81.5	-17.7917	-159.5420
017S160W-115	CBG04	159.30 W 17.50 S	81.5	-17.7917	-159.4580
017S160W-116	CBG04	159.25 W 17.50 S	81.5	-17.7917	-159.3750
017S160W-117	CBG04	159.20 W 17.50 S	81.5	-17.7917	-159.2920
017S160W-118	CBG04	159.15 W 17.50 S	81.5	-17.7917	-159.2080
017S160W-119	CBG04	159.10 W 17.50 S	81.5	-17.7917	-159.1250
017S160W-120	CBG04	159.05 W 17.50 S	81.5	-17.7917	-159.0420
017S159W-109	CBG04	159.00 W 17.50 S	81.5	-17.7917	-158.9580
017S159W-110	CBG04	158.55 W 17.50 S	81.5	-17.7917	-158.8750
017S159W-111	CBG04	158.50 W 17.50 S	81.5	-17.7917	-158.7920
017S159W-112	CBG04	158.45 W 17.50 S	81.5	-17.7917	-158.7080
017S159W-113	CBG04	158.40 W 17.50 S	81.5	-17.7917	-158.6250
017S159W-114	CBG04	158.35 W 17.50 S	81.5	-17.7917	-158.5420
017S159W-115	CBG04	158.30 W 17.50 S	81.5	-17.7917	-158.4580
017S159W-116	CBG04	158.25 W 17.50 S	81.5	-17.7917	-158.3750
017S159W-117	CBG04	158.20 W 17.50 S	81.5	-17.7917	-158.2920
017S159W-118	CBG04	158.15 W 17.50 S	81.5	-17.7917	-158.2080
017S159W-119	CBG04	158.10 W 17.50 S	81.5	-17.7917	-158.1250
017S161W-97	CBG04	161.00 W 17.45 S	81.5	-17.7083	-160.9580
017S161W-98	CBG04	160.55 W 17.45 S	81.5	-17.7083	-160.8750
017S161W-99	CBG04	160.50 W 17.45 S	81.5	-17.7083	-160.7920
017S161W-100	CBG04	160.45 W 17.45 S	81.5	-17.7083	-160.7080
017S161W-101	CBG04	160.40 W 17.45 S	81.5	-17.7083	-160.6250
017S161W-102	CBG04	160.35 W 17.45 S	81.5	-17.7083	-160.5420
017S161W-103	CBG04	160.30 W 17.45 S	81.5	-17.7083	-160.4580
017S161W-104	CBG04	160.25 W 17.45 S	81.5	-17.7083	-160.3750
017S161W-105	CBG04	160.20 W 17.45 S	81.5	-17.7083	-160.2920
017S161W-106	CBG04	160.15 W 17.45 S	81.5	-17.7083	-160.2080
017S161W-107	CBG04	160.10 W 17.45 S	81.5	-17.7083	-160.1250
017S161W-108	CBG04	160.05 W 17.45 S	81.5	-17.7083	-160.0420
017S160W-97	CBG04	160.00 W 17.45 S	81.5	-17.7083	-159.9580
017S160W-98	CBG04	159.55 W 17.45 S	81.5	-17.7083	-159.8750
017S160W-99	CBG04	159.50 W 17.45 S	81.5	-17.7083	-159.7920
017S160W-100	CBG04	159.45 W 17.45 S	81.5	-17.7083	-159.7080
017S160W-101	CBG04	159.40 W 17.45 S	81.5	-17.7083	-159.6250
017S160W-102	CBG04	159.35 W 17.45 S	81.5	-17.7083	-159.5420
017S160W-103	CBG04	159.30 W 17.45 S	81.5	-17.7083	-159.4580
017S160W-104	CBG04	159.25 W 17.45 S	81.5	-17.7083	-159.3750
017S160W-105	CBG04	159.20 W 17.45 S	81.5	-17.7083	-159.2920
017S160W-106	CBG04	159.15 W 17.45 S	81.5	-17.7083	-159.2080
017S160W-107	CBG04	159.10 W 17.45 S	81.5	-17.7083	-159.1250
017S160W-108	CBG04	159.05 W 17.45 S	81.5	-17.7083	-159.0420
017S159W-97	CBG04	159.00 W 17.45 S	81.5	-17.7083	-158.9580
017S159W-98	CBG04	158.55 W 17.45 S	81.5	-17.7083	-158.8750
017S159W-99	CBG04	158.50 W 17.45 S	81.5	-17.7083	-158.7920
017S159W-100	CBG04	158.45 W 17.45 S	81.5	-17.7083	-158.7080
017S159W-101	CBG04	158.40 W 17.45 S	81.5	-17.7083	-158.6250
017S159W-102	CBG04	158.35 W 17.45 S	81.5	-17.7083	-158.5420
017S159W-103	CBG04	158.30 W 17.45 S	81.5	-17.7083	-158.4580
017S159W-104	CBG04	158.25 W 17.45 S	81.5	-17.7083	-158.3750
017S159W-105	CBG04	158.20 W 17.45 S	81.5	-17.7083	-158.2920
017S159W-106	CBG04	158.15 W 17.45 S	81.5	-17.7083	-158.2080
017S159W-107	CBG04	158.10 W 17.45 S	81.5	-17.7083	-158.1250
017S159W-108	CBG04	158.05 W 17.45 S	81.5	-17.7083	-158.0420
017S161W-85	CBG04	161.00 W 17.40 S	81.6	-17.6250	-160.9580
017S161W-86	CBG04	160.55 W 17.40 S	81.6	-17.6250	-160.8750
017S161W-87	CBG04	160.50 W 17.40 S	81.6	-17.6250	-160.7920
017S161W-88	CBG04	160.45 W 17.40 S	81.6	-17.6250	-160.7080
017S161W-89	CBG04	160.40 W 17.40 S	81.6	-17.6250	-160.6250
017S161W-90	CBG04	160.35 W 17.40 S	81.6	-17.6250	-160.5420
017S161W-91	CBG04	160.30 W 17.40 S	81.6	-17.6250	-160.4580
017S161W-92	CBG04	160.25 W 17.40 S	81.6	-17.6250	-160.3750
017S161W-93	CBG04	160.20 W 17.40 S	81.6	-17.6250	-160.2920
017S161W-94	CBG04	160.15 W 17.40 S	81.6	-17.6250	-160.2080
017S161W-95	CBG04	160.10 W 17.40 S	81.6	-17.6250	-160.1250
017S161W-96	CBG04	160.05 W 17.40 S	81.6	-17.6250	-160.0420
017S160W-85	CBG04	160.00 W 17.40 S	81.6	-17.6250	-159.9580
017S160W-86	CBG04	159.55 W 17.40 S	81.6	-17.6250	-159.8750
017S160W-87	CBG04	159.50 W 17.40 S	81.6	-17.6250	-159.7920
017S160W-88	CBG04	159.45 W 17.40 S	81.6	-17.6250	-159.7080
017S160W-89	CBG04	159.40 W 17.40 S	81.6	-17.6250	-159.6250
017S160W-90	CBG04	159.35 W 17.40 S	81.6	-17.6250	-159.5420
017S160W-91	CBG04	159.30 W 17.40 S	81.6	-17.6250	-159.4580
017S160W-92	CBG04	159.25 W 17.40 S	81.6	-17.6250	-159.3750
017S160W-93	CBG04	159.20 W 17.40 S	81.6	-17.6250	-159.2920
017S160W-94	CBG04	159.15 W 17.40 S	81.6	-17.6250	-159.2080
017S160W-95	CBG04	159.10 W 17.40 S	81.6	-17.6250	-159.1250
017S160W-96	CBG04	159.05 W 17.40 S	81.6	-17.6250	-159.0420
017S159W-85	CBG04	159.00 W 17.40 S	81.6	-17.6250	-158.9580
017S159W-86	CBG04	158.55 W 17.40 S	81.6	-17.6250	-158.8750
017S159W-87	CBG04	158.50 W 17.40 S	81.6	-17.6250	-158.7920
017S159W-88	CBG04	158.45 W 17.40 S	81.6	-17.6250	-158.7080
017S159W-89	CBG04	158.40 W 17.40 S	81.6	-17.6250	-158.6250
017S159W-90	CBG04	158.35 W 17.40 S	81.6	-17.6250	-158.5420
017S159W-91	CBG04	158.30 W 17.40 S	81.6	-17.6250	-158.4580
017S159W-92	CBG04	158.25 W 17.40 S	81.6	-17.6250	-158.3750
017S159W-93	CBG04	158.20 W 17.40 S	81.6	-17.6250	-158.2920
017S159W-94	CBG04	158.15 W 17.40 S	81.6	-17.6250	-158.2080
017S159W-95	CBG04	158.10 W 17.40 S	81.6	-17.6250	-158.1250
017S159W-96	CBG04	158.05 W 17.40 S	81.6	-17.6250	-158.0420
017S161W-73	CBG04	161.00 W 17.35 S	81.6	-17.5417	-160.9580
017S161W-74	CBG04	160.55 W 17.35 S	81.6	-17.5417	-160.8750
017S161W-75	CBG04	160.50 W 17.35 S	81.6	-17.5417	-160.7920
017S161W-76	CBG04	160.45 W 17.35 S	81.6	-17.5417	-160.7080
017S161W-77	CBG04	160.40 W 17.35 S	81.6	-17.5417	-160.6250
017S161W-78	CBG04	160.35 W 17.35 S	81.6	-17.5417	-160.5420
017S161W-79	CBG04	160.30 W 17.35 S	81.6	-17.5417	-160.4580
017S161W-80	CBG04	160.25 W 17.35 S	81.6	-17.5417	-160.3750
017S161W-81	CBG04	160.20 W 17.35 S	81.6	-17.5417	-160.2920
017S161W-82	CBG04	160.15 W 17.35 S	81.6	-17.5417	-160.2080
017S161W-83	CBG04	160.10 W 17.35 S	81.6	-17.5417	-160.1250
017S161W-84	CBG04	160.05 W 17.35 S	81.6	-17.5417	-160.0420
017S160W-73	CBG04	160.00 W 17.35 S	81.6	-17.5417	-159.9580

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
017S160W-74	CBG04	159.55 W 17.35 S	81.6	-17.5417	-159.8750
017S160W-75	CBG04	159.50 W 17.35 S	81.6	-17.5417	-159.7920
017S160W-76	CBG04	159.45 W 17.35 S	81.6	-17.5417	-159.7080
017S160W-77	CBG04	159.40 W 17.35 S	81.6	-17.5417	-159.6250
017S160W-78	CBG04	159.35 W 17.35 S	81.6	-17.5417	-159.5420
017S160W-79	CBG04	159.30 W 17.35 S	81.6	-17.5417	-159.4580
017S160W-80	CBG04	159.25 W 17.35 S	81.6	-17.5417	-159.3750
017S160W-81	CBG04	159.20 W 17.35 S	81.6	-17.5417	-159.2920
017S160W-82	CBG04	159.15 W 17.35 S	81.6	-17.5417	-159.2080
017S160W-83	CBG04	159.10 W 17.35 S	81.6	-17.5417	-159.1250
017S160W-84	CBG04	159.05 W 17.35 S	81.6	-17.5417	-159.0420
017S159W-73	CBG04	159.00 W 17.35 S	81.6	-17.5417	-158.9580
017S159W-74	CBG04	158.55 W 17.35 S	81.6	-17.5417	-158.8750
017S159W-75	CBG04	158.50 W 17.35 S	81.6	-17.5417	-158.7920
017S159W-76	CBG04	158.45 W 17.35 S	81.6	-17.5417	-158.7080
017S159W-77	CBG04	158.40 W 17.35 S	81.6	-17.5417	-158.6250
017S159W-78	CBG04	158.35 W 17.35 S	81.6	-17.5417	-158.5420
017S159W-79	CBG04	158.30 W 17.35 S	81.6	-17.5417	-158.4580
017S159W-80	CBG04	158.25 W 17.35 S	81.6	-17.5417	-158.3750
017S159W-81	CBG04	158.20 W 17.35 S	81.6	-17.5417	-158.2920
017S159W-82	CBG04	158.15 W 17.35 S	81.6	-17.5417	-158.2080
017S159W-83	CBG04	158.10 W 17.35 S	81.6	-17.5417	-158.1250
017S159W-84	CBG04	158.05 W 17.35 S	81.6	-17.5417	-158.0420
017S161W-61	CBG04	161.00 W 17.30 S	81.6	-17.4583	-160.9580
017S161W-62	CBG04	160.55 W 17.30 S	81.6	-17.4583	-160.8750
017S161W-63	CBG04	160.50 W 17.30 S	81.6	-17.4583	-160.7920
017S161W-64	CBG04	160.45 W 17.30 S	81.6	-17.4583	-160.7080
017S161W-65	CBG04	160.40 W 17.30 S	81.6	-17.4583	-160.6250
017S161W-66	CBG04	160.35 W 17.30 S	81.6	-17.4583	-160.5420
017S161W-67	CBG04	160.30 W 17.30 S	81.6	-17.4583	-160.4580
017S161W-68	CBG04	160.25 W 17.30 S	81.6	-17.4583	-160.3750
017S161W-69	CBG04	160.20 W 17.30 S	81.6	-17.4583	-160.2920
017S161W-70	CBG04	160.15 W 17.30 S	81.6	-17.4583	-160.2080
017S161W-71	CBG04	160.10 W 17.30 S	81.6	-17.4583	-160.1250
017S161W-72	CBG04	160.05 W 17.30 S	81.6	-17.4583	-160.0420
017S160W-61	CBG04	160.00 W 17.30 S	81.6	-17.4583	-159.9580
017S160W-62	CBG04	159.55 W 17.30 S	81.6	-17.4583	-159.8750
017S160W-63	CBG04	159.50 W 17.30 S	81.6	-17.4583	-159.7920
017S160W-64	CBG04	159.45 W 17.30 S	81.6	-17.4583	-159.7080
017S160W-65	CBG04	159.40 W 17.30 S	81.6	-17.4583	-159.6250
017S160W-66	CBG04	159.35 W 17.30 S	81.6	-17.4583	-159.5420
017S160W-67	CBG04	159.30 W 17.30 S	81.6	-17.4583	-159.4580
017S160W-68	CBG04	159.25 W 17.30 S	81.6	-17.4583	-159.3750
017S160W-69	CBG04	159.20 W 17.30 S	81.6	-17.4583	-159.2920
017S160W-70	CBG04	159.15 W 17.30 S	81.6	-17.4583	-159.2080
017S160W-71	CBG04	159.10 W 17.30 S	81.6	-17.4583	-159.1250
017S160W-72	CBG04	159.05 W 17.30 S	81.6	-17.4583	-159.0420
017S159W-61	CBG04	159.00 W 17.30 S	81.6	-17.4583	-158.9580
017S159W-62	CBG04	158.55 W 17.30 S	81.6	-17.4583	-158.8750
017S159W-63	CBG04	158.50 W 17.30 S	81.6	-17.4583	-158.7920
017S159W-64	CBG04	158.45 W 17.30 S	81.6	-17.4583	-158.7080
017S159W-65	CBG04	158.40 W 17.30 S	81.6	-17.4583	-158.6250
017S159W-66	CBG04	158.35 W 17.30 S	81.6	-17.4583	-158.5420
017S159W-67	CBG04	158.30 W 17.30 S	81.6	-17.4583	-158.4580
017S159W-68	CBG04	158.25 W 17.30 S	81.6	-17.4583	-158.3750
017S159W-69	CBG04	158.20 W 17.30 S	81.6	-17.4583	-158.2920
017S159W-70	CBG04	158.15 W 17.30 S	81.6	-17.4583	-158.2080
017S159W-71	CBG04	158.10 W 17.30 S	81.6	-17.4583	-158.1250
017S159W-72	CBG04	158.05 W 17.30 S	81.6	-17.4583	-158.0420
017S161W-49	CBG04	161.00 W 17.25 S	81.7	-17.3750	-160.9580
017S161W-50	CBG04	160.55 W 17.25 S	81.7	-17.3750	-160.8750
017S161W-51	CBG04	160.50 W 17.25 S	81.7	-17.3750	-160.7920
017S161W-52	CBG04	160.45 W 17.25 S	81.7	-17.3750	-160.7080
017S161W-53	CBG04	160.40 W 17.25 S	81.7	-17.3750	-160.6250
017S161W-54	CBG04	160.35 W 17.25 S	81.7	-17.3750	-160.5420
017S161W-55	CBG04	160.30 W 17.25 S	81.7	-17.3750	-160.4580
017S161W-56	CBG04	160.25 W 17.25 S	81.7	-17.3750	-160.3750
017S161W-57	CBG04	160.20 W 17.25 S	81.7	-17.3750	-160.2920
017S161W-58	CBG04	160.15 W 17.25 S	81.7	-17.3750	-160.2080
017S161W-59	CBG04	160.10 W 17.25 S	81.7	-17.3750	-160.1250
017S161W-60	CBG04	160.05 W 17.25 S	81.7	-17.3750	-160.0420
017S160W-49	CBG04	160.00 W 17.25 S	81.7	-17.3750	-159.9580
017S160W-50	CBG04	159.55 W 17.25 S	81.7	-17.3750	-159.8750
017S160W-51	CBG04	159.50 W 17.25 S	81.7	-17.3750	-159.7920
017S160W-52	CBG04	159.45 W 17.25 S	81.7	-17.3750	-159.7080
017S160W-53	CBG04	159.40 W 17.25 S	81.7	-17.3750	-159.6250
017S160W-54	CBG04	159.35 W 17.25 S	81.7	-17.3750	-159.5420
017S160W-55	CBG04	159.30 W 17.25 S	81.7	-17.3750	-159.4580
017S160W-56	CBG04	159.25 W 17.25 S	81.7	-17.3750	-159.3750
017S160W-57	CBG04	159.20 W 17.25 S	81.7	-17.3750	-159.2920
017S160W-58	CBG04	159.15 W 17.25 S	81.7	-17.3750	-159.2080
017S160W-59	CBG04	159.10 W 17.25 S	81.7	-17.3750	-159.1250
017S160W-60	CBG04	159.05 W 17.25 S	81.7	-17.3750	-159.0420
017S159W-49	CBG04	159.00 W 17.25 S	81.7	-17.3750	-158.9580
017S159W-50	CBG04	158.55 W 17.25 S	81.7	-17.3750	-158.8750
017S159W-51	CBG04	158.50 W 17.25 S	81.7	-17.3750	-158.7920
017S159W-52	CBG04	158.45 W 17.25 S	81.7	-17.3750	-158.7080
017S159W-53	CBG04	158.40 W 17.25 S	81.7	-17.3750	-158.6250
017S159W-54	CBG04	158.35 W 17.25 S	81.7	-17.3750	-158.5420
017S159W-55	CBG04	158.30 W 17.25 S	81.7	-17.3750	-158.4580
017S159W-56	CBG04	158.25 W 17.25 S	81.7	-17.3750	-158.3750
017S159W-57	CBG04	158.20 W 17.25 S	81.7	-17.3750	-158.2920
017S159W-58	CBG04	158.15 W 17.25 S	81.7	-17.3750	-158.2080
017S159W-59	CBG04	158.10 W 17.25 S	81.7	-17.3750	-158.1250
017S159W-60	CBG04	158.05 W 17.25 S	81.7	-17.3750	-158.0420
017S161W-37	CBG04	161.00 W 17.20 S	81.7	-17.2917	-160.9580
017S161W-38	CBG04	160.55 W 17.20 S	81.7	-17.2917	-160.8750
017S161W-39	CBG04	160.50 W 17.20 S	81.7	-17.2917	-160.7920
017S161W-40	CBG04	160.45 W 17.20 S	81.7	-17.2917	-160.7080
017S161W-41	CBG04	160.40 W 17.20 S	81.7	-17.2917	-160.6250
017S161W-42	CBG04	160.35 W 17.20 S	81.7	-17.2917	-160.5420
017S161W-43	CBG04	160.30 W 17.20 S	81.7	-17.2917	-160.4580
017S161W-44	CBG04	160.25 W 17.20 S	81.7	-17.2917	-160.3750
017S161W-45	CBG04	160.20 W 17.20 S	81.7	-17.2917	-160.2920
017S161W-46	CBG04	160.15 W 17.20 S	81.7	-17.2917	-160.2080
017S161W-47	CBG04	160.10 W 17.20 S	81.7	-17.2917	-160.1250
017S161W-48	CBG04	160.05 W 17.20 S	81.7	-17.2917	-160.0420
017S160W-37	CBG04	160.00 W 17.20 S	81.7	-17.2917	-159.9580
017S160W-38	CBG04	159.55 W 17.20 S	81.7	-17.2917	-159.8750
017S160W-39	CBG04	159.50 W 17.20 S	81.7	-17.2917	-159.7920
017S160W-40	CBG04	159.45 W 17.20 S	81.7	-17.2917	-159.7080
017S160W-41	CBG04	159.40 W 17.20 S	81.7	-17.2917	-159.6250
017S160W-42	CBG04	159.35 W 17.20 S	81.7	-17.2917	-159.5420
017S160W-43	CBG04	159.30 W 17.20 S	81.7	-17.2917	-159.4580
017S160W-44	CBG04	159.25 W 17.20 S	81.7	-17.2917	-159.3750
017S160W-45	CBG04	159.20 W 17.20 S	81.7	-17.2917	-159.2920
017S160W-46	CBG04	159.15 W 17.20 S	81.7	-17.2917	-159.2080
017S160W-47	CBG04	159.10 W 17.20 S	81.7	-17.2917	-159.1250

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
017S160W-48	CBG04	159.05 W 17.20 S	81.7	-17.2917	-159.0420
017S159W-37	CBG04	159.00 W 17.20 S	81.7	-17.2917	-158.9580
017S159W-38	CBG04	158.55 W 17.20 S	81.7	-17.2917	-158.8750
017S159W-39	CBG04	158.50 W 17.20 S	81.7	-17.2917	-158.7920
017S159W-40	CBG04	158.45 W 17.20 S	81.7	-17.2917	-158.7080
017S159W-41	CBG04	158.40 W 17.20 S	81.7	-17.2917	-158.6250
017S159W-42	CBG04	158.35 W 17.20 S	81.7	-17.2917	-158.5420
017S159W-43	CBG04	158.30 W 17.20 S	81.7	-17.2917	-158.4580
017S159W-44	CBG04	158.25 W 17.20 S	81.7	-17.2917	-158.3750
017S159W-45	CBG04	158.20 W 17.20 S	81.7	-17.2917	-158.2920
017S159W-46	CBG04	158.15 W 17.20 S	81.7	-17.2917	-158.2080
017S159W-47	CBG04	158.10 W 17.20 S	81.7	-17.2917	-158.1250
017S159W-48	CBG04	158.05 W 17.20 S	81.7	-17.2917	-158.0420
017S161W-25	CBG04	161.00 W 17.15 S	81.7	-17.2083	-160.9580
017S161W-26	CBG04	160.55 W 17.15 S	81.7	-17.2083	-160.8750
017S161W-27	CBG04	160.50 W 17.15 S	81.7	-17.2083	-160.7920
017S161W-28	CBG04	160.45 W 17.15 S	81.7	-17.2083	-160.7080
017S161W-29	CBG04	160.40 W 17.15 S	81.7	-17.2083	-160.6250
017S161W-30	CBG04	160.35 W 17.15 S	81.7	-17.2083	-160.5420
017S161W-31	CBG04	160.30 W 17.15 S	81.7	-17.2083	-160.4580
017S161W-32	CBG04	160.25 W 17.15 S	81.7	-17.2083	-160.3750
017S161W-33	CBG04	160.20 W 17.15 S	81.7	-17.2083	-160.2920
017S161W-34	CBG04	160.15 W 17.15 S	81.7	-17.2083	-160.2080
017S161W-35	CBG04	160.10 W 17.15 S	81.7	-17.2083	-160.1250
017S161W-36	CBG04	160.05 W 17.15 S	81.7	-17.2083	-160.0420
017S160W-25	CBG04	160.00 W 17.15 S	81.7	-17.2083	-159.9580
017S160W-26	CBG04	159.55 W 17.15 S	81.7	-17.2083	-159.8750
017S160W-27	CBG04	159.50 W 17.15 S	81.7	-17.2083	-159.7920
017S160W-28	CBG04	159.45 W 17.15 S	81.7	-17.2083	-159.7080
017S160W-29	CBG04	159.40 W 17.15 S	81.7	-17.2083	-159.6250
017S160W-30	CBG04	159.35 W 17.15 S	81.7	-17.2083	-159.5420
017S160W-31	CBG04	159.30 W 17.15 S	81.7	-17.2083	-159.4580
017S160W-32	CBG04	159.25 W 17.15 S	81.7	-17.2083	-159.3750
017S160W-33	CBG04	159.20 W 17.15 S	81.7	-17.2083	-159.2920
017S160W-34	CBG04	159.15 W 17.15 S	81.7	-17.2083	-159.2080
017S160W-35	CBG04	159.10 W 17.15 S	81.7	-17.2083	-159.1250
017S160W-36	CBG04	159.05 W 17.15 S	81.7	-17.2083	-159.0420
017S159W-25	CBG04	159.00 W 17.15 S	81.7	-17.2083	-158.9580
017S159W-26	CBG04	158.55 W 17.15 S	81.7	-17.2083	-158.8750
017S159W-27	CBG04	158.50 W 17.15 S	81.7	-17.2083	-158.7920
017S159W-28	CBG04	158.45 W 17.15 S	81.7	-17.2083	-158.7080
017S159W-29	CBG04	158.40 W 17.15 S	81.7	-17.2083	-158.6250
017S159W-30	CBG04	158.35 W 17.15 S	81.7	-17.2083	-158.5420
017S159W-31	CBG04	158.30 W 17.15 S	81.7	-17.2083	-158.4580
017S159W-32	CBG04	158.25 W 17.15 S	81.7	-17.2083	-158.3750
017S159W-33	CBG04	158.20 W 17.15 S	81.7	-17.2083	-158.2920
017S159W-34	CBG04	158.15 W 17.15 S	81.7	-17.2083	-158.2080
017S159W-35	CBG04	158.10 W 17.15 S	81.7	-17.2083	-158.1250
017S159W-36	CBG04	158.05 W 17.15 S	81.7	-17.2083	-158.0420
017S161W-13	CBG04	161.00 W 17.10 S	81.8	-17.1250	-160.9580
017S161W-14	CBG04	160.55 W 17.10 S	81.8	-17.1250	-160.8750
017S161W-15	CBG04	160.50 W 17.10 S	81.8	-17.1250	-160.7920
017S161W-16	CBG04	160.45 W 17.10 S	81.8	-17.1250	-160.7080
017S161W-17	CBG04	160.40 W 17.10 S	81.8	-17.1250	-160.6250
017S161W-18	CBG04	160.35 W 17.10 S	81.8	-17.1250	-160.5420
017S161W-19	CBG04	160.30 W 17.10 S	81.8	-17.1250	-160.4580
017S161W-20	CBG04	160.25 W 17.10 S	81.8	-17.1250	-160.3750
017S161W-21	CBG04	160.20 W 17.10 S	81.8	-17.1250	-160.2920
017S161W-22	CBG04	160.15 W 17.10 S	81.8	-17.1250	-160.2080
017S161W-23	CBG04	160.10 W 17.10 S	81.8	-17.1250	-160.1250
017S161W-24	CBG04	160.05 W 17.10 S	81.8	-17.1250	-160.0420
017S160W-13	CBG04	160.00 W 17.10 S	81.8	-17.1250	-159.9580
017S160W-14	CBG04	159.55 W 17.10 S	81.8	-17.1250	-159.8750
017S160W-15	CBG04	159.50 W 17.10 S	81.8	-17.1250	-159.7920
017S160W-16	CBG04	159.45 W 17.10 S	81.8	-17.1250	-159.7080
017S160W-17	CBG04	159.40 W 17.10 S	81.8	-17.1250	-159.6250
017S160W-18	CBG04	159.35 W 17.10 S	81.8	-17.1250	-159.5420
017S160W-19	CBG04	159.30 W 17.10 S	81.8	-17.1250	-159.4580
017S160W-20	CBG04	159.25 W 17.10 S	81.8	-17.1250	-159.3750
017S160W-21	CBG04	159.20 W 17.10 S	81.8	-17.1250	-159.2920
017S160W-22	CBG04	159.15 W 17.10 S	81.8	-17.1250	-159.2080
017S160W-23	CBG04	159.10 W 17.10 S	81.8	-17.1250	-159.1250
017S160W-24	CBG04	159.05 W 17.10 S	81.8	-17.1250	-159.0420
017S159W-13	CBG04	159.00 W 17.10 S	81.8	-17.1250	-158.9580
017S159W-14	CBG04	158.55 W 17.10 S	81.8	-17.1250	-158.8750
017S159W-15	CBG04	158.50 W 17.10 S	81.8	-17.1250	-158.7920
017S159W-16	CBG04	158.45 W 17.10 S	81.8	-17.1250	-158.7080
017S159W-17	CBG04	158.40 W 17.10 S	81.8	-17.1250	-158.6250
017S159W-18	CBG04	158.35 W 17.10 S	81.8	-17.1250	-158.5420
017S159W-19	CBG04	158.30 W 17.10 S	81.8	-17.1250	-158.4580
017S159W-20	CBG04	158.25 W 17.10 S	81.8	-17.1250	-158.3750
017S159W-21	CBG04	158.20 W 17.10 S	81.8	-17.1250	-158.2920
017S159W-22	CBG04	158.15 W 17.10 S	81.8	-17.1250	-158.2080
017S159W-23	CBG04	158.10 W 17.10 S	81.8	-17.1250	-158.1250
017S159W-24	CBG04	158.05 W 17.10 S	81.8	-17.1250	-158.0420
017S161W-1	CBG04	161.00 W 17.05 S	81.8	-17.0417	-160.9580
017S161W-2	CBG04	160.55 W 17.05 S	81.8	-17.0417	-160.8750
017S161W-3	CBG04	160.50 W 17.05 S	81.8	-17.0417	-160.7920
017S161W-4	CBG04	160.45 W 17.05 S	81.8	-17.0417	-160.7080
017S161W-5	CBG04	160.40 W 17.05 S	81.8	-17.0417	-160.6250
017S161W-6	CBG04	160.35 W 17.05 S	81.8	-17.0417	-160.5420
017S161W-7	CBG04	160.30 W 17.05 S	81.8	-17.0417	-160.4580
017S161W-8	CBG04	160.25 W 17.05 S	81.8	-17.0417	-160.3750
017S161W-9	CBG04	160.20 W 17.05 S	81.8	-17.0417	-160.2920
017S161W-10	CBG04	160.15 W 17.05 S	81.8	-17.0417	-160.2080
017S161W-11	CBG04	160.10 W 17.05 S	81.8	-17.0417	-160.1250
017S161W-12	CBG04	160.05 W 17.05 S	81.8	-17.0417	-160.0420
017S160W-1	CBG04	160.00 W 17.05 S	81.8	-17.0417	-159.9580
017S160W-2	CBG04	159.55 W 17.05 S	81.8	-17.0417	-159.8750
017S160W-3	CBG04	159.50 W 17.05 S	81.8	-17.0417	-159.7920
017S160W-4	CBG04	159.45 W 17.05 S	81.8	-17.0417	-159.7080
017S160W-5	CBG04	159.40 W 17.05 S	81.8	-17.0417	-159.6250
017S160W-6	CBG04	159.35 W 17.05 S	81.8	-17.0417	-159.5420
017S160W-7	CBG04	159.30 W 17.05 S	81.8	-17.0417	-159.4580
017S160W-8	CBG04	159.25 W 17.05 S	81.8	-17.0417	-159.3750
017S160W-9	CBG04	159.20 W 17.05 S	81.8	-17.0417	-159.2920
017S160W-10	CBG04	159.15 W 17.05 S	81.8	-17.0417	-159.2080
017S160W-11	CBG04	159.10 W 17.05 S	81.8	-17.0417	-159.1250
017S160W-12	CBG04	159.05 W 17.05 S	81.8	-17.0417	-159.0420
017S159W-1	CBG04	159.00 W 17.05 S	81.8	-17.0417	-158.9580
017S159W-2	CBG04	158.55 W 17.05 S	81.8	-17.0417	-158.8750
017S159W-3	CBG04	158.50 W 17.05 S	81.8	-17.0417	-158.7920
017S159W-4	CBG04	158.45 W 17.05 S	81.8	-17.0417	-158.7080
017S159W-5	CBG04	158.40 W 17.05 S	81.8	-17.0417	-158.6250
017S159W-6	CBG04	158.35 W 17.05 S	81.8	-17.0417	-158.5420
017S159W-7	CBG04	158.30 W 17.05 S	81.8	-17.0417	-158.4580
017S159W-8	CBG04	158.25 W 17.05 S	81.8	-17.0417	-158.3750
017S159W-9	CBG04	158.20 W 17.05 S	81.8	-17.0417	-158.2920

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
017S159W-10	CBG04	158.15 W 17.05 S	81.8	-17.0417	-158.2080
017S159W-11	CBG04	158.10 W 17.05 S	81.8	-17.0417	-158.1250
017S159W-12	CBG04	158.05 W 17.05 S	81.8	-17.0417	-158.0420
016S161W-133	CBG04	161.00 W 17.00 S	81.9	-16.9583	-160.9580
016S161W-134	CBG04	160.55 W 17.00 S	81.9	-16.9583	-160.8750
016S161W-135	CBG04	160.50 W 17.00 S	81.9	-16.9583	-160.7920
016S161W-136	CBG04	160.45 W 17.00 S	81.9	-16.9583	-160.7080
016S161W-137	CBG04	160.40 W 17.00 S	81.9	-16.9583	-160.6250
016S161W-138	CBG04	160.35 W 17.00 S	81.9	-16.9583	-160.5420
016S159W-139	CBG04	158.30 W 17.00 S	81.9	-16.9583	-158.4580
016S159W-140	CBG04	158.25 W 17.00 S	81.9	-16.9583	-158.3750
016S159W-141	CBG04	158.20 W 17.00 S	81.9	-16.9583	-158.2920
016S159W-142	CBG04	158.15 W 17.00 S	81.9	-16.9583	-158.2080
016S159W-143	CBG04	158.10 W 17.00 S	81.9	-16.9583	-158.1250
016S159W-144	CBG04	158.05 W 17.00 S	81.9	-16.9583	-158.0420
016S161W-121	CBG04	161.00 W 16.55 S	81.9	-16.8750	-160.9580
016S161W-122	CBG04	160.55 W 16.55 S	81.9	-16.8750	-160.8750
016S161W-123	CBG04	160.50 W 16.55 S	81.9	-16.8750	-160.7920
016S161W-124	CBG04	160.45 W 16.55 S	81.9	-16.8750	-160.7080
016S161W-125	CBG04	160.40 W 16.55 S	81.9	-16.8750	-160.6250
016S161W-126	CBG04	160.35 W 16.55 S	81.9	-16.8750	-160.5420
016S159W-127	CBG04	158.30 W 16.55 S	81.9	-16.8750	-158.4580
016S159W-128	CBG04	158.25 W 16.55 S	81.9	-16.8750	-158.3750
016S159W-129	CBG04	158.20 W 16.55 S	81.9	-16.8750	-158.2920
016S159W-130	CBG04	158.15 W 16.55 S	81.9	-16.8750	-158.2080
016S159W-131	CBG04	158.10 W 16.55 S	81.9	-16.8750	-158.1250
016S159W-132	CBG04	158.05 W 16.55 S	81.9	-16.8750	-158.0420
016S161W-109	CBG04	161.00 W 16.50 S	81.9	-16.7917	-160.9580
016S161W-110	CBG04	160.55 W 16.50 S	81.9	-16.7917	-160.8750
016S161W-111	CBG04	160.50 W 16.50 S	81.9	-16.7917	-160.7920
016S161W-112	CBG04	160.45 W 16.50 S	81.9	-16.7917	-160.7080
016S161W-113	CBG04	160.40 W 16.50 S	81.9	-16.7917	-160.6250
016S161W-114	CBG04	160.35 W 16.50 S	81.9	-16.7917	-160.5420
016S159W-115	CBG04	158.30 W 16.50 S	81.9	-16.7917	-158.4580
016S159W-116	CBG04	158.25 W 16.50 S	81.9	-16.7917	-158.3750
016S159W-117	CBG04	158.20 W 16.50 S	81.9	-16.7917	-158.2920
016S159W-118	CBG04	158.15 W 16.50 S	81.9	-16.7917	-158.2080
016S159W-119	CBG04	158.10 W 16.50 S	81.9	-16.7917	-158.1250
016S159W-120	CBG04	158.05 W 16.50 S	81.9	-16.7917	-158.0420
016S161W-97	CBG04	161.00 W 16.45 S	82.0	-16.7083	-160.9580
016S161W-98	CBG04	160.55 W 16.45 S	82.0	-16.7083	-160.8750
016S161W-99	CBG04	160.50 W 16.45 S	82.0	-16.7083	-160.7920
016S161W-100	CBG04	160.45 W 16.45 S	82.0	-16.7083	-160.7080
016S161W-101	CBG04	160.40 W 16.45 S	82.0	-16.7083	-160.6250
016S161W-102	CBG04	160.35 W 16.45 S	82.0	-16.7083	-160.5420
016S159W-103	CBG04	158.30 W 16.45 S	82.0	-16.7083	-158.4580
016S159W-104	CBG04	158.25 W 16.45 S	82.0	-16.7083	-158.3750
016S159W-105	CBG04	158.20 W 16.45 S	82.0	-16.7083	-158.2920
016S159W-106	CBG04	158.15 W 16.45 S	82.0	-16.7083	-158.2080
016S159W-107	CBG04	158.10 W 16.45 S	82.0	-16.7083	-158.1250
016S159W-108	CBG04	158.05 W 16.45 S	82.0	-16.7083	-158.0420
016S161W-85	CBG04	161.00 W 16.40 S	82.0	-16.6250	-160.9580
016S161W-86	CBG04	160.55 W 16.40 S	82.0	-16.6250	-160.8750
016S161W-87	CBG04	160.50 W 16.40 S	82.0	-16.6250	-160.7920
016S161W-88	CBG04	160.45 W 16.40 S	82.0	-16.6250	-160.7080
016S161W-89	CBG04	160.40 W 16.40 S	82.0	-16.6250	-160.6250
016S161W-90	CBG04	160.35 W 16.40 S	82.0	-16.6250	-160.5420
016S159W-91	CBG04	158.30 W 16.40 S	82.0	-16.6250	-158.4580
016S159W-92	CBG04	158.25 W 16.40 S	82.0	-16.6250	-158.3750
016S159W-93	CBG04	158.20 W 16.40 S	82.0	-16.6250	-158.2920
016S159W-94	CBG04	158.15 W 16.40 S	82.0	-16.6250	-158.2080
016S159W-95	CBG04	158.10 W 16.40 S	82.0	-16.6250	-158.1250
016S159W-96	CBG04	158.05 W 16.40 S	82.0	-16.6250	-158.0420
016S161W-73	CBG04	161.00 W 16.35 S	82.0	-16.5417	-160.9580
016S161W-74	CBG04	160.55 W 16.35 S	82.0	-16.5417	-160.8750
016S161W-75	CBG04	160.50 W 16.35 S	82.0	-16.5417	-160.7920
016S161W-76	CBG04	160.45 W 16.35 S	82.0	-16.5417	-160.7080
016S161W-77	CBG04	160.40 W 16.35 S	82.0	-16.5417	-160.6250
016S161W-78	CBG04	160.35 W 16.35 S	82.0	-16.5417	-160.5420
016S159W-79	CBG04	158.30 W 16.35 S	82.0	-16.5417	-158.4580
016S159W-80	CBG04	158.25 W 16.35 S	82.0	-16.5417	-158.3750
016S159W-81	CBG04	158.20 W 16.35 S	82.0	-16.5417	-158.2920
016S159W-82	CBG04	158.15 W 16.35 S	82.0	-16.5417	-158.2080
016S159W-83	CBG04	158.10 W 16.35 S	82.0	-16.5417	-158.1250
016S159W-84	CBG04	158.05 W 16.35 S	82.0	-16.5417	-158.0420
016S161W-61	CBG04	161.00 W 16.30 S	82.1	-16.4583	-160.9580
016S161W-62	CBG04	160.55 W 16.30 S	82.1	-16.4583	-160.8750
016S161W-63	CBG04	160.50 W 16.30 S	82.1	-16.4583	-160.7920
016S161W-64	CBG04	160.45 W 16.30 S	82.1	-16.4583	-160.7080
016S161W-65	CBG04	160.40 W 16.30 S	82.1	-16.4583	-160.6250
016S161W-66	CBG04	160.35 W 16.30 S	82.1	-16.4583	-160.5420
016S159W-67	CBG04	158.30 W 16.30 S	82.1	-16.4583	-158.4580
016S159W-68	CBG04	158.25 W 16.30 S	82.1	-16.4583	-158.3750
016S159W-69	CBG04	158.20 W 16.30 S	82.1	-16.4583	-158.2920
016S159W-70	CBG04	158.15 W 16.30 S	82.1	-16.4583	-158.2080
016S159W-71	CBG04	158.10 W 16.30 S	82.1	-16.4583	-158.1250
016S159W-72	CBG04	158.05 W 16.30 S	82.1	-16.4583	-158.0420
016S161W-49	CBG04	161.00 W 16.25 S	82.1	-16.3750	-160.9580
016S161W-50	CBG04	160.55 W 16.25 S	82.1	-16.3750	-160.8750
016S161W-51	CBG04	160.50 W 16.25 S	82.1	-16.3750	-160.7920
016S161W-52	CBG04	160.45 W 16.25 S	82.1	-16.3750	-160.7080
016S161W-53	CBG04	160.40 W 16.25 S	82.1	-16.3750	-160.6250
016S161W-54	CBG04	160.35 W 16.25 S	82.1	-16.3750	-160.5420
016S159W-55	CBG04	158.30 W 16.25 S	82.1	-16.3750	-158.4580
016S159W-56	CBG04	158.25 W 16.25 S	82.1	-16.3750	-158.3750
016S159W-57	CBG04	158.20 W 16.25 S	82.1	-16.3750	-158.2920
016S159W-58	CBG04	158.15 W 16.25 S	82.1	-16.3750	-158.2080
016S159W-59	CBG04	158.10 W 16.25 S	82.1	-16.3750	-158.1250
016S159W-60	CBG04	158.05 W 16.25 S	82.1	-16.3750	-158.0420
016S161W-37	CBG04	161.00 W 16.20 S	82.1	-16.2917	-160.9580
016S161W-38	CBG04	160.55 W 16.20 S	82.1	-16.2917	-160.8750
016S161W-39	CBG04	160.50 W 16.20 S	82.1	-16.2917	-160.7920
016S161W-40	CBG04	160.45 W 16.20 S	82.1	-16.2917	-160.7080
016S161W-41	CBG04	160.40 W 16.20 S	82.1	-16.2917	-160.6250
016S161W-42	CBG04	160.35 W 16.20 S	82.1	-16.2917	-160.5420
016S159W-43	CBG04	158.30 W 16.20 S	82.1	-16.2917	-158.4580
016S159W-44	CBG04	158.25 W 16.20 S	82.1	-16.2917	-158.3750
016S159W-45	CBG04	158.20 W 16.20 S	82.1	-16.2917	-158.2920
016S159W-46	CBG04	158.15 W 16.20 S	82.1	-16.2917	-158.2080
016S159W-47	CBG04	158.10 W 16.20 S	82.1	-16.2917	-158.1250
016S159W-48	CBG04	158.05 W 16.20 S	82.1	-16.2917	-158.0420
016S161W-25	CBG04	161.00 W 16.15 S	82.2	-16.2083	-160.9580
016S161W-26	CBG04	160.55 W 16.15 S	82.2	-16.2083	-160.8750
016S161W-27	CBG04	160.50 W 16.15 S	82.2	-16.2083	-160.7920
016S161W-28	CBG04	160.45 W 16.15 S	82.2	-16.2083	-160.7080
016S161W-29	CBG04	160.40 W 16.15 S	82.2	-16.2083	-160.6250
016S161W-30	CBG04	160.35 W 16.15 S	82.2	-16.2083	-160.5420
016S159W-31	CBG04	158.30 W 16.15 S	82.2	-16.2083	-158.4580

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
016S159W-32	CBG04	158.25 W 16.15 S	82.2	-16.2083	-158.3750
016S159W-33	CBG04	158.20 W 16.15 S	82.2	-16.2083	-158.2920
016S159W-34	CBG04	158.15 W 16.15 S	82.2	-16.2083	-158.2080
016S159W-35	CBG04	158.10 W 16.15 S	82.2	-16.2083	-158.1250
016S159W-36	CBG04	158.05 W 16.15 S	82.2	-16.2083	-158.0420
016S161W-13	CBG04	161.00 W 16.10 S	82.2	-16.1250	-160.9580
016S161W-14	CBG04	160.55 W 16.10 S	82.2	-16.1250	-160.8750
016S161W-15	CBG04	160.50 W 16.10 S	82.2	-16.1250	-160.7920
016S161W-16	CBG04	160.45 W 16.10 S	82.2	-16.1250	-160.7080
016S161W-17	CBG04	160.40 W 16.10 S	82.2	-16.1250	-160.6250
016S161W-18	CBG04	160.35 W 16.10 S	82.2	-16.1250	-160.5420
016S159W-19	CBG04	158.30 W 16.10 S	82.2	-16.1250	-158.4580
016S159W-20	CBG04	158.25 W 16.10 S	82.2	-16.1250	-158.3750
016S159W-21	CBG04	158.20 W 16.10 S	82.2	-16.1250	-158.2920
016S159W-22	CBG04	158.15 W 16.10 S	82.2	-16.1250	-158.2080
016S159W-23	CBG04	158.10 W 16.10 S	82.2	-16.1250	-158.1250
016S161W-1	CBG04	161.00 W 16.05 S	82.2	-16.0417	-160.9580
016S161W-2	CBG04	160.55 W 16.05 S	82.2	-16.0417	-160.8750
016S161W-3	CBG04	160.50 W 16.05 S	82.2	-16.0417	-160.7920
016S161W-4	CBG04	160.45 W 16.05 S	82.2	-16.0417	-160.7080
016S161W-5	CBG04	160.40 W 16.05 S	82.2	-16.0417	-160.6250
016S161W-6	CBG04	160.35 W 16.05 S	82.2	-16.0417	-160.5420
016S159W-7	CBG04	158.30 W 16.05 S	82.2	-16.0417	-158.4580
016S159W-8	CBG04	158.25 W 16.05 S	82.2	-16.0417	-158.3750
016S159W-9	CBG04	158.20 W 16.05 S	82.2	-16.0417	-158.2920
016S159W-10	CBG04	158.15 W 16.05 S	82.2	-16.0417	-158.2080
016S159W-11	CBG04	158.10 W 16.05 S	82.2	-16.0417	-158.1250
012S159W-16	CBG05	158.40 W 12.10 S	83.6	-12.1250	-158.7080
012S159W-17	CBG05	158.35 W 12.10 S	83.6	-12.1250	-158.6250
012S159W-18	CBG05	158.30 W 12.10 S	83.6	-12.1250	-158.5420
012S159W-19	CBG05	158.25 W 12.10 S	83.6	-12.1250	-158.4580
012S159W-20	CBG05	158.20 W 12.10 S	83.6	-12.1250	-158.3750
012S159W-21	CBG05	158.15 W 12.10 S	83.6	-12.1250	-158.2920
012S159W-4	CBG05	158.40 W 12.05 S	83.6	-12.0417	-158.7080
012S159W-5	CBG05	158.35 W 12.05 S	83.6	-12.0417	-158.6250
012S159W-6	CBG05	158.30 W 12.05 S	83.6	-12.0417	-158.5420
012S159W-7	CBG05	158.25 W 12.05 S	83.6	-12.0417	-158.4580
012S159W-8	CBG05	158.20 W 12.05 S	83.6	-12.0417	-158.3750
012S159W-9	CBG05	158.15 W 12.05 S	83.6	-12.0417	-158.2920
011S159W-136	CBG05	158.40 W 12.00 S	83.7	-11.9583	-158.7080
011S159W-137	CBG05	158.35 W 12.00 S	83.7	-11.9583	-158.6250
011S159W-138	CBG05	158.30 W 12.00 S	83.7	-11.9583	-158.5420
011S159W-139	CBG05	158.25 W 12.00 S	83.7	-11.9583	-158.4580
011S159W-140	CBG05	158.20 W 12.00 S	83.7	-11.9583	-158.3750
011S159W-141	CBG05	158.15 W 12.00 S	83.7	-11.9583	-158.2920
011S159W-124	CBG05	158.40 W 11.55 S	83.7	-11.8750	-158.7080
011S159W-125	CBG05	158.35 W 11.55 S	83.7	-11.8750	-158.6250
011S159W-126	CBG05	158.30 W 11.55 S	83.7	-11.8750	-158.5420
011S159W-127	CBG05	158.25 W 11.55 S	83.7	-11.8750	-158.4580
011S159W-128	CBG05	158.20 W 11.55 S	83.7	-11.8750	-158.3750
011S159W-129	CBG05	158.15 W 11.55 S	83.7	-11.8750	-158.2920
011S159W-112	CBG05	158.40 W 11.50 S	83.7	-11.7917	-158.7080
011S159W-113	CBG05	158.35 W 11.50 S	83.7	-11.7917	-158.6250
011S159W-114	CBG05	158.30 W 11.50 S	83.7	-11.7917	-158.5420
011S159W-115	CBG05	158.25 W 11.50 S	83.7	-11.7917	-158.4580
011S159W-116	CBG05	158.20 W 11.50 S	83.7	-11.7917	-158.3750
011S159W-117	CBG05	158.15 W 11.50 S	83.7	-11.7917	-158.2920
011S158W-89	CBG06	157.35 W 11.40 S	83.8	-11.6250	-157.6250
011S158W-90	CBG06	157.30 W 11.40 S	83.8	-11.6250	-157.5420
011S158W-91	CBG06	157.25 W 11.40 S	83.8	-11.6250	-157.4580
011S158W-92	CBG06	157.20 W 11.40 S	83.8	-11.6250	-157.3750
011S158W-77	CBG06	157.35 W 11.35 S	83.8	-11.5417	-157.6250
011S158W-78	CBG06	157.30 W 11.35 S	83.8	-11.5417	-157.5420
011S158W-79	CBG06	157.25 W 11.35 S	83.8	-11.5417	-157.4580
011S158W-80	CBG06	157.20 W 11.35 S	83.8	-11.5417	-157.3750
011S158W-65	CBG06	157.35 W 11.30 S	83.8	-11.4583	-157.6250
011S158W-66	CBG06	157.30 W 11.30 S	83.8	-11.4583	-157.5420
011S158W-67	CBG06	157.25 W 11.30 S	83.8	-11.4583	-157.4580
011S158W-68	CBG06	157.20 W 11.30 S	83.8	-11.4583	-157.3750
011S158W-53	CBG06	157.35 W 11.25 S	83.8	-11.3750	-157.6250
011S158W-54	CBG06	157.30 W 11.25 S	83.8	-11.3750	-157.5420
011S158W-55	CBG06	157.25 W 11.25 S	83.8	-11.3750	-157.4580
011S158W-56	CBG06	157.20 W 11.25 S	83.8	-11.3750	-157.3750
014S161W-133	CBG07	160.55 W 15.00 S	82.7	-14.9583	-160.9580
014S161W-134	CBG07	160.50 W 15.00 S	82.7	-14.9583	-160.8750
014S161W-135	CBG07	160.45 W 15.00 S	82.7	-14.9583	-160.7920
014S161W-136	CBG07	160.40 W 15.00 S	82.7	-14.9583	-160.7080
014S161W-137	CBG07	160.35 W 15.00 S	82.7	-14.9583	-160.6250
014S161W-138	CBG07	160.30 W 15.00 S	82.7	-14.9583	-160.5420
014S161W-139	CBG07	160.25 W 15.00 S	82.7	-14.9583	-160.4580
014S161W-140	CBG07	160.20 W 15.00 S	82.7	-14.9583	-160.3750
014S161W-141	CBG07	160.15 W 15.00 S	82.7	-14.9583	-160.2920
014S161W-142	CBG07	160.10 W 15.00 S	82.7	-14.9583	-160.2080
014S161W-121	CBG07	160.55 W 14.55 S	82.7	-14.8750	-160.9580
014S161W-122	CBG07	160.50 W 14.55 S	82.7	-14.8750	-160.8750
014S161W-123	CBG07	160.45 W 14.55 S	82.7	-14.8750	-160.7920
014S161W-124	CBG07	160.40 W 14.55 S	82.7	-14.8750	-160.7080
014S161W-125	CBG07	160.35 W 14.55 S	82.7	-14.8750	-160.6250
014S161W-126	CBG07	160.30 W 14.55 S	82.7	-14.8750	-160.5420
014S161W-127	CBG07	160.25 W 14.55 S	82.7	-14.8750	-160.4580
014S161W-128	CBG07	160.20 W 14.55 S	82.7	-14.8750	-160.3750
014S161W-129	CBG07	160.15 W 14.55 S	82.7	-14.8750	-160.2920
014S161W-130	CBG07	160.10 W 14.55 S	82.7	-14.8750	-160.2080
014S161W-131	CBG07	160.05 W 14.55 S	82.7	-14.8750	-160.1250
014S161W-109	CBG07	160.55 W 14.50 S	82.7	-14.7917	-160.9580
014S161W-110	CBG07	160.50 W 14.50 S	82.7	-14.7917	-160.8750
014S161W-111	CBG07	160.45 W 14.50 S	82.7	-14.7917	-160.7920
014S161W-112	CBG07	160.40 W 14.50 S	82.7	-14.7917	-160.7080
014S161W-113	CBG07	160.35 W 14.50 S	82.7	-14.7917	-160.6250
014S161W-114	CBG07	160.30 W 14.50 S	82.7	-14.7917	-160.5420
014S161W-115	CBG07	160.25 W 14.50 S	82.7	-14.7917	-160.4580
014S161W-116	CBG07	160.20 W 14.50 S	82.7	-14.7917	-160.3750
014S161W-117	CBG07	160.15 W 14.50 S	82.7	-14.7917	-160.2920
014S161W-118	CBG07	160.10 W 14.50 S	82.7	-14.7917	-160.2080
014S161W-119	CBG07	160.05 W 14.50 S	82.7	-14.7917	-160.1250
014S161W-120	CBG07	160.00 W 14.50 S	82.7	-14.7917	-160.0420
014S161W-97	CBG07	160.55 W 14.45 S	82.8	-14.7083	-160.9580
014S161W-98	CBG07	160.50 W 14.45 S	82.8	-14.7083	-160.8750
014S161W-99	CBG07	160.45 W 14.45 S	82.8	-14.7083	-160.7920
014S161W-100	CBG07	160.40 W 14.45 S	82.8	-14.7083	-160.7080
014S161W-101	CBG07	160.35 W 14.45 S	82.8	-14.7083	-160.6250
014S161W-102	CBG07	160.30 W 14.45 S	82.8	-14.7083	-160.5420
014S161W-103	CBG07	160.25 W 14.45 S	82.8	-14.7083	-160.4580
014S161W-104	CBG07	160.20 W 14.45 S	82.8	-14.7083	-160.3750
014S161W-105	CBG07	160.15 W 14.45 S	82.8	-14.7083	-160.2920
014S161W-106	CBG07	160.10 W 14.45 S	82.8	-14.7083	-160.2080
014S161W-107	CBG07	160.05 W 14.45 S	82.8	-14.7083	-160.1250
014S161W-108	CBG07	160.00 W 14.45 S	82.8	-14.7083	-160.0420

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
014S161W-85	CBG07	160.55 W 14.40 S	82.8	-14.6250	-160.9580
014S161W-86	CBG07	160.50 W 14.40 S	82.8	-14.6250	-160.8750
014S161W-87	CBG07	160.45 W 14.40 S	82.8	-14.6250	-160.7920
014S161W-88	CBG07	160.40 W 14.40 S	82.8	-14.6250	-160.7080
014S161W-89	CBG07	160.35 W 14.40 S	82.8	-14.6250	-160.6250
014S161W-90	CBG07	160.30 W 14.40 S	82.8	-14.6250	-160.5420
014S161W-91	CBG07	160.25 W 14.40 S	82.8	-14.6250	-160.4580
014S161W-92	CBG07	160.20 W 14.40 S	82.8	-14.6250	-160.3750
014S161W-93	CBG07	160.15 W 14.40 S	82.8	-14.6250	-160.2920
014S161W-94	CBG07	160.10 W 14.40 S	82.8	-14.6250	-160.2080
014S161W-95	CBG07	160.05 W 14.40 S	82.8	-14.6250	-160.1250
014S161W-96	CBG07	160.00 W 14.40 S	82.8	-14.6250	-160.0420
014S161W-73	CBG07	160.55 W 14.35 S	82.8	-14.5417	-160.9580
014S161W-74	CBG07	160.50 W 14.35 S	82.8	-14.5417	-160.8750
014S161W-75	CBG07	160.45 W 14.35 S	82.8	-14.5417	-160.7920
014S161W-76	CBG07	160.40 W 14.35 S	82.8	-14.5417	-160.7080
014S161W-77	CBG07	160.35 W 14.35 S	82.8	-14.5417	-160.6250
014S161W-78	CBG07	160.30 W 14.35 S	82.8	-14.5417	-160.5420
014S161W-79	CBG07	160.25 W 14.35 S	82.8	-14.5417	-160.4580
014S161W-80	CBG07	160.20 W 14.35 S	82.8	-14.5417	-160.3750
014S161W-81	CBG07	160.15 W 14.35 S	82.8	-14.5417	-160.2920
014S161W-82	CBG07	160.10 W 14.35 S	82.8	-14.5417	-160.2080
014S161W-83	CBG07	160.05 W 14.35 S	82.8	-14.5417	-160.1250
014S161W-84	CBG07	160.00 W 14.35 S	82.8	-14.5417	-160.0420
014S161W-61	CBG07	160.55 W 14.30 S	82.8	-14.4583	-160.9580
014S161W-62	CBG07	160.50 W 14.30 S	82.8	-14.4583	-160.8750
014S161W-63	CBG07	160.45 W 14.30 S	82.8	-14.4583	-160.7920
014S161W-64	CBG07	160.40 W 14.30 S	82.8	-14.4583	-160.7080
014S161W-65	CBG07	160.35 W 14.30 S	82.8	-14.4583	-160.6250
014S161W-66	CBG07	160.30 W 14.30 S	82.8	-14.4583	-160.5420
014S161W-67	CBG07	160.25 W 14.30 S	82.8	-14.4583	-160.4580
014S161W-68	CBG07	160.20 W 14.30 S	82.8	-14.4583	-160.3750
014S161W-69	CBG07	160.15 W 14.30 S	82.8	-14.4583	-160.2920
014S161W-70	CBG07	160.10 W 14.30 S	82.8	-14.4583	-160.2080
014S161W-71	CBG07	160.05 W 14.30 S	82.8	-14.4583	-160.1250
014S161W-72	CBG07	160.00 W 14.30 S	82.8	-14.4583	-160.0420
014S160W-61	CBG07	159.55 W 14.30 S	82.8	-14.4583	-159.9580
014S161W-49	CBG07	160.55 W 14.25 S	82.9	-14.3750	-160.9580
014S161W-50	CBG07	160.50 W 14.25 S	82.9	-14.3750	-160.8750
014S161W-51	CBG07	160.45 W 14.25 S	82.9	-14.3750	-160.7920
014S161W-52	CBG07	160.40 W 14.25 S	82.9	-14.3750	-160.7080
014S161W-53	CBG07	160.35 W 14.25 S	82.9	-14.3750	-160.6250
014S161W-54	CBG07	160.30 W 14.25 S	82.9	-14.3750	-160.5420
014S161W-55	CBG07	160.25 W 14.25 S	82.9	-14.3750	-160.4580
014S161W-56	CBG07	160.20 W 14.25 S	82.9	-14.3750	-160.3750
014S161W-57	CBG07	160.15 W 14.25 S	82.9	-14.3750	-160.2920
014S161W-58	CBG07	160.10 W 14.25 S	82.9	-14.3750	-160.2080
014S161W-59	CBG07	160.05 W 14.25 S	82.9	-14.3750	-160.1250
014S161W-60	CBG07	160.00 W 14.25 S	82.9	-14.3750	-160.0420
014S160W-49	CBG07	159.55 W 14.25 S	82.9	-14.3750	-159.9580
014S160W-50	CBG07	159.50 W 14.25 S	82.9	-14.3750	-159.8750
014S161W-37	CBG07	160.55 W 14.20 S	82.9	-14.2917	-160.9580
014S161W-38	CBG07	160.50 W 14.20 S	82.9	-14.2917	-160.8750
014S161W-39	CBG07	160.45 W 14.20 S	82.9	-14.2917	-160.7920
014S161W-40	CBG07	160.40 W 14.20 S	82.9	-14.2917	-160.7080
014S161W-41	CBG07	160.35 W 14.20 S	82.9	-14.2917	-160.6250
014S161W-42	CBG07	160.30 W 14.20 S	82.9	-14.2917	-160.5420
014S161W-43	CBG07	160.25 W 14.20 S	82.9	-14.2917	-160.4580
014S161W-44	CBG07	160.20 W 14.20 S	82.9	-14.2917	-160.3750
014S161W-45	CBG07	160.15 W 14.20 S	82.9	-14.2917	-160.2920
014S161W-46	CBG07	160.10 W 14.20 S	82.9	-14.2917	-160.2080
014S161W-47	CBG07	160.05 W 14.20 S	82.9	-14.2917	-160.1250
014S161W-48	CBG07	160.00 W 14.20 S	82.9	-14.2917	-160.0420
014S160W-37	CBG07	159.55 W 14.20 S	82.9	-14.2917	-159.9580
014S160W-38	CBG07	159.50 W 14.20 S	82.9	-14.2917	-159.8750
014S161W-25	CBG07	160.55 W 14.15 S	82.9	-14.2083	-160.9580
014S161W-26	CBG07	160.50 W 14.15 S	82.9	-14.2083	-160.8750
014S161W-27	CBG07	160.45 W 14.15 S	82.9	-14.2083	-160.7920
014S161W-28	CBG07	160.40 W 14.15 S	82.9	-14.2083	-160.7080
014S161W-29	CBG07	160.35 W 14.15 S	82.9	-14.2083	-160.6250
014S161W-30	CBG07	160.30 W 14.15 S	82.9	-14.2083	-160.5420
014S161W-31	CBG07	160.25 W 14.15 S	82.9	-14.2083	-160.4580
014S161W-32	CBG07	160.20 W 14.15 S	82.9	-14.2083	-160.3750
014S161W-33	CBG07	160.15 W 14.15 S	82.9	-14.2083	-160.2920
014S161W-34	CBG07	160.10 W 14.15 S	82.9	-14.2083	-160.2080
014S161W-35	CBG07	160.05 W 14.15 S	82.9	-14.2083	-160.1250
014S161W-36	CBG07	160.00 W 14.15 S	82.9	-14.2083	-160.0420
014S160W-25	CBG07	159.55 W 14.15 S	82.9	-14.2083	-159.9580
014S160W-26	CBG07	159.50 W 14.15 S	82.9	-14.2083	-159.8750
014S161W-13	CBG07	160.55 W 14.10 S	83.0	-14.1250	-160.9580
014S161W-14	CBG07	160.50 W 14.10 S	83.0	-14.1250	-160.8750
014S161W-15	CBG07	160.45 W 14.10 S	83.0	-14.1250	-160.7920
014S161W-16	CBG07	160.40 W 14.10 S	83.0	-14.1250	-160.7080
014S161W-17	CBG07	160.35 W 14.10 S	83.0	-14.1250	-160.6250
014S161W-18	CBG07	160.30 W 14.10 S	83.0	-14.1250	-160.5420
014S161W-19	CBG07	160.25 W 14.10 S	83.0	-14.1250	-160.4580
014S161W-20	CBG07	160.20 W 14.10 S	83.0	-14.1250	-160.3750
014S161W-21	CBG07	160.15 W 14.10 S	83.0	-14.1250	-160.2920
014S161W-22	CBG07	160.10 W 14.10 S	83.0	-14.1250	-160.2080
014S161W-23	CBG07	160.05 W 14.10 S	83.0	-14.1250	-160.1250
014S161W-24	CBG07	160.00 W 14.10 S	83.0	-14.1250	-160.0420
014S160W-13	CBG07	159.55 W 14.10 S	83.0	-14.1250	-159.9580
014S160W-14	CBG07	159.50 W 14.10 S	83.0	-14.1250	-159.8750
014S160W-15	CBG07	159.45 W 14.10 S	83.0	-14.1250	-159.7920
014S161W-1	CBG07	160.55 W 14.05 S	83.0	-14.0417	-160.9580
014S161W-2	CBG07	160.50 W 14.05 S	83.0	-14.0417	-160.8750
014S161W-3	CBG07	160.45 W 14.05 S	83.0	-14.0417	-160.7920
014S161W-4	CBG07	160.40 W 14.05 S	83.0	-14.0417	-160.7080
014S161W-5	CBG07	160.35 W 14.05 S	83.0	-14.0417	-160.6250
014S161W-6	CBG07	160.30 W 14.05 S	83.0	-14.0417	-160.5420
014S161W-7	CBG07	160.25 W 14.05 S	83.0	-14.0417	-160.4580
014S161W-8	CBG07	160.20 W 14.05 S	83.0	-14.0417	-160.3750
014S161W-9	CBG07	160.15 W 14.05 S	83.0	-14.0417	-160.2920
014S161W-10	CBG07	160.10 W 14.05 S	83.0	-14.0417	-160.2080
014S161W-11	CBG07	160.05 W 14.05 S	83.0	-14.0417	-160.1250
014S161W-12	CBG07	160.00 W 14.05 S	83.0	-14.0417	-160.0420
014S160W-1	CBG07	159.55 W 14.05 S	83.0	-14.0417	-159.9580
014S160W-2	CBG07	159.50 W 14.05 S	83.0	-14.0417	-159.8750
014S160W-3	CBG07	159.45 W 14.05 S	83.0	-14.0417	-159.7920
013S161W-139	CBG07	160.25 W 14.00 S	83.0	-13.9583	-160.4580
013S161W-140	CBG07	160.20 W 14.00 S	83.0	-13.9583	-160.3750
013S161W-141	CBG07	160.15 W 14.00 S	83.0	-13.9583	-160.2920
013S161W-142	CBG07	160.10 W 14.00 S	83.0	-13.9583	-160.2080
013S161W-143	CBG07	160.05 W 14.00 S	83.0	-13.9583	-160.1250
013S161W-144	CBG07	160.00 W 14.00 S	83.0	-13.9583	-160.0420
013S160W-133	CBG07	159.55 W 14.00 S	83.0	-13.9583	-159.9580
013S160W-134	CBG07	159.50 W 14.00 S	83.0	-13.9583	-159.8750
013S160W-135	CBG07	159.45 W 14.00 S	83.0	-13.9583	-159.7920

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
013S161W-127	CBG07	160.25 W 13.55 S	83.0	-13.8750	-160.4580
013S161W-128	CBG07	160.20 W 13.55 S	83.0	-13.8750	-160.3750
013S161W-129	CBG07	160.15 W 13.55 S	83.0	-13.8750	-160.2920
013S161W-130	CBG07	160.10 W 13.55 S	83.0	-13.8750	-160.2080
013S161W-131	CBG07	160.05 W 13.55 S	83.0	-13.8750	-160.1250
013S161W-132	CBG07	160.00 W 13.55 S	83.0	-13.8750	-160.0420
013S160W-121	CBG07	159.55 W 13.55 S	83.0	-13.8750	-159.9580
013S160W-122	CBG07	159.50 W 13.55 S	83.0	-13.8750	-159.8750
013S160W-123	CBG07	159.45 W 13.55 S	83.0	-13.8750	-159.7920
013S161W-115	CBG07	160.25 W 13.50 S	83.1	-13.7917	-160.4580
013S161W-116	CBG07	160.20 W 13.50 S	83.1	-13.7917	-160.3750
013S161W-117	CBG07	160.15 W 13.50 S	83.1	-13.7917	-160.2920
013S161W-118	CBG07	160.10 W 13.50 S	83.1	-13.7917	-160.2080
013S161W-119	CBG07	160.05 W 13.50 S	83.1	-13.7917	-160.1250
013S161W-120	CBG07	160.00 W 13.50 S	83.1	-13.7917	-160.0420
013S160W-109	CBG07	159.55 W 13.50 S	83.1	-13.7917	-159.9580
013S160W-110	CBG07	159.50 W 13.50 S	83.1	-13.7917	-159.8750
013S160W-111	CBG07	159.45 W 13.50 S	83.1	-13.7917	-159.7920
013S160W-112	CBG07	159.40 W 13.50 S	83.1	-13.7917	-159.7080
013S161W-103	CBG07	160.25 W 13.45 S	83.1	-13.7083	-160.4580
013S161W-104	CBG07	160.20 W 13.45 S	83.1	-13.7083	-160.3750
013S161W-105	CBG07	160.15 W 13.45 S	83.1	-13.7083	-160.2920
013S161W-106	CBG07	160.10 W 13.45 S	83.1	-13.7083	-160.2080
013S161W-107	CBG07	160.05 W 13.45 S	83.1	-13.7083	-160.1250
013S161W-108	CBG07	160.00 W 13.45 S	83.1	-13.7083	-160.0420
013S160W-97	CBG07	159.55 W 13.45 S	83.1	-13.7083	-159.9580
013S160W-98	CBG07	159.50 W 13.45 S	83.1	-13.7083	-159.8750
013S160W-99	CBG07	159.45 W 13.45 S	83.1	-13.7083	-159.7920
013S160W-100	CBG07	159.40 W 13.45 S	83.1	-13.7083	-159.7080
013S161W-91	CBG07	160.25 W 13.40 S	83.1	-13.6250	-160.4580
013S161W-92	CBG07	160.20 W 13.40 S	83.1	-13.6250	-160.3750
013S161W-93	CBG07	160.15 W 13.40 S	83.1	-13.6250	-160.2920
013S161W-94	CBG07	160.10 W 13.40 S	83.1	-13.6250	-160.2080
013S161W-95	CBG07	160.05 W 13.40 S	83.1	-13.6250	-160.1250
013S161W-96	CBG07	160.00 W 13.40 S	83.1	-13.6250	-160.0420
013S160W-85	CBG07	159.55 W 13.40 S	83.1	-13.6250	-159.9580
013S160W-86	CBG07	159.50 W 13.40 S	83.1	-13.6250	-159.8750
013S160W-87	CBG07	159.45 W 13.40 S	83.1	-13.6250	-159.7920
013S160W-88	CBG07	159.40 W 13.40 S	83.1	-13.6250	-159.7080
013S161W-79	CBG07	160.25 W 13.35 S	83.2	-13.5417	-160.4580
013S161W-80	CBG07	160.20 W 13.35 S	83.2	-13.5417	-160.3750
013S161W-81	CBG07	160.15 W 13.35 S	83.2	-13.5417	-160.2920
013S161W-82	CBG07	160.10 W 13.35 S	83.2	-13.5417	-160.2080
013S161W-83	CBG07	160.05 W 13.35 S	83.2	-13.5417	-160.1250
013S161W-84	CBG07	160.00 W 13.35 S	83.2	-13.5417	-160.0420
013S160W-73	CBG07	159.55 W 13.35 S	83.2	-13.5417	-159.9580
013S160W-74	CBG07	159.50 W 13.35 S	83.2	-13.5417	-159.8750
013S160W-75	CBG07	159.45 W 13.35 S	83.2	-13.5417	-159.7920
013S160W-76	CBG07	159.40 W 13.35 S	83.2	-13.5417	-159.7080
013S161W-67	CBG07	160.25 W 13.30 S	83.2	-13.4583	-160.4580
013S161W-68	CBG07	160.20 W 13.30 S	83.2	-13.4583	-160.3750
013S161W-69	CBG07	160.15 W 13.30 S	83.2	-13.4583	-160.2920
013S161W-70	CBG07	160.10 W 13.30 S	83.2	-13.4583	-160.2080
013S161W-71	CBG07	160.05 W 13.30 S	83.2	-13.4583	-160.1250
013S161W-72	CBG07	160.00 W 13.30 S	83.2	-13.4583	-160.0420
013S160W-61	CBG07	159.55 W 13.30 S	83.2	-13.4583	-159.9580
013S160W-62	CBG07	159.50 W 13.30 S	83.2	-13.4583	-159.8750
013S160W-63	CBG07	159.45 W 13.30 S	83.2	-13.4583	-159.7920
013S160W-64	CBG07	159.40 W 13.30 S	83.2	-13.4583	-159.7080
013S161W-55	CBG07	160.25 W 13.25 S	83.2	-13.3750	-160.4580
013S161W-56	CBG07	160.20 W 13.25 S	83.2	-13.3750	-160.3750
013S161W-57	CBG07	160.15 W 13.25 S	83.2	-13.3750	-160.2920
013S161W-58	CBG07	160.10 W 13.25 S	83.2	-13.3750	-160.2080
013S161W-59	CBG07	160.05 W 13.25 S	83.2	-13.3750	-160.1250
013S161W-60	CBG07	160.00 W 13.25 S	83.2	-13.3750	-160.0420
013S160W-49	CBG07	159.55 W 13.25 S	83.2	-13.3750	-159.9580
013S160W-50	CBG07	159.50 W 13.25 S	83.2	-13.3750	-159.8750
013S160W-51	CBG07	159.45 W 13.25 S	83.2	-13.3750	-159.7920
013S160W-52	CBG07	159.40 W 13.25 S	83.2	-13.3750	-159.7080
013S160W-53	CBG07	159.35 W 13.25 S	83.2	-13.3750	-159.6250
013S160W-54	CBG07	159.30 W 13.25 S	83.2	-13.3750	-159.5420
013S161W-43	CBG07	160.25 W 13.20 S	83.2	-13.2917	-160.4580
013S161W-44	CBG07	160.20 W 13.20 S	83.2	-13.2917	-160.3750
013S161W-45	CBG07	160.15 W 13.20 S	83.2	-13.2917	-160.2920
013S161W-46	CBG07	160.10 W 13.20 S	83.2	-13.2917	-160.2080
013S161W-47	CBG07	160.05 W 13.20 S	83.2	-13.2917	-160.1250
013S161W-48	CBG07	160.00 W 13.20 S	83.2	-13.2917	-160.0420
013S160W-37	CBG07	159.55 W 13.20 S	83.2	-13.2917	-159.9580
013S160W-38	CBG07	159.50 W 13.20 S	83.2	-13.2917	-159.8750
013S160W-39	CBG07	159.45 W 13.20 S	83.2	-13.2917	-159.7920
013S160W-40	CBG07	159.40 W 13.20 S	83.2	-13.2917	-159.7080
013S160W-41	CBG07	159.35 W 13.20 S	83.2	-13.2917	-159.6250
013S160W-42	CBG07	159.30 W 13.20 S	83.2	-13.2917	-159.5420
013S160W-43	CBG07	159.25 W 13.20 S	83.2	-13.2917	-159.4580
013S160W-44	CBG07	159.20 W 13.20 S	83.2	-13.2917	-159.3750
013S161W-31	CBG07	160.25 W 13.15 S	83.3	-13.2083	-160.4580
013S161W-32	CBG07	160.20 W 13.15 S	83.3	-13.2083	-160.3750
013S161W-33	CBG07	160.15 W 13.15 S	83.3	-13.2083	-160.2920
013S161W-34	CBG07	160.10 W 13.15 S	83.3	-13.2083	-160.2080
013S161W-35	CBG07	160.05 W 13.15 S	83.3	-13.2083	-160.1250
013S161W-36	CBG07	160.00 W 13.15 S	83.3	-13.2083	-160.0420
013S160W-25	CBG07	159.55 W 13.15 S	83.3	-13.2083	-159.9580
013S160W-26	CBG07	159.50 W 13.15 S	83.3	-13.2083	-159.8750
013S160W-27	CBG07	159.45 W 13.15 S	83.3	-13.2083	-159.7920
013S160W-28	CBG07	159.40 W 13.15 S	83.3	-13.2083	-159.7080
013S160W-29	CBG07	159.35 W 13.15 S	83.3	-13.2083	-159.6250
013S160W-30	CBG07	159.30 W 13.15 S	83.3	-13.2083	-159.5420
013S160W-31	CBG07	159.25 W 13.15 S	83.3	-13.2083	-159.4580
013S160W-32	CBG07	159.20 W 13.15 S	83.3	-13.2083	-159.3750
013S160W-33	CBG07	159.15 W 13.15 S	83.3	-13.2083	-159.2920
013S160W-34	CBG07	159.10 W 13.15 S	83.3	-13.2083	-159.2080
013S161W-19	CBG07	160.25 W 13.10 S	83.3	-13.1250	-160.4580
013S161W-20	CBG07	160.20 W 13.10 S	83.3	-13.1250	-160.3750
013S161W-21	CBG07	160.15 W 13.10 S	83.3	-13.1250	-160.2920
013S161W-22	CBG07	160.10 W 13.10 S	83.3	-13.1250	-160.2080
013S161W-23	CBG07	160.05 W 13.10 S	83.3	-13.1250	-160.1250
013S161W-24	CBG07	160.00 W 13.10 S	83.3	-13.1250	-160.0420
013S160W-13	CBG07	159.55 W 13.10 S	83.3	-13.1250	-159.9580
013S160W-14	CBG07	159.50 W 13.10 S	83.3	-13.1250	-159.8750
013S160W-15	CBG07	159.45 W 13.10 S	83.3	-13.1250	-159.7920
013S160W-16	CBG07	159.40 W 13.10 S	83.3	-13.1250	-159.7080
013S160W-17	CBG07	159.35 W 13.10 S	83.3	-13.1250	-159.6250
013S160W-18	CBG07	159.30 W 13.10 S	83.3	-13.1250	-159.5420
013S160W-19	CBG07	159.25 W 13.10 S	83.3	-13.1250	-159.4580
013S160W-20	CBG07	159.20 W 13.10 S	83.3	-13.1250	-159.3750
013S160W-21	CBG07	159.15 W 13.10 S	83.3	-13.1250	-159.2920
013S160W-22	CBG07	159.10 W 13.10 S	83.3	-13.1250	-159.2080
013S161W-7	CBG07	160.25 W 13.05 S	83.3	-13.0417	-160.4580
013S161W-8	CBG07	160.20 W 13.05 S	83.3	-13.0417	-160.3750
013S161W-9	CBG07	160.15 W 13.05 S	83.3	-13.0417	-160.2920
013S161W-10	CBG07	160.10 W 13.05 S	83.3	-13.0417	-160.2080
013S161W-11	CBG07	160.05 W 13.05 S	83.3	-13.0417	-160.1250
013S161W-12	CBG07	160.00 W 13.05 S	83.3	-13.0417	-160.0420
013S160W-1	CBG07	159.55 W 13.05 S	83.3	-13.0417	-159.9580
013S160W-2	CBG07	159.50 W 13.05 S	83.3	-13.0417	-159.8750
013S160W-3	CBG07	159.45 W 13.05 S	83.3	-13.0417	-159.7920
013S160W-4	CBG07	159.40 W 13.05 S	83.3	-13.0417	-159.7080
013S160W-5	CBG07	159.35 W 13.05 S	83.3	-13.0417	-159.6250
013S160W-6	CBG07	159.30 W 13.05 S	83.3	-13.0417	-159.5420
013S160W-7	CBG07	159.25 W 13.05 S	83.3	-13.0417	-159.4580
013S160W-8	CBG07	159.20 W 13.05 S	83.3	-13.0417	-159.3750
013S160W-9	CBG07	159.15 W 13.05 S	83.3	-13.0417	-159.2920
013S160W-10	CBG07	159.10 W 13.05 S	83.3	-13.0417	-159.2080
012S160W-133	CBG07	159.55 W 13.00 S	83.4	-12.9583	-159.9580
012S160W-134	CBG07	159.50 W 13.00 S	83.4	-12.9583	-159.8750
012S160W-135	CBG07	159.45 W 13.00 S	83.4	-12.9583	-159.7920
012S160W-136	CBG07	159.40 W 13.00 S	83.4	-12.9583	-159.7080
012S160W-137	CBG07	159.35 W 13.00 S	83.4	-12.9583	-159.6250
012S160W-138	CBG07	159.30 W 13.00 S	83.4	-12.9583	-159.5420
012S160W-139	CBG07	159.25 W 13.00 S	83.4	-12.9583	-159.4580
012S160W-140	CBG07	159.20 W 13.00 S	83.4	-12.9583	-159.3750
012S160W-141	CBG07	159.15 W 13.00 S	83.4	-12.9583	-159.2920
012S160W-142	CBG07	159.10 W 13.00 S	83.4	-12.9583	-159.2080
012S160W-121	CBG07	159.55 W 12.55 S	83.4	-12.8750	-159.9580
012S160W-122	CBG07	159.50 W 12.55 S	83.4	-12.8750	-159.8750
012S160W-123	CBG07	159.45 W 12.55 S	83.4	-12.8750	-159.7920
012S160W-124	CBG07	159.40 W 12.55 S	83.4	-12.8750	-159.7080
012S160W-125	CBG07	159.35 W 12.55 S	83.4	-12.8750	-159.6250
012S160W-126	CBG07	159.30 W 12.55 S	83.4	-12.8750	-159.5420
012S160W-127	CBG07	159.25 W 12.55 S	83.4	-12.8750	-159.4580
012S160W-128	CBG07	159.20 W 12.55 S	83.4	-12.8750	-159.3750
012S160W-129	CBG07	159.15 W 12.55 S	83.4	-12.8750	-159.2920
012S160W-130	CBG07	159.10 W 12.55 S	83.4	-12.8750	-159.2080
012S160W-131	CBG07	159.05 W 12.55 S	83.4	-12.8750	-159.1250
012S160W-132	CBG07	159.00 W 12.55 S	83.4	-12.8750	-159.0420
012S160W-109	CBG07	159.55 W 12.50 S	83.4	-12.7917	-159.9580
012S160W-110	CBG07	159.50 W 12.50 S	83.4	-12.7917	-159.8750
012S160W-111	CBG07	159.45 W 12.50 S	83.4	-12.7917	-159.7920
012S160W-112	CBG07	159.40 W 12.50 S	83.4	-12.7917	-159.7080
012S160W-113	CBG07	159.35 W 12.50 S	83.4	-12.7917	-159.6250
012S160W-114	CBG07	159.30 W 12.50 S	83.4	-12.7917	-159.5420
012S160W-115	CBG07	159.25 W 12.50 S	83.4	-12.7917	-159.4580
012S160W-116	CBG07	159.20 W 12.50 S	83.4	-12.7917	-159.3750
012S160W-117	CBG07	159.15 W 12.50 S	83.4	-12.7917	-159.2920
012S160W-118	CBG07	159.10 W 12.50 S	83.4	-12.7917	-159.2080
012S160W-119	CBG07	159.05 W 12.50 S	83.4	-12.7917	-159.1250
012S160W-120	CBG07	159.00 W 12.50 S	83.4	-12.7917	-159.0420
012S160W-97	CBG07	159.55 W 12.45 S	83.4	-12.7083	-159.9580
012S160W-98	CBG07	159.50 W 12.45 S	83.4	-12.7083	-159.8750
012S160W-99	CBG07	159.45 W 12.45 S	83.4	-12.7083	-159.7920
012S160W-100	CBG07	159.40 W 12.45 S	83.4	-12.7083	-159.7080
012S160W-101	CBG07	159.35 W 12.45 S	83.4	-12.7083	-159.6250
012S160W-102	CBG07	159.30 W 12.45 S	83.4	-12.7083	-159.5420
012S160W-103	CBG07	159.25 W 12.45 S	83.4	-12.7083	-159.4580
012S160W-104	CBG07	159.20 W 12.45 S	83.4	-12.7083	-159.3750
012S160W-105	CBG07	159.15 W 12.45 S	83.4	-12.7083	-159.2920
012S160W-106	CBG07	159.10 W 12.45 S	83.4	-12.7083	-159.2080
012S160W-107	CBG07	159.05 W 12.45 S	83.4	-12.7083	-159.1250
012S160W-108	CBG07	159.00 W 12.45 S	83.4	-12.7083	-159.0420
012S160W-85	CBG07	159.55 W 12.40 S	83.5	-12.6250	-159.9580
012S160W-86	CBG07	159.50 W 12.40 S	83.5	-12.6250	-159.8750
012S160W-87	CBG07	159.45 W 12.40 S	83.5	-12.6250	-159.7920
012S160W-88	CBG07	159.40 W 12.40 S	83.5	-12.6250	-159.7080
012S160W-89	CBG07	159.35 W 12.40 S	83.5	-12.6250	-159.6250
012S160W-90	CBG07	159.30 W 12.40 S	83.5	-12.6250	-159.5420
012S160W-91	CBG07	159.25 W 12.40 S	83.5	-12.6250	-159.4580
012S160W-92	CBG07	159.20 W 12.40 S	83.5	-12.6250	-159.3750
012S160W-93	CBG07	159.15 W 12.40 S	83.5	-12.6250	-159.2920
012S160W-94	CBG07	159.10 W 12.40 S	83.5	-12.6250	-159.2080
012S160W-95	CBG07	159.05 W 12.40 S	83.5	-12.6250	-159.1250
012S160W-96	CBG07	159.00 W 12.40 S	83.5	-12.6250	-159.0420
012S160W-73	CBG07	159.55 W 12.35 S	83.5	-12.5417	-159.9580
012S160W-74	CBG07	159.50 W 12.35 S	83.5	-12.5417	-159.8750
012S160W-75	CBG07	159.45 W 12.35 S	83.5	-12.5417	-159.7920
012S160W-76	CBG07	159.40 W 12.35 S	83.5	-12.5417	-159.7080
012S160W-77	CBG07	159.35 W 12.35 S	83.5	-12.5417	-159.6250
012S160W-78	CBG07	159.30 W 12.35 S	83.5	-12.5417	-159.5420
012S160W-79	CBG07	159.25 W 12.35 S	83.5	-12.5417	-159.4580
012S160W-80	CBG07	159.20 W 12.35 S	83.5	-12.5417	-159.3750
012S160W-81	CBG07	159.15 W 12.35 S	83.5	-12.5417	-159.2920
012S160W-82	CBG07	159.10 W 12.35 S	83.5	-12.5417	-159.2080
012S160W-83	CBG07	159.05 W 12.35 S	83.5	-12.5417	-159.1250
012S160W-84	CBG07	159.00 W 12.35 S	83.5	-12.5417	-159.0420
012S160W-61	CBG07	159.55 W 12.30 S	83.5	-12.4583	-159.9580
012S160W-62	CBG07	159.50 W 12.30 S	83.5	-12.4583	-159.8750
012S160W-63	CBG07	159.45 W 12.30 S	83.5	-12.4583	-159.7920
012S160W-64	CBG07	159.40 W 12.30 S	83.5	-12.4583	-159.7080
012S160W-65	CBG07	159.35 W 12.30 S	83.5	-12.4583	-159.6250
012S160W-66	CBG07	159.30 W 12.30 S	83.5	-12.4583	-159.5420
012S160W-67	CBG07	159.25 W 12.30 S	83.5	-12.4583	-159.4580
012S160W-68	CBG07	159.20 W 12.30 S	83.5	-12.4583	-159.3750
012S160W-69	CBG07	159.15 W 12.30 S	83.5	-12.4583	-159.2920
012S160W-70	CBG07	159.10 W 12.30 S	83.5	-12.4583	-159.2080
012S160W-71	CBG07	159.05 W 12.30 S	83.5	-12.4583	-159.1250
012S160W-72	CBG07	159.00 W 12.30 S	83.5	-12.4583	-159.0420
012S160W-49	CBG07	159.55 W 12.25 S	83.5	-12.3750	-159.9580
012S160W-50	CBG07	159.50 W 12.25 S	83.5	-12.3750	-159.8750
012S160W-51	CBG07	159.45 W 12.25 S	83.5	-12.3750	-159.7920
012S160W-52	CBG07	159.40 W 12.25 S	83.5	-12.3750	-159.7080
012S160W-53	CBG07	159.35 W 12.25 S	83.5	-12.3750	-159.6250
012S160W-54	CBG07	159.30 W 12.25 S	83.5	-12.3750	-159.5420
012S160W-55	CBG07	159.25 W 12.25 S	83.5	-12.3750	-159.4580
012S160W-56	CBG07	159.20 W 12.25 S	83.5	-12.3750	-159.3750
012S160W-57	CBG07	159.15 W 12.25 S	83.5	-12.3750	-159.2920
012S160W-58	CBG07	159.10 W 12.25 S	83.5	-12.3750	-159.2080
012S160W-59	CBG07	159.05 W 12.25 S	83.5	-12.3750	-159.1250
012S160W-60	CBG07	159.00 W 12.25 S	83.5	-12.3750	-159.0420
012S160W-37	CBG07	159.55 W 12.20 S	83.6	-12.2917	-159.9580
012S160W-38	CBG07	159.50 W 12.20 S	83.6	-12.2917	-159.8750
012S160W-39	CBG07	159.45 W 12.20 S	83.6	-12.2917	-159.7920
012S160W-40	CBG07	159.40 W 12.20 S	83.6	-12.2917	-159.7080
012S160W-41	CBG07	159.35 W 12.20 S	83.6	-12.2917	-159.6250
012S160W-42	CBG07	159.30 W 12.20 S	83.6	-12.2917	-159.5420
012S160W-43	CBG07	159.25 W 12.20 S	83.6	-12.2917	-159.4580
012S160W-44	CBG07	159.20 W 12.20 S	83.6	-12.2917	-159.3750
012S160W-45	CBG07	159.15 W 12.20 S	83.6	-12.2917	-159.2920

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
012S160W-46	CBG07	159.10 W 12.20 S	83.6	-12.2917	-159.2080
012S160W-47	CBG07	159.05 W 12.20 S	83.6	-12.2917	-159.1250
012S160W-48	CBG07	159.00 W 12.20 S	83.6	-12.2917	-159.0420
012S160W-25	CBG07	159.55 W 12.15 S	83.6	-12.2083	-159.9580
012S160W-26	CBG07	159.50 W 12.15 S	83.6	-12.2083	-159.8750
012S160W-27	CBG07	159.45 W 12.15 S	83.6	-12.2083	-159.7920
012S160W-28	CBG07	159.40 W 12.15 S	83.6	-12.2083	-159.7080
012S160W-29	CBG07	159.35 W 12.15 S	83.6	-12.2083	-159.6250
012S160W-30	CBG07	159.30 W 12.15 S	83.6	-12.2083	-159.5420
012S160W-31	CBG07	159.25 W 12.15 S	83.6	-12.2083	-159.4580
012S160W-32	CBG07	159.20 W 12.15 S	83.6	-12.2083	-159.3750
012S160W-33	CBG07	159.15 W 12.15 S	83.6	-12.2083	-159.2920
012S160W-34	CBG07	159.10 W 12.15 S	83.6	-12.2083	-159.2080
012S160W-35	CBG07	159.05 W 12.15 S	83.6	-12.2083	-159.1250
012S160W-36	CBG07	159.00 W 12.15 S	83.6	-12.2083	-159.0420
012S160W-13	CBG07	159.55 W 12.10 S	83.6	-12.1250	-159.9580
012S160W-14	CBG07	159.50 W 12.10 S	83.6	-12.1250	-159.8750
012S160W-15	CBG07	159.45 W 12.10 S	83.6	-12.1250	-159.7920
012S160W-16	CBG07	159.40 W 12.10 S	83.6	-12.1250	-159.7080
012S160W-17	CBG07	159.35 W 12.10 S	83.6	-12.1250	-159.6250
012S160W-18	CBG07	159.30 W 12.10 S	83.6	-12.1250	-159.5420
012S160W-19	CBG07	159.25 W 12.10 S	83.6	-12.1250	-159.4580
012S160W-20	CBG07	159.20 W 12.10 S	83.6	-12.1250	-159.3750
012S160W-1	CBG07	159.55 W 12.05 S	83.6	-12.0417	-159.9580
012S160W-2	CBG07	159.50 W 12.05 S	83.6	-12.0417	-159.8750
012S160W-3	CBG07	159.45 W 12.05 S	83.6	-12.0417	-159.7920
012S160W-4	CBG07	159.40 W 12.05 S	83.6	-12.0417	-159.7080
012S160W-5	CBG07	159.35 W 12.05 S	83.6	-12.0417	-159.6250
012S160W-6	CBG07	159.30 W 12.05 S	83.6	-12.0417	-159.5420
012S160W-7	CBG07	159.25 W 12.05 S	83.6	-12.0417	-159.4580
012S160W-8	CBG07	159.20 W 12.05 S	83.6	-12.0417	-159.3750
016S162W-139	CBG08	161.30 W 16.55 S	81.9	-16.9583	-161.4580
016S162W-140	CBG08	161.25 W 16.55 S	81.9	-16.9583	-161.3750
016S162W-141	CBG08	161.20 W 16.55 S	81.9	-16.9583	-161.2920
016S162W-142	CBG08	161.15 W 16.55 S	81.9	-16.9583	-161.2080
016S162W-143	CBG08	161.10 W 16.55 S	81.9	-16.9583	-161.1250
016S162W-144	CBG08	161.05 W 16.55 S	81.9	-16.9583	-161.0420
016S162W-127	CBG08	161.30 W 16.50 S	81.9	-16.8750	-161.4580
016S162W-128	CBG08	161.25 W 16.50 S	81.9	-16.8750	-161.3750
016S162W-129	CBG08	161.20 W 16.50 S	81.9	-16.8750	-161.2920
016S162W-130	CBG08	161.15 W 16.50 S	81.9	-16.8750	-161.2080
016S162W-131	CBG08	161.10 W 16.50 S	81.9	-16.8750	-161.1250
016S162W-132	CBG08	161.05 W 16.50 S	81.9	-16.8750	-161.0420
016S162W-115	CBG08	161.30 W 16.45 S	81.9	-16.7917	-161.4580
016S162W-116	CBG08	161.25 W 16.45 S	81.9	-16.7917	-161.3750
016S162W-117	CBG08	161.20 W 16.45 S	81.9	-16.7917	-161.2920
016S162W-118	CBG08	161.15 W 16.45 S	81.9	-16.7917	-161.2080
016S162W-119	CBG08	161.10 W 16.45 S	81.9	-16.7917	-161.1250
016S162W-120	CBG08	161.05 W 16.45 S	81.9	-16.7917	-161.0420
016S162W-103	CBG08	161.30 W 16.40 S	82.0	-16.7083	-161.4580
016S162W-104	CBG08	161.25 W 16.40 S	82.0	-16.7083	-161.3750
016S162W-105	CBG08	161.20 W 16.40 S	82.0	-16.7083	-161.2920
016S162W-106	CBG08	161.15 W 16.40 S	82.0	-16.7083	-161.2080
016S162W-107	CBG08	161.10 W 16.40 S	82.0	-16.7083	-161.1250
016S162W-108	CBG08	161.05 W 16.40 S	82.0	-16.7083	-161.0420
016S162W-91	CBG08	161.30 W 16.35 S	82.0	-16.6250	-161.4580
016S162W-92	CBG08	161.25 W 16.35 S	82.0	-16.6250	-161.3750
016S162W-93	CBG08	161.20 W 16.35 S	82.0	-16.6250	-161.2920
016S162W-94	CBG08	161.15 W 16.35 S	82.0	-16.6250	-161.2080
016S162W-95	CBG08	161.10 W 16.35 S	82.0	-16.6250	-161.1250
016S162W-96	CBG08	161.05 W 16.35 S	82.0	-16.6250	-161.0420
016S162W-79	CBG08	161.30 W 16.30 S	82.0	-16.5417	-161.4580
016S162W-80	CBG08	161.25 W 16.30 S	82.0	-16.5417	-161.3750
016S162W-81	CBG08	161.20 W 16.30 S	82.0	-16.5417	-161.2920
016S162W-82	CBG08	161.15 W 16.30 S	82.0	-16.5417	-161.2080
016S162W-83	CBG08	161.10 W 16.30 S	82.0	-16.5417	-161.1250
016S162W-84	CBG08	161.05 W 16.30 S	82.0	-16.5417	-161.0420
016S162W-67	CBG08	161.30 W 16.25 S	82.1	-16.4583	-161.4580
016S162W-68	CBG08	161.25 W 16.25 S	82.1	-16.4583	-161.3750
016S162W-69	CBG08	161.20 W 16.25 S	82.1	-16.4583	-161.2920
016S162W-70	CBG08	161.15 W 16.25 S	82.1	-16.4583	-161.2080
016S162W-71	CBG08	161.10 W 16.25 S	82.1	-16.4583	-161.1250
016S162W-72	CBG08	161.05 W 16.25 S	82.1	-16.4583	-161.0420
016S163W-55	CBG08	162.30 W 16.20 S	82.1	-16.3750	-162.4580
016S163W-56	CBG08	162.25 W 16.20 S	82.1	-16.3750	-162.3750
016S163W-57	CBG08	162.20 W 16.20 S	82.1	-16.3750	-162.2920
016S163W-58	CBG08	162.15 W 16.20 S	82.1	-16.3750	-162.2080
016S163W-59	CBG08	162.10 W 16.20 S	82.1	-16.3750	-162.1250
016S163W-60	CBG08	162.05 W 16.20 S	82.1	-16.3750	-162.0420
016S162W-55	CBG08	161.30 W 16.20 S	82.1	-16.3750	-161.4580
016S162W-56	CBG08	161.25 W 16.20 S	82.1	-16.3750	-161.3750
016S162W-57	CBG08	161.20 W 16.20 S	82.1	-16.3750	-161.2920
016S162W-58	CBG08	161.15 W 16.20 S	82.1	-16.3750	-161.2080
016S162W-59	CBG08	161.10 W 16.20 S	82.1	-16.3750	-161.1250
016S162W-60	CBG08	161.05 W 16.20 S	82.1	-16.3750	-161.0420
016S163W-43	CBG08	162.30 W 16.15 S	82.1	-16.2917	-162.4580
016S163W-44	CBG08	162.25 W 16.15 S	82.1	-16.2917	-162.3750
016S163W-45	CBG08	162.20 W 16.15 S	82.1	-16.2917	-162.2920
016S163W-46	CBG08	162.15 W 16.15 S	82.1	-16.2917	-162.2080
016S163W-47	CBG08	162.10 W 16.15 S	82.1	-16.2917	-162.1250
016S163W-48	CBG08	162.05 W 16.15 S	82.1	-16.2917	-162.0420
016S162W-43	CBG08	161.30 W 16.15 S	82.1	-16.2917	-161.4580
016S162W-44	CBG08	161.25 W 16.15 S	82.1	-16.2917	-161.3750
016S162W-45	CBG08	161.20 W 16.15 S	82.1	-16.2917	-161.2920
016S162W-46	CBG08	161.15 W 16.15 S	82.1	-16.2917	-161.2080
016S162W-47	CBG08	161.10 W 16.15 S	82.1	-16.2917	-161.1250
016S162W-48	CBG08	161.05 W 16.15 S	82.1	-16.2917	-161.0420
016S163W-31	CBG08	162.30 W 16.10 S	82.2	-16.2083	-162.4580
016S163W-32	CBG08	162.25 W 16.10 S	82.2	-16.2083	-162.3750
016S163W-33	CBG08	162.20 W 16.10 S	82.2	-16.2083	-162.2920
016S163W-34	CBG08	162.15 W 16.10 S	82.2	-16.2083	-162.2080
016S163W-35	CBG08	162.10 W 16.10 S	82.2	-16.2083	-162.1250
016S163W-36	CBG08	162.05 W 16.10 S	82.2	-16.2083	-162.0420
016S162W-25	CBG08	162.00 W 16.10 S	82.2	-16.2083	-161.9580
016S162W-26	CBG08	161.55 W 16.10 S	82.2	-16.2083	-161.8750
016S162W-27	CBG08	161.50 W 16.10 S	82.2	-16.2083	-161.7920
016S162W-28	CBG08	161.45 W 16.10 S	82.2	-16.2083	-161.7080
016S162W-29	CBG08	161.40 W 16.10 S	82.2	-16.2083	-161.6250
016S162W-30	CBG08	161.35 W 16.10 S	82.2	-16.2083	-161.5420
016S162W-31	CBG08	161.30 W 16.10 S	82.2	-16.2083	-161.4580
016S162W-32	CBG08	161.25 W 16.10 S	82.2	-16.2083	-161.3750
016S162W-33	CBG08	161.20 W 16.10 S	82.2	-16.2083	-161.2920
016S162W-34	CBG08	161.15 W 16.10 S	82.2	-16.2083	-161.2080
016S162W-35	CBG08	161.10 W 16.10 S	82.2	-16.2083	-161.1250
016S162W-36	CBG08	161.05 W 16.10 S	82.2	-16.2083	-161.0420
016S163W-19	CBG08	162.30 W 16.05 S	82.2	-16.1250	-162.4580
016S163W-20	CBG08	162.25 W 16.05 S	82.2	-16.1250	-162.3750
016S163W-21	CBG08	162.20 W 16.05 S	82.2	-16.1250	-162.2920

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
016S163W-22	CBG08	162.15 W 16.05 S	82.2	-16.1250	-162.2080
016S163W-23	CBG08	162.10 W 16.05 S	82.2	-16.1250	-162.1250
016S163W-24	CBG08	162.05 W 16.05 S	82.2	-16.1250	-162.0420
016S162W-13	CBG08	162.00 W 16.05 S	82.2	-16.1250	-161.9580
016S162W-14	CBG08	161.55 W 16.05 S	82.2	-16.1250	-161.8750
016S162W-15	CBG08	161.50 W 16.05 S	82.2	-16.1250	-161.7920
016S162W-16	CBG08	161.45 W 16.05 S	82.2	-16.1250	-161.7080
016S162W-17	CBG08	161.40 W 16.05 S	82.2	-16.1250	-161.6250
016S162W-18	CBG08	161.35 W 16.05 S	82.2	-16.1250	-161.5420
016S162W-19	CBG08	161.30 W 16.05 S	82.2	-16.1250	-161.4580
016S162W-20	CBG08	161.25 W 16.05 S	82.2	-16.1250	-161.3750
016S162W-21	CBG08	161.20 W 16.05 S	82.2	-16.1250	-161.2920
016S162W-22	CBG08	161.15 W 16.05 S	82.2	-16.1250	-161.2080
016S162W-23	CBG08	161.10 W 16.05 S	82.2	-16.1250	-161.1250
016S162W-24	CBG08	161.05 W 16.05 S	82.2	-16.1250	-161.0420
016S163W-7	CBG08	162.30 W 16.00 S	82.2	-16.0417	-162.4580
016S163W-8	CBG08	162.25 W 16.00 S	82.2	-16.0417	-162.3750
016S163W-9	CBG08	162.20 W 16.00 S	82.2	-16.0417	-162.2920
016S163W-10	CBG08	162.15 W 16.00 S	82.2	-16.0417	-162.2080
016S163W-11	CBG08	162.10 W 16.00 S	82.2	-16.0417	-162.1250
016S163W-12	CBG08	162.05 W 16.00 S	82.2	-16.0417	-162.0420
016S162W-1	CBG08	162.00 W 16.00 S	82.2	-16.0417	-161.9580
016S162W-2	CBG08	161.55 W 16.00 S	82.2	-16.0417	-161.8750
016S162W-3	CBG08	161.50 W 16.00 S	82.2	-16.0417	-161.7920
016S162W-4	CBG08	161.45 W 16.00 S	82.2	-16.0417	-161.7080
016S162W-5	CBG08	161.40 W 16.00 S	82.2	-16.0417	-161.6250
016S162W-6	CBG08	161.35 W 16.00 S	82.2	-16.0417	-161.5420
016S162W-7	CBG08	161.30 W 16.00 S	82.2	-16.0417	-161.4580
016S162W-8	CBG08	161.25 W 16.00 S	82.2	-16.0417	-161.3750
016S162W-9	CBG08	161.20 W 16.00 S	82.2	-16.0417	-161.2920
016S162W-10	CBG08	161.15 W 16.00 S	82.2	-16.0417	-161.2080
016S162W-11	CBG08	161.10 W 16.00 S	82.2	-16.0417	-161.1250
016S162W-12	CBG08	161.05 W 16.00 S	82.2	-16.0417	-161.0420
015S163W-133	CBG08	163.00 W 15.55 S	82.3	-15.9583	-162.9580
015S163W-134	CBG08	162.55 W 15.55 S	82.3	-15.9583	-162.8750
015S163W-135	CBG08	162.50 W 15.55 S	82.3	-15.9583	-162.7920
015S163W-136	CBG08	162.45 W 15.55 S	82.3	-15.9583	-162.7080
015S163W-137	CBG08	162.40 W 15.55 S	82.3	-15.9583	-162.6250
015S163W-138	CBG08	162.35 W 15.55 S	82.3	-15.9583	-162.5420
015S163W-139	CBG08	162.30 W 15.55 S	82.3	-15.9583	-162.4580
015S163W-140	CBG08	162.25 W 15.55 S	82.3	-15.9583	-162.3750
015S163W-141	CBG08	162.20 W 15.55 S	82.3	-15.9583	-162.2920
015S163W-142	CBG08	162.15 W 15.55 S	82.3	-15.9583	-162.2080
015S163W-143	CBG08	162.10 W 15.55 S	82.3	-15.9583	-162.1250
015S163W-144	CBG08	162.05 W 15.55 S	82.3	-15.9583	-162.0420
015S162W-133	CBG08	162.00 W 15.55 S	82.3	-15.9583	-161.9580
015S162W-134	CBG08	161.55 W 15.55 S	82.3	-15.9583	-161.8750
015S162W-135	CBG08	161.50 W 15.55 S	82.3	-15.9583	-161.7920
015S162W-136	CBG08	161.45 W 15.55 S	82.3	-15.9583	-161.7080
015S162W-137	CBG08	161.40 W 15.55 S	82.3	-15.9583	-161.6250
015S162W-138	CBG08	161.35 W 15.55 S	82.3	-15.9583	-161.5420
015S162W-139	CBG08	161.30 W 15.55 S	82.3	-15.9583	-161.4580
015S162W-140	CBG08	161.25 W 15.55 S	82.3	-15.9583	-161.3750
015S162W-141	CBG08	161.20 W 15.55 S	82.3	-15.9583	-161.2920
015S162W-142	CBG08	161.15 W 15.55 S	82.3	-15.9583	-161.2080
015S162W-143	CBG08	161.10 W 15.55 S	82.3	-15.9583	-161.1250
015S162W-144	CBG08	161.05 W 15.55 S	82.3	-15.9583	-161.0420
015S163W-121	CBG08	163.00 W 15.50 S	82.3	-15.8750	-162.9580
015S163W-122	CBG08	162.55 W 15.50 S	82.3	-15.8750	-162.8750
015S163W-123	CBG08	162.50 W 15.50 S	82.3	-15.8750	-162.7920
015S163W-124	CBG08	162.45 W 15.50 S	82.3	-15.8750	-162.7080
015S163W-125	CBG08	162.40 W 15.50 S	82.3	-15.8750	-162.6250
015S163W-126	CBG08	162.35 W 15.50 S	82.3	-15.8750	-162.5420
015S163W-127	CBG08	162.30 W 15.50 S	82.3	-15.8750	-162.4580
015S163W-128	CBG08	162.25 W 15.50 S	82.3	-15.8750	-162.3750
015S163W-129	CBG08	162.20 W 15.50 S	82.3	-15.8750	-162.2920
015S163W-130	CBG08	162.15 W 15.50 S	82.3	-15.8750	-162.2080
015S163W-131	CBG08	162.10 W 15.50 S	82.3	-15.8750	-162.1250
015S163W-132	CBG08	162.05 W 15.50 S	82.3	-15.8750	-162.0420
015S162W-121	CBG08	162.00 W 15.50 S	82.3	-15.8750	-161.9580
015S162W-122	CBG08	161.55 W 15.50 S	82.3	-15.8750	-161.8750
015S162W-123	CBG08	161.50 W 15.50 S	82.3	-15.8750	-161.7920
015S162W-124	CBG08	161.45 W 15.50 S	82.3	-15.8750	-161.7080
015S162W-125	CBG08	161.40 W 15.50 S	82.3	-15.8750	-161.6250
015S162W-126	CBG08	161.35 W 15.50 S	82.3	-15.8750	-161.5420
015S162W-127	CBG08	161.30 W 15.50 S	82.3	-15.8750	-161.4580
015S162W-128	CBG08	161.25 W 15.50 S	82.3	-15.8750	-161.3750
015S162W-129	CBG08	161.20 W 15.50 S	82.3	-15.8750	-161.2920
015S162W-130	CBG08	161.15 W 15.50 S	82.3	-15.8750	-161.2080
015S162W-131	CBG08	161.10 W 15.50 S	82.3	-15.8750	-161.1250
015S162W-132	CBG08	161.05 W 15.50 S	82.3	-15.8750	-161.0420
015S163W-109	CBG08	163.00 W 15.45 S	82.3	-15.7917	-162.9580
015S163W-110	CBG08	162.55 W 15.45 S	82.3	-15.7917	-162.8750
015S163W-111	CBG08	162.50 W 15.45 S	82.3	-15.7917	-162.7920
015S163W-112	CBG08	162.45 W 15.45 S	82.3	-15.7917	-162.7080
015S163W-113	CBG08	162.40 W 15.45 S	82.3	-15.7917	-162.6250
015S163W-114	CBG08	162.35 W 15.45 S	82.3	-15.7917	-162.5420
015S163W-115	CBG08	162.30 W 15.45 S	82.3	-15.7917	-162.4580
015S163W-116	CBG08	162.25 W 15.45 S	82.3	-15.7917	-162.3750
015S163W-117	CBG08	162.20 W 15.45 S	82.3	-15.7917	-162.2920
015S163W-118	CBG08	162.15 W 15.45 S	82.3	-15.7917	-162.2080
015S163W-119	CBG08	162.10 W 15.45 S	82.3	-15.7917	-162.1250
015S163W-120	CBG08	162.05 W 15.45 S	82.3	-15.7917	-162.0420
015S162W-109	CBG08	162.00 W 15.45 S	82.3	-15.7917	-161.9580
015S162W-110	CBG08	161.55 W 15.45 S	82.3	-15.7917	-161.8750
015S162W-111	CBG08	161.50 W 15.45 S	82.3	-15.7917	-161.7920
015S162W-112	CBG08	161.45 W 15.45 S	82.3	-15.7917	-161.7080
015S162W-113	CBG08	161.40 W 15.45 S	82.3	-15.7917	-161.6250
015S162W-114	CBG08	161.35 W 15.45 S	82.3	-15.7917	-161.5420
015S162W-115	CBG08	161.30 W 15.45 S	82.3	-15.7917	-161.4580
015S162W-116	CBG08	161.25 W 15.45 S	82.3	-15.7917	-161.3750
015S162W-117	CBG08	161.20 W 15.45 S	82.3	-15.7917	-161.2920
015S162W-118	CBG08	161.15 W 15.45 S	82.3	-15.7917	-161.2080
015S162W-119	CBG08	161.10 W 15.45 S	82.3	-15.7917	-161.1250
015S162W-120	CBG08	161.05 W 15.45 S	82.3	-15.7917	-161.0420
015S163W-97	CBG08	163.00 W 15.40 S	82.4	-15.7083	-162.9580
015S163W-98	CBG08	162.55 W 15.40 S	82.4	-15.7083	-162.8750
015S163W-99	CBG08	162.50 W 15.40 S	82.4	-15.7083	-162.7920
015S163W-100	CBG08	162.45 W 15.40 S	82.4	-15.7083	-162.7080
015S163W-101	CBG08	162.40 W 15.40 S	82.4	-15.7083	-162.6250
015S163W-102	CBG08	162.35 W 15.40 S	82.4	-15.7083	-162.5420
015S163W-103	CBG08	162.30 W 15.40 S	82.4	-15.7083	-162.4580
015S163W-104	CBG08	162.25 W 15.40 S	82.4	-15.7083	-162.3750
015S163W-105	CBG08	162.20 W 15.40 S	82.4	-15.7083	-162.2920
015S163W-106	CBG08	162.15 W 15.40 S	82.4	-15.7083	-162.2080
015S163W-107	CBG08	162.10 W 15.40 S	82.4	-15.7083	-162.1250
015S163W-108	CBG08	162.05 W 15.40 S	82.4	-15.7083	-162.0420
015S162W-97	CBG08	162.00 W 15.40 S	82.4	-15.7083	-161.9580

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
015S162W-98	CBG08	161.55 W 15.40 S	82.4	-15.7083	-161.8750
015S162W-99	CBG08	161.50 W 15.40 S	82.4	-15.7083	-161.7920
015S162W-103	CBG08	161.30 W 15.40 S	82.4	-15.7083	-161.4580
015S162W-104	CBG08	161.25 W 15.40 S	82.4	-15.7083	-161.3750
015S162W-105	CBG08	161.20 W 15.40 S	82.4	-15.7083	-161.2920
015S162W-106	CBG08	161.15 W 15.40 S	82.4	-15.7083	-161.2080
015S162W-107	CBG08	161.10 W 15.40 S	82.4	-15.7083	-161.1250
015S162W-108	CBG08	161.05 W 15.40 S	82.4	-15.7083	-161.0420
015S163W-85	CBG08	163.00 W 15.35 S	82.4	-15.6250	-162.9580
015S163W-86	CBG08	162.55 W 15.35 S	82.4	-15.6250	-162.8750
015S163W-87	CBG08	162.50 W 15.35 S	82.4	-15.6250	-162.7920
015S163W-88	CBG08	162.45 W 15.35 S	82.4	-15.6250	-162.7080
015S163W-89	CBG08	162.40 W 15.35 S	82.4	-15.6250	-162.6250
015S163W-90	CBG08	162.35 W 15.35 S	82.4	-15.6250	-162.5420
015S163W-91	CBG08	162.30 W 15.35 S	82.4	-15.6250	-162.4580
015S163W-92	CBG08	162.25 W 15.35 S	82.4	-15.6250	-162.3750
015S163W-93	CBG08	162.20 W 15.35 S	82.4	-15.6250	-162.2920
015S163W-94	CBG08	162.15 W 15.35 S	82.4	-15.6250	-162.2080
015S163W-95	CBG08	162.10 W 15.35 S	82.4	-15.6250	-162.1250
015S163W-96	CBG08	162.05 W 15.35 S	82.4	-15.6250	-162.0420
015S162W-85	CBG08	162.00 W 15.35 S	82.4	-15.6250	-161.9580
015S162W-86	CBG08	161.55 W 15.35 S	82.4	-15.6250	-161.8750
015S162W-87	CBG08	161.50 W 15.35 S	82.4	-15.6250	-161.7920
015S162W-91	CBG08	161.30 W 15.35 S	82.4	-15.6250	-161.4580
015S162W-92	CBG08	161.25 W 15.35 S	82.4	-15.6250	-161.3750
015S162W-93	CBG08	161.20 W 15.35 S	82.4	-15.6250	-161.2920
015S162W-94	CBG08	161.15 W 15.35 S	82.4	-15.6250	-161.2080
015S162W-95	CBG08	161.10 W 15.35 S	82.4	-15.6250	-161.1250
015S162W-96	CBG08	161.05 W 15.35 S	82.4	-15.6250	-161.0420
015S163W-73	CBG08	163.00 W 15.30 S	82.4	-15.5417	-162.9580
015S163W-74	CBG08	162.55 W 15.30 S	82.4	-15.5417	-162.8750
015S163W-75	CBG08	162.50 W 15.30 S	82.4	-15.5417	-162.7920
015S163W-76	CBG08	162.45 W 15.30 S	82.4	-15.5417	-162.7080
015S163W-77	CBG08	162.40 W 15.30 S	82.4	-15.5417	-162.6250
015S163W-78	CBG08	162.35 W 15.30 S	82.4	-15.5417	-162.5420
015S163W-79	CBG08	162.30 W 15.30 S	82.4	-15.5417	-162.4580
015S163W-80	CBG08	162.25 W 15.30 S	82.4	-15.5417	-162.3750
015S163W-81	CBG08	162.20 W 15.30 S	82.4	-15.5417	-162.2920
015S163W-82	CBG08	162.15 W 15.30 S	82.4	-15.5417	-162.2080
015S163W-83	CBG08	162.10 W 15.30 S	82.4	-15.5417	-162.1250
015S163W-84	CBG08	162.05 W 15.30 S	82.4	-15.5417	-162.0420
015S162W-79	CBG08	161.30 W 15.30 S	82.4	-15.5417	-161.4580
015S162W-80	CBG08	161.25 W 15.30 S	82.4	-15.5417	-161.3750
015S162W-81	CBG08	161.20 W 15.30 S	82.4	-15.5417	-161.2920
015S162W-82	CBG08	161.15 W 15.30 S	82.4	-15.5417	-161.2080
015S162W-83	CBG08	161.10 W 15.30 S	82.4	-15.5417	-161.1250
015S162W-84	CBG08	161.05 W 15.30 S	82.4	-15.5417	-161.0420
015S162W-67	CBG08	161.30 W 15.25 S	82.5	-15.4583	-161.4580
015S162W-68	CBG08	161.25 W 15.25 S	82.5	-15.4583	-161.3750
015S162W-69	CBG08	161.20 W 15.25 S	82.5	-15.4583	-161.2920
015S162W-70	CBG08	161.15 W 15.25 S	82.5	-15.4583	-161.2080
015S162W-71	CBG08	161.10 W 15.25 S	82.5	-15.4583	-161.1250
015S162W-72	CBG08	161.05 W 15.25 S	82.5	-15.4583	-161.0420
015S162W-55	CBG08	161.30 W 15.20 S	82.5	-15.3750	-161.4580
015S162W-56	CBG08	161.25 W 15.20 S	82.5	-15.3750	-161.3750
015S162W-57	CBG08	161.20 W 15.20 S	82.5	-15.3750	-161.2920
015S162W-58	CBG08	161.15 W 15.20 S	82.5	-15.3750	-161.2080
015S162W-59	CBG08	161.10 W 15.20 S	82.5	-15.3750	-161.1250
015S162W-60	CBG08	161.05 W 15.20 S	82.5	-15.3750	-161.0420
015S162W-43	CBG08	161.30 W 15.15 S	82.5	-15.2917	-161.4580
015S162W-44	CBG08	161.25 W 15.15 S	82.5	-15.2917	-161.3750
015S162W-45	CBG08	161.20 W 15.15 S	82.5	-15.2917	-161.2920
015S162W-46	CBG08	161.15 W 15.15 S	82.5	-15.2917	-161.2080
015S162W-47	CBG08	161.10 W 15.15 S	82.5	-15.2917	-161.1250
015S162W-48	CBG08	161.05 W 15.15 S	82.5	-15.2917	-161.0420
015S162W-31	CBG08	161.30 W 15.10 S	82.6	-15.2083	-161.4580
015S162W-32	CBG08	161.25 W 15.10 S	82.6	-15.2083	-161.3750
015S162W-33	CBG08	161.20 W 15.10 S	82.6	-15.2083	-161.2920
015S162W-34	CBG08	161.15 W 15.10 S	82.6	-15.2083	-161.2080
015S162W-35	CBG08	161.10 W 15.10 S	82.6	-15.2083	-161.1250
015S162W-36	CBG08	161.05 W 15.10 S	82.6	-15.2083	-161.0420
015S162W-19	CBG08	161.30 W 15.05 S	82.6	-15.1250	-161.4580
015S162W-20	CBG08	161.25 W 15.05 S	82.6	-15.1250	-161.3750
015S162W-21	CBG08	161.20 W 15.05 S	82.6	-15.1250	-161.2920
015S162W-22	CBG08	161.15 W 15.05 S	82.6	-15.1250	-161.2080
015S162W-23	CBG08	161.10 W 15.05 S	82.6	-15.1250	-161.1250
015S162W-24	CBG08	161.05 W 15.05 S	82.6	-15.1250	-161.0420
015S162W-7	CBG08	161.30 W 15.00 S	82.6	-15.0417	-161.4580
015S162W-8	CBG08	161.25 W 15.00 S	82.6	-15.0417	-161.3750
015S162W-9	CBG08	161.20 W 15.00 S	82.6	-15.0417	-161.2920
015S162W-10	CBG08	161.15 W 15.00 S	82.6	-15.0417	-161.2080
015S162W-11	CBG08	161.10 W 15.00 S	82.6	-15.0417	-161.1250
015S162W-12	CBG08	161.05 W 15.00 S	82.6	-15.0417	-161.0420
010S160W-67	CBG09	159.25 W 10.30 S	84.1	-10.4583	-159.4580
010S160W-68	CBG09	159.20 W 10.30 S	84.1	-10.4583	-159.3750
010S160W-69	CBG09	159.15 W 10.30 S	84.1	-10.4583	-159.2920
010S160W-70	CBG09	159.10 W 10.30 S	84.1	-10.4583	-159.2080
010S160W-71	CBG09	159.05 W 10.30 S	84.1	-10.4583	-159.1250
010S160W-72	CBG09	159.00 W 10.30 S	84.1	-10.4583	-159.0420
010S159W-61	CBG09	158.55 W 10.30 S	84.1	-10.4583	-158.9580
010S159W-62	CBG09	158.50 W 10.30 S	84.1	-10.4583	-158.8750
010S159W-63	CBG09	158.45 W 10.30 S	84.1	-10.4583	-158.7920
010S160W-55	CBG09	159.25 W 10.25 S	84.1	-10.3750	-159.4580
010S160W-56	CBG09	159.20 W 10.25 S	84.1	-10.3750	-159.3750
010S160W-57	CBG09	159.15 W 10.25 S	84.1	-10.3750	-159.2920
010S160W-58	CBG09	159.10 W 10.25 S	84.1	-10.3750	-159.2080
010S160W-59	CBG09	159.05 W 10.25 S	84.1	-10.3750	-159.1250
010S160W-60	CBG09	159.00 W 10.25 S	84.1	-10.3750	-159.0420
010S159W-49	CBG09	158.55 W 10.25 S	84.1	-10.3750	-158.9580
010S159W-50	CBG09	158.50 W 10.25 S	84.1	-10.3750	-158.8750
010S159W-51	CBG09	158.45 W 10.25 S	84.1	-10.3750	-158.7920
010S160W-43	CBG09	159.25 W 10.20 S	84.1	-10.2917	-159.4580
010S160W-44	CBG09	159.20 W 10.20 S	84.1	-10.2917	-159.3750
010S160W-45	CBG09	159.15 W 10.20 S	84.1	-10.2917	-159.2920
010S160W-46	CBG09	159.10 W 10.20 S	84.1	-10.2917	-159.2080
010S160W-47	CBG09	159.05 W 10.20 S	84.1	-10.2917	-159.1250
010S160W-48	CBG09	159.00 W 10.20 S	84.1	-10.2917	-159.0420
010S159W-37	CBG09	158.55 W 10.20 S	84.1	-10.2917	-158.9580
010S159W-38	CBG09	158.50 W 10.20 S	84.1	-10.2917	-158.8750
010S159W-39	CBG09	158.45 W 10.20 S	84.1	-10.2917	-158.7920
010S160W-31	CBG09	159.25 W 10.15 S	84.2	-10.2083	-159.4580
010S160W-32	CBG09	159.20 W 10.15 S	84.2	-10.2083	-159.3750
010S160W-33	CBG09	159.15 W 10.15 S	84.2	-10.2083	-159.2920
010S160W-34	CBG09	159.10 W 10.15 S	84.2	-10.2083	-159.2080
010S160W-35	CBG09	159.05 W 10.15 S	84.2	-10.2083	-159.1250
010S160W-36	CBG09	159.00 W 10.15 S	84.2	-10.2083	-159.0420
010S159W-25	CBG09	158.55 W 10.15 S	84.2	-10.2083	-158.9580
010S159W-26	CBG09	158.50 W 10.15 S	84.2	-10.2083	-158.8750

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
010S159W-27	CBG09	158.45 W 10.15 S	84.2	-10.2083	-158.7920
010S160W-19	CBG09	159.25 W 10.10 S	84.2	-10.1250	-159.4580
010S160W-20	CBG09	159.20 W 10.10 S	84.2	-10.1250	-159.3750
010S160W-21	CBG09	159.15 W 10.10 S	84.2	-10.1250	-159.2920
010S160W-22	CBG09	159.10 W 10.10 S	84.2	-10.1250	-159.2080
010S160W-23	CBG09	159.05 W 10.10 S	84.2	-10.1250	-159.1250
010S160W-24	CBG09	159.00 W 10.10 S	84.2	-10.1250	-159.0420
010S159W-13	CBG09	158.55 W 10.10 S	84.2	-10.1250	-158.9580
010S159W-14	CBG09	158.50 W 10.10 S	84.2	-10.1250	-158.8750
010S159W-15	CBG09	158.45 W 10.10 S	84.2	-10.1250	-158.7920
010S160W-7	CBG09	159.25 W 10.05 S	84.2	-10.0417	-159.4580
010S160W-8	CBG09	159.20 W 10.05 S	84.2	-10.0417	-159.3750
010S160W-9	CBG09	159.15 W 10.05 S	84.2	-10.0417	-159.2920
010S160W-10	CBG09	159.10 W 10.05 S	84.2	-10.0417	-159.2080
010S160W-11	CBG09	159.05 W 10.05 S	84.2	-10.0417	-159.1250
010S160W-12	CBG09	159.00 W 10.05 S	84.2	-10.0417	-159.0420
010S159W-1	CBG09	158.55 W 10.05 S	84.2	-10.0417	-158.9580
010S159W-2	CBG09	158.50 W 10.05 S	84.2	-10.0417	-158.8750
010S159W-3	CBG09	158.45 W 10.05 S	84.2	-10.0417	-158.7920
009S160W-142	CBG09	159.10 W 10.00 S	84.2	-9.9583	-159.2080
009S160W-143	CBG09	159.05 W 10.00 S	84.2	-9.9583	-159.1250
009S160W-144	CBG09	159.00 W 10.00 S	84.2	-9.9583	-159.0420
009S159W-133	CBG09	158.55 W 10.00 S	84.2	-9.9583	-158.9580
009S159W-134	CBG09	158.50 W 10.00 S	84.2	-9.9583	-158.8750
009S159W-135	CBG09	158.45 W 10.00 S	84.2	-9.9583	-158.7920
009S160W-130	CBG09	159.10 W 9.55 S	84.2	-9.8750	-159.2080
009S160W-131	CBG09	159.05 W 9.55 S	84.2	-9.8750	-159.1250
009S160W-132	CBG09	159.00 W 9.55 S	84.2	-9.8750	-159.0420
009S159W-121	CBG09	158.55 W 9.55 S	84.2	-9.8750	-158.9580
009S159W-122	CBG09	158.50 W 9.55 S	84.2	-9.8750	-158.8750
009S159W-123	CBG09	158.45 W 9.55 S	84.2	-9.8750	-158.7920
009S160W-118	CBG09	159.10 W 9.50 S	84.3	-9.7917	-159.2080
009S160W-119	CBG09	159.05 W 9.50 S	84.3	-9.7917	-159.1250
009S160W-120	CBG09	159.00 W 9.50 S	84.3	-9.7917	-159.0420
009S159W-109	CBG09	158.55 W 9.50 S	84.3	-9.7917	-158.9580
009S159W-110	CBG09	158.50 W 9.50 S	84.3	-9.7917	-158.8750
009S159W-111	CBG09	158.45 W 9.50 S	84.3	-9.7917	-158.7920
019S167W-45	CBG10	166.20 W 19.15 S	80.8	-19.2917	-166.2920
019S167W-46	CBG10	166.15 W 19.15 S	80.8	-19.2917	-166.2080
019S167W-47	CBG10	166.10 W 19.15 S	80.8	-19.2917	-166.1250
019S167W-48	CBG10	166.05 W 19.15 S	80.8	-19.2917	-166.0420
019S166W-37	CBG10	166.00 W 19.15 S	80.8	-19.2917	-165.9580
019S166W-38	CBG10	165.55 W 19.15 S	80.8	-19.2917	-165.8750
019S166W-39	CBG10	165.50 W 19.15 S	80.8	-19.2917	-165.7920
019S166W-40	CBG10	165.45 W 19.15 S	80.8	-19.2917	-165.7080
019S166W-41	CBG10	165.40 W 19.15 S	80.8	-19.2917	-165.6250
019S166W-42	CBG10	165.35 W 19.15 S	80.8	-19.2917	-165.5420
019S166W-43	CBG10	165.30 W 19.15 S	80.8	-19.2917	-165.4580
019S166W-44	CBG10	165.25 W 19.15 S	80.8	-19.2917	-165.3750
019S166W-45	CBG10	165.20 W 19.15 S	80.8	-19.2917	-165.2920
019S166W-46	CBG10	165.15 W 19.15 S	80.8	-19.2917	-165.2080
019S166W-47	CBG10	165.10 W 19.15 S	80.8	-19.2917	-165.1250
019S166W-48	CBG10	165.05 W 19.15 S	80.8	-19.2917	-165.0420
019S165W-37	CBG10	165.00 W 19.15 S	80.8	-19.2917	-164.9580
019S165W-38	CBG10	164.55 W 19.15 S	80.8	-19.2917	-164.8750
019S165W-39	CBG10	164.50 W 19.15 S	80.8	-19.2917	-164.7920
019S165W-40	CBG10	164.45 W 19.15 S	80.8	-19.2917	-164.7080
019S165W-41	CBG10	164.40 W 19.15 S	80.8	-19.2917	-164.6250
019S165W-42	CBG10	164.35 W 19.15 S	80.8	-19.2917	-164.5420
019S165W-43	CBG10	164.30 W 19.15 S	80.8	-19.2917	-164.4580
019S165W-44	CBG10	164.25 W 19.15 S	80.8	-19.2917	-164.3750
019S167W-33	CBG10	166.20 W 19.10 S	80.8	-19.2083	-166.2920
019S167W-34	CBG10	166.15 W 19.10 S	80.8	-19.2083	-166.2080
019S167W-35	CBG10	166.10 W 19.10 S	80.8	-19.2083	-166.1250
019S167W-36	CBG10	166.05 W 19.10 S	80.8	-19.2083	-166.0420
019S166W-25	CBG10	166.00 W 19.10 S	80.8	-19.2083	-165.9580
019S166W-26	CBG10	165.55 W 19.10 S	80.8	-19.2083	-165.8750
019S166W-27	CBG10	165.50 W 19.10 S	80.8	-19.2083	-165.7920
019S166W-28	CBG10	165.45 W 19.10 S	80.8	-19.2083	-165.7080
019S166W-29	CBG10	165.40 W 19.10 S	80.8	-19.2083	-165.6250
019S166W-30	CBG10	165.35 W 19.10 S	80.8	-19.2083	-165.5420
019S166W-31	CBG10	165.30 W 19.10 S	80.8	-19.2083	-165.4580
019S166W-32	CBG10	165.25 W 19.10 S	80.8	-19.2083	-165.3750
019S166W-33	CBG10	165.20 W 19.10 S	80.8	-19.2083	-165.2920
019S166W-34	CBG10	165.15 W 19.10 S	80.8	-19.2083	-165.2080
019S166W-35	CBG10	165.10 W 19.10 S	80.8	-19.2083	-165.1250
019S166W-36	CBG10	165.05 W 19.10 S	80.8	-19.2083	-165.0420
019S165W-25	CBG10	165.00 W 19.10 S	80.8	-19.2083	-164.9580
019S165W-26	CBG10	164.55 W 19.10 S	80.8	-19.2083	-164.8750
019S165W-27	CBG10	164.50 W 19.10 S	80.8	-19.2083	-164.7920
019S165W-28	CBG10	164.45 W 19.10 S	80.8	-19.2083	-164.7080
019S165W-29	CBG10	164.40 W 19.10 S	80.8	-19.2083	-164.6250
019S165W-30	CBG10	164.35 W 19.10 S	80.8	-19.2083	-164.5420
019S165W-31	CBG10	164.30 W 19.10 S	80.8	-19.2083	-164.4580
019S165W-32	CBG10	164.25 W 19.10 S	80.8	-19.2083	-164.3750
019S167W-21	CBG10	166.20 W 19.05 S	80.9	-19.1250	-166.2920
019S167W-22	CBG10	166.15 W 19.05 S	80.9	-19.1250	-166.2080
019S167W-23	CBG10	166.10 W 19.05 S	80.9	-19.1250	-166.1250
019S167W-24	CBG10	166.05 W 19.05 S	80.9	-19.1250	-166.0420
019S166W-13	CBG10	166.00 W 19.05 S	80.9	-19.1250	-165.9580
019S166W-14	CBG10	165.55 W 19.05 S	80.9	-19.1250	-165.8750
019S166W-15	CBG10	165.50 W 19.05 S	80.9	-19.1250	-165.7920
019S166W-16	CBG10	165.45 W 19.05 S	80.9	-19.1250	-165.7080
019S166W-17	CBG10	165.40 W 19.05 S	80.9	-19.1250	-165.6250
019S166W-18	CBG10	165.35 W 19.05 S	80.9	-19.1250	-165.5420
019S166W-19	CBG10	165.30 W 19.05 S	80.9	-19.1250	-165.4580
019S166W-20	CBG10	165.25 W 19.05 S	80.9	-19.1250	-165.3750
019S166W-21	CBG10	165.20 W 19.05 S	80.9	-19.1250	-165.2920
019S166W-22	CBG10	165.15 W 19.05 S	80.9	-19.1250	-165.2080
019S166W-23	CBG10	165.10 W 19.05 S	80.9	-19.1250	-165.1250
019S166W-24	CBG10	165.05 W 19.05 S	80.9	-19.1250	-165.0420
019S165W-13	CBG10	165.00 W 19.05 S	80.9	-19.1250	-164.9580
019S165W-14	CBG10	164.55 W 19.05 S	80.9	-19.1250	-164.8750
019S165W-15	CBG10	164.50 W 19.05 S	80.9	-19.1250	-164.7920
019S165W-16	CBG10	164.45 W 19.05 S	80.9	-19.1250	-164.7080
019S165W-17	CBG10	164.40 W 19.05 S	80.9	-19.1250	-164.6250
019S165W-18	CBG10	164.35 W 19.05 S	80.9	-19.1250	-164.5420
019S165W-19	CBG10	164.30 W 19.05 S	80.9	-19.1250	-164.4580
019S167W-9	CBG10	166.20 W 19.00 S	80.9	-19.0417	-166.2920
019S167W-10	CBG10	166.15 W 19.00 S	80.9	-19.0417	-166.2080
019S167W-11	CBG10	166.10 W 19.00 S	80.9	-19.0417	-166.1250
019S167W-12	CBG10	166.05 W 19.00 S	80.9	-19.0417	-166.0420
019S166W-1	CBG10	166.00 W 19.00 S	80.9	-19.0417	-165.9580
019S166W-2	CBG10	165.55 W 19.00 S	80.9	-19.0417	-165.8750
019S166W-3	CBG10	165.50 W 19.00 S	80.9	-19.0417	-165.7920
019S166W-4	CBG10	165.45 W 19.00 S	80.9	-19.0417	-165.7080
019S166W-5	CBG10	165.40 W 19.00 S	80.9	-19.0417	-165.6250
019S166W-6	CBG10	165.35 W 19.00 S	80.9	-19.0417	-165.5420

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
019S166W-7	CBG10	165.30 W 19.00 S	80.9	-19.0417	-165.4580
019S166W-8	CBG10	165.25 W 19.00 S	80.9	-19.0417	-165.3750
019S166W-9	CBG10	165.20 W 19.00 S	80.9	-19.0417	-165.2920
019S166W-10	CBG10	165.15 W 19.00 S	80.9	-19.0417	-165.2080
019S166W-11	CBG10	165.10 W 19.00 S	80.9	-19.0417	-165.1250
019S166W-12	CBG10	165.05 W 19.00 S	80.9	-19.0417	-165.0420
019S165W-1	CBG10	165.00 W 19.00 S	80.9	-19.0417	-164.9580
019S165W-2	CBG10	164.55 W 19.00 S	80.9	-19.0417	-164.8750
019S165W-3	CBG10	164.50 W 19.00 S	80.9	-19.0417	-164.7920
019S165W-4	CBG10	164.45 W 19.00 S	80.9	-19.0417	-164.7080
019S165W-5	CBG10	164.40 W 19.00 S	80.9	-19.0417	-164.6250
019S165W-6	CBG10	164.35 W 19.00 S	80.9	-19.0417	-164.5420
019S165W-7	CBG10	164.30 W 19.00 S	80.9	-19.0417	-164.4580
018S167W-141	CBG10	166.20 W 18.55 S	81.0	-18.9583	-166.2920
018S167W-142	CBG10	166.15 W 18.55 S	81.0	-18.9583	-166.2080
018S167W-143	CBG10	166.10 W 18.55 S	81.0	-18.9583	-166.1250
018S167W-144	CBG10	166.05 W 18.55 S	81.0	-18.9583	-166.0420
018S166W-133	CBG10	166.00 W 18.55 S	81.0	-18.9583	-165.9580
018S166W-134	CBG10	165.55 W 18.55 S	81.0	-18.9583	-165.8750
018S166W-135	CBG10	165.50 W 18.55 S	81.0	-18.9583	-165.7920
018S166W-136	CBG10	165.45 W 18.55 S	81.0	-18.9583	-165.7080
018S166W-137	CBG10	165.40 W 18.55 S	81.0	-18.9583	-165.6250
018S166W-138	CBG10	165.35 W 18.55 S	81.0	-18.9583	-165.5420
018S166W-139	CBG10	165.30 W 18.55 S	81.0	-18.9583	-165.4580
018S166W-140	CBG10	165.25 W 18.55 S	81.0	-18.9583	-165.3750
018S166W-141	CBG10	165.20 W 18.55 S	81.0	-18.9583	-165.2920
018S166W-142	CBG10	165.15 W 18.55 S	81.0	-18.9583	-165.2080
018S166W-143	CBG10	165.10 W 18.55 S	81.0	-18.9583	-165.1250
018S166W-144	CBG10	165.05 W 18.55 S	81.0	-18.9583	-165.0420
018S165W-133	CBG10	165.00 W 18.55 S	81.0	-18.9583	-164.9580
018S165W-134	CBG10	164.55 W 18.55 S	81.0	-18.9583	-164.8750
018S165W-135	CBG10	164.50 W 18.55 S	81.0	-18.9583	-164.7920
018S165W-136	CBG10	164.45 W 18.55 S	81.0	-18.9583	-164.7080
018S165W-137	CBG10	164.40 W 18.55 S	81.0	-18.9583	-164.6250
018S165W-138	CBG10	164.35 W 18.55 S	81.0	-18.9583	-164.5420
018S167W-128	CBG10	166.25 W 18.50 S	81.0	-18.8750	-166.3750
018S167W-129	CBG10	166.20 W 18.50 S	81.0	-18.8750	-166.2920
018S167W-130	CBG10	166.15 W 18.50 S	81.0	-18.8750	-166.2080
018S167W-131	CBG10	166.10 W 18.50 S	81.0	-18.8750	-166.1250
018S167W-132	CBG10	166.05 W 18.50 S	81.0	-18.8750	-166.0420
018S166W-121	CBG10	166.00 W 18.50 S	81.0	-18.8750	-165.9580
018S166W-122	CBG10	165.55 W 18.50 S	81.0	-18.8750	-165.8750
018S166W-123	CBG10	165.50 W 18.50 S	81.0	-18.8750	-165.7920
018S166W-124	CBG10	165.45 W 18.50 S	81.0	-18.8750	-165.7080
018S166W-125	CBG10	165.40 W 18.50 S	81.0	-18.8750	-165.6250
018S166W-126	CBG10	165.35 W 18.50 S	81.0	-18.8750	-165.5420
018S166W-127	CBG10	165.30 W 18.50 S	81.0	-18.8750	-165.4580
018S166W-128	CBG10	165.25 W 18.50 S	81.0	-18.8750	-165.3750
018S166W-129	CBG10	165.20 W 18.50 S	81.0	-18.8750	-165.2920
018S166W-130	CBG10	165.15 W 18.50 S	81.0	-18.8750	-165.2080
018S166W-131	CBG10	165.10 W 18.50 S	81.0	-18.8750	-165.1250
018S166W-132	CBG10	165.05 W 18.50 S	81.0	-18.8750	-165.0420
018S165W-121	CBG10	165.00 W 18.50 S	81.0	-18.8750	-164.9580
018S165W-122	CBG10	164.55 W 18.50 S	81.0	-18.8750	-164.8750
018S165W-123	CBG10	164.50 W 18.50 S	81.0	-18.8750	-164.7920
018S165W-124	CBG10	164.45 W 18.50 S	81.0	-18.8750	-164.7080
018S165W-125	CBG10	164.40 W 18.50 S	81.0	-18.8750	-164.6250
018S165W-126	CBG10	164.35 W 18.50 S	81.0	-18.8750	-164.5420
018S167W-116	CBG10	166.25 W 18.45 S	81.0	-18.7917	-166.3750
018S167W-117	CBG10	166.20 W 18.45 S	81.0	-18.7917	-166.2920
018S167W-118	CBG10	166.15 W 18.45 S	81.0	-18.7917	-166.2080
018S167W-119	CBG10	166.10 W 18.45 S	81.0	-18.7917	-166.1250
018S167W-120	CBG10	166.05 W 18.45 S	81.0	-18.7917	-166.0420
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018S166W-116	CBG10	165.25 W 18.45 S	81.0	-18.7917	-165.3750
018S166W-117	CBG10	165.20 W 18.45 S	81.0	-18.7917	-165.2920
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018S166W-120	CBG10	165.05 W 18.45 S	81.0	-18.7917	-165.0420
018S165W-109	CBG10	165.00 W 18.45 S	81.0	-18.7917	-164.9580
018S165W-110	CBG10	164.55 W 18.45 S	81.0	-18.7917	-164.8750
018S165W-111	CBG10	164.50 W 18.45 S	81.0	-18.7917	-164.7920
018S165W-112	CBG10	164.45 W 18.45 S	81.0	-18.7917	-164.7080
018S165W-113	CBG10	164.40 W 18.45 S	81.0	-18.7917	-164.6250
018S165W-114	CBG10	164.35 W 18.45 S	81.0	-18.7917	-164.5420
018S167W-104	CBG10	166.25 W 18.40 S	81.1	-18.7083	-166.3750
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018S167W-107	CBG10	166.10 W 18.40 S	81.1	-18.7083	-166.1250
018S167W-108	CBG10	166.05 W 18.40 S	81.1	-18.7083	-166.0420
018S166W-97	CBG10	166.00 W 18.40 S	81.1	-18.7083	-165.9580
018S166W-98	CBG10	165.55 W 18.40 S	81.1	-18.7083	-165.8750
018S166W-99	CBG10	165.50 W 18.40 S	81.1	-18.7083	-165.7920
018S166W-100	CBG10	165.45 W 18.40 S	81.1	-18.7083	-165.7080
018S166W-101	CBG10	165.40 W 18.40 S	81.1	-18.7083	-165.6250
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018S166W-103	CBG10	165.30 W 18.40 S	81.1	-18.7083	-165.4580
018S166W-104	CBG10	165.25 W 18.40 S	81.1	-18.7083	-165.3750
018S166W-105	CBG10	165.20 W 18.40 S	81.1	-18.7083	-165.2920
018S166W-106	CBG10	165.15 W 18.40 S	81.1	-18.7083	-165.2080
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018S166W-108	CBG10	165.05 W 18.40 S	81.1	-18.7083	-165.0420
018S165W-97	CBG10	165.00 W 18.40 S	81.1	-18.7083	-164.9580
018S165W-98	CBG10	164.55 W 18.40 S	81.1	-18.7083	-164.8750
018S165W-99	CBG10	164.50 W 18.40 S	81.1	-18.7083	-164.7920
018S165W-100	CBG10	164.45 W 18.40 S	81.1	-18.7083	-164.7080
018S165W-101	CBG10	164.40 W 18.40 S	81.1	-18.7083	-164.6250
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018S167W-93	CBG10	166.20 W 18.35 S	81.1	-18.6250	-166.2920
018S167W-94	CBG10	166.15 W 18.35 S	81.1	-18.6250	-166.2080
018S167W-95	CBG10	166.10 W 18.35 S	81.1	-18.6250	-166.1250
018S167W-96	CBG10	166.05 W 18.35 S	81.1	-18.6250	-166.0420
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018S166W-87	CBG10	165.50 W 18.35 S	81.1	-18.6250	-165.7920
018S166W-88	CBG10	165.45 W 18.35 S	81.1	-18.6250	-165.7080
018S166W-89	CBG10	165.40 W 18.35 S	81.1	-18.6250	-165.6250
018S166W-90	CBG10	165.35 W 18.35 S	81.1	-18.6250	-165.5420
018S166W-91	CBG10	165.30 W 18.35 S	81.1	-18.6250	-165.4580
018S166W-92	CBG10	165.25 W 18.35 S	81.1	-18.6250	-165.3750
018S166W-93	CBG10	165.20 W 18.35 S	81.1	-18.6250	-165.2920

Name	Group	NW_Coord	Area km^2	LatCenter	LongCenter
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018S166W-95	CBG10	165.10 W 18.35 S	81.1	-18.6250	-165.1250
018S166W-96	CBG10	165.05 W 18.35 S	81.1	-18.6250	-165.0420
018S165W-85	CBG10	165.00 W 18.35 S	81.1	-18.6250	-164.9580
018S165W-86	CBG10	164.55 W 18.35 S	81.1	-18.6250	-164.8750
018S165W-87	CBG10	164.50 W 18.35 S	81.1	-18.6250	-164.7920
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018S167W-81	CBG10	166.20 W 18.30 S	81.2	-18.5417	-166.2920
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018S167W-84	CBG10	166.05 W 18.30 S	81.2	-18.5417	-166.0420
018S166W-73	CBG10	166.00 W 18.30 S	81.2	-18.5417	-165.9580
018S166W-74	CBG10	165.55 W 18.30 S	81.2	-18.5417	-165.8750
018S166W-75	CBG10	165.50 W 18.30 S	81.2	-18.5417	-165.7920
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018S166W-79	CBG10	165.30 W 18.30 S	81.2	-18.5417	-165.4580
018S166W-80	CBG10	165.25 W 18.30 S	81.2	-18.5417	-165.3750
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018S166W-82	CBG10	165.15 W 18.30 S	81.2	-18.5417	-165.2080
018S166W-83	CBG10	165.10 W 18.30 S	81.2	-18.5417	-165.1250
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018S167W-69	CBG10	166.20 W 18.25 S	81.2	-18.4583	-166.2920
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018S166W-68	CBG10	165.25 W 18.25 S	81.2	-18.4583	-165.3750
018S166W-69	CBG10	165.20 W 18.25 S	81.2	-18.4583	-165.2920
018S166W-70	CBG10	165.15 W 18.25 S	81.2	-18.4583	-165.2080
018S166W-71	CBG10	165.10 W 18.25 S	81.2	-18.4583	-165.1250
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018S167W-58	CBG10	166.15 W 18.20 S	81.2	-18.3750	-166.2080
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018S166W-49	CBG10	166.00 W 18.20 S	81.2	-18.3750	-165.9580
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018S166W-55	CBG10	165.30 W 18.20 S	81.2	-18.3750	-165.4580
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018S166W-57	CBG10	165.20 W 18.20 S	81.2	-18.3750	-165.2920
018S166W-58	CBG10	165.15 W 18.20 S	81.2	-18.3750	-165.2080
018S166W-59	CBG10	165.10 W 18.20 S	81.2	-18.3750	-165.1250
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018S167W-46	CBG10	166.15 W 18.15 S	81.3	-18.2917	-166.2080
018S167W-47	CBG10	166.10 W 18.15 S	81.3	-18.2917	-166.1250
018S167W-48	CBG10	166.05 W 18.15 S	81.3	-18.2917	-166.0420
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018S166W-38	CBG10	165.55 W 18.15 S	81.3	-18.2917	-165.8750
018S166W-39	CBG10	165.50 W 18.15 S	81.3	-18.2917	-165.7920
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018S166W-43	CBG10	165.30 W 18.15 S	81.3	-18.2917	-165.4580
018S166W-44	CBG10	165.25 W 18.15 S	81.3	-18.2917	-165.3750
018S166W-45	CBG10	165.20 W 18.15 S	81.3	-18.2917	-165.2920
018S166W-46	CBG10	165.15 W 18.15 S	81.3	-18.2917	-165.2080
018S166W-47	CBG10	165.10 W 18.15 S	81.3	-18.2917	-165.1250
018S166W-48	CBG10	165.05 W 18.15 S	81.3	-18.2917	-165.0420
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018S167W-31	CBG10	166.30 W 18.10 S	81.3	-18.2083	-166.4580
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018S167W-33	CBG10	166.20 W 18.10 S	81.3	-18.2083	-166.2920
018S167W-34	CBG10	166.15 W 18.10 S	81.3	-18.2083	-166.2080
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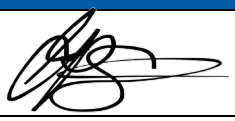
018S166W-27	CBG10	165.50 W 18.10 S	81.3	-18.2083	-165.7920
018S166W-28	CBG10	165.45 W 18.10 S	81.3	-18.2083	-165.7080
018S166W-29	CBG10	165.40 W 18.10 S	81.3	-18.2083	-165.6250
018S166W-30	CBG10	165.35 W 18.10 S	81.3	-18.2083	-165.5420
018S166W-31	CBG10	165.30 W 18.10 S	81.3	-18.2083	-165.4580
018S166W-32	CBG10	165.25 W 18.10 S	81.3	-18.2083	-165.3750
018S166W-33	CBG10	165.20 W 18.10 S	81.3	-18.2083	-165.2920
018S166W-34	CBG10	165.15 W 18.10 S	81.3	-18.2083	-165.2080
018S166W-35	CBG10	165.10 W 18.10 S	81.3	-18.2083	-165.1250
018S167W-19	CBG10	166.30 W 18.05 S	81.3	-18.1250	-166.4580
018S167W-20	CBG10	166.25 W 18.05 S	81.3	-18.1250	-166.3750
018S167W-21	CBG10	166.20 W 18.05 S	81.3	-18.1250	-166.2920
018S167W-22	CBG10	166.15 W 18.05 S	81.3	-18.1250	-166.2080
018S167W-23	CBG10	166.10 W 18.05 S	81.3	-18.1250	-166.1250
018S167W-24	CBG10	166.05 W 18.05 S	81.3	-18.1250	-166.0420
018S166W-13	CBG10	166.00 W 18.05 S	81.3	-18.1250	-165.9580
018S166W-14	CBG10	165.55 W 18.05 S	81.3	-18.1250	-165.8750
018S166W-15	CBG10	165.50 W 18.05 S	81.3	-18.1250	-165.7920
018S166W-16	CBG10	165.45 W 18.05 S	81.3	-18.1250	-165.7080
018S166W-17	CBG10	165.40 W 18.05 S	81.3	-18.1250	-165.6250
018S166W-18	CBG10	165.35 W 18.05 S	81.3	-18.1250	-165.5420
018S166W-19	CBG10	165.30 W 18.05 S	81.3	-18.1250	-165.4580
018S166W-20	CBG10	165.25 W 18.05 S	81.3	-18.1250	-165.3750
018S166W-21	CBG10	165.20 W 18.05 S	81.3	-18.1250	-165.2920
018S166W-22	CBG10	165.15 W 18.05 S	81.3	-18.1250	-165.2080
018S166W-23	CBG10	165.10 W 18.05 S	81.3	-18.1250	-165.1250

CIC Limited's Exploration Work Plan for Exploration Licence EL1 (CIC065)

As of January 25, 2022

"Responsible Exploration of Seabed Resources of the Cook Islands"

APPROVAL(S)

Name & Title	Signature	Date
Gregory P Stemm Managing Director CIC Ltd		January 25, 2022

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Name & Title	Signature	Date
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John Oppermann Vice President, Director of Research and Scientific Services Odyssey Marine Exploration		January 25, 2022

CHANGE HISTORY

Date	Change Req No.	Revision	Description of Change
January 25, 2022	N/A	0	Issued

Table of Contents

1. Introduction

CIC LIMITED (CIC) (Registration #C3864) is a privately held Cook Islands' company formed to pursue seabed mineral exploration opportunities in the Cook Islands. CIC's Exploration Work Plan (EWP) (CIC065) draws upon the collective experience of the CIC Consortium (the 'Consortium'), a partnership of individuals, companies, organisations, and investors that will support the project with their collective experience in marine and terrestrial mineral exploration, marine scientific research, and resource management.

Odyssey Marine Exploration, Inc. (Odyssey) is a CIC Consortium member and the exclusive marine operating partner for the CIC EWP. For purposes of this document when CIC is referenced it could imply CIC LTD or its Consortium or both. For practical purposes, all funding, management, and operational activities are performed by CIC personnel under intercompany agreements. Parties to contracts with contractors and consultants will be at subsidiary level whenever practical and as such meet the requirements for local content and spending.

CIC is confident that the proposed exploration methodology and the experienced professionals involved with this project will result in a successful EWP and detailed understanding of the resource and environment.

2. The CIC Exploration Work Plan (EWP)

The first exploration objective is to identify and map mineral resources in order to determine whether it is economically feasible to justify commercial harvesting. For this purpose, CIC will use the protocols and general guidelines of either the Australasian Joint Ore Reserves Committee (JORC) or the Canadian Institute of Mining, Metallurgy and Petroleum (CIM). The CIM guidelines are defined in the Canadian National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* (NI 43-101).

The second, and most important, exploration objective is to obtain sufficient environmental data to permit the completion of a detailed EIA to determine whether seabed harvesting can be accomplished without serious harm to the environment and, if it is determined it can be conducted, development of a comprehensive and effective EMP satisfying all requirements of the Environment Act 2003, and its associated regulations and applicable guidelines.

The third exploration objective is to recover sufficient samples of polymetallic nodules and sediment to support metallurgical processing development and to provide additional environmental baseline information.

The fourth exploration objective is to complete the necessary geotechnical engineering testing on the seafloor and to collect samples from the seafloor to support development of a harvesting system that can reliably, and with minimal environmental impact, meet the production goals required for profitable commercial extraction of cobalt and other minerals from the seabed within the Cook Islands' EEZ.

If approved, the fifth exploration objective would be testing the harvesting system, which would provide valuable data that will in turn contribute to CIC's comprehensive EIA. *In situ* data collected on plume dispersion, benthic impact, light emission, the lift system as it relates to seawater isolation and many other critical variables would be measured at a level of accuracy that can best be accomplished during a harvesting technology testing phase. Gathering this data is one way that CIC would incorporate the precautionary approach.

Discoveries made during harvesting technology testing would also have the benefit of shaping a clear understanding of how a full-scale harvesting operation would work in the Cook Islands. CIC recognises that Environmental Project Permits will be necessary from both the Cook Islands National Environment Service (NES) and the National Environmental Council (NEC) prior to planning any harvesting technology testing.

Additionally, harvesting technology testing is an opportunity for the Cook Islands to realise a revenue source prior to the conclusion of the five-year Exploration Licence, taking into account that it would be dependent on the SBMA and other Cook Islands regulatory authorities granting permission for CIC to proceed with this activity. Mineral processing for harvesting technology testing will take place at a brownfield site and/or an existing facility (outside of the Cook Islands) that is retrofitted for nodule intake. Metal recovery may not be optimised in this scenario, but CIC's goal would be to recover at least the cobalt, nickel, copper and hopefully some rare earth elements (REE) or manganese product to gauge efficacy and economic value for the eventual investment or joint venture in a full-scale processing facility.

3. Environmental Baseline Studies

CIC will assist the Cook Islands to develop their marine mineral resources with a clearly understood responsibility for environmental stewardship of the marine mineral resources of the nation. The environmental aspects of this project will remain prioritised at the forefront of each step of the strategic and tactical decision-making processes of the project.

The methodologies described in Table 1 and section 5 are recommendations that have been developed through a transparent process and multi-stakeholder approach, that included scientific experts, regulators, sponsoring states, contractors (developers), and NGOs (non-governmental organisations), among others.

By conducting thorough baseline studies of the seafloor, water column and surface waters at various locations throughout the licence area, CIC will provide a detailed understanding of the environment and an in-depth assessment of the impacts that would be expected from nodule harvesting. This will allow CIC, along with the Cook Islands' Government and other key stakeholders, to develop strategies to help avoid or otherwise minimise impacts.

Detailed baseline studies will be conducted at the proposed mineral harvesting sites (once they have been identified through exploration work) and at other sites in order to establish a reference area, or areas, as needed, separated from the impact of harvesting. The purpose of these reference areas is two-fold: (1) to study natural variability in harvesting areas with no harvesting activity and (2) to ensure the protection of habitats and biota representative of what may be lost or impacted due to harvesting.

3.1 Objectives of Environmental Data Acquisition

The key objectives of CIC environmental data acquisition are to:

- Conduct environmental baseline studies in order to characterise the existing environment at the seafloor, underlying sediment, and overlying water column;
- Enable the development of an EIA, which will define the expected environmental effects from a nodule harvesting operation which will allow a determination to be made as to whether seabed nodule harvesting can be accomplished with no serious harm to the environment;
- Evaluate and develop strategies to prevent where possible, or otherwise minimise, impacts to the environment in the event that harvesting operations are eventually permitted;
- Allow the development of a robust Environmental Management Plan and Monitoring Plan for harvesting if it is eventually permitted;
- Conduct ongoing environmental monitoring to ensure that no serious harm is caused to the marine environment from activities during exploration;

- Address the critical environmental points that Gerald McCormack has articulated in his publication *Cook Islands Seabed Minerals: A Precautionary Approach to Mining*, including *inter alia*:
    - Application of the precautionary approach at every stage of exploration;
    - Determination of particulate organic carbon flux to the seafloor and standing stocks of benthic communities to permit accurate comparison of biomass with levels found in the CCZ (Clarion-Clipperton Zone);
    - Plume management, including determination of relevant sediment properties, long-term measurement of benthic current velocities, modelling of plume dispersion, and monitoring of test harvesting operations;
    - Constraint of water and sediments to their respective stratified layers;
    - Extensive regional mapping of species distributions throughout the licenced area;
    - Representative Biodiversity and Protected Areas established where no impacts from exploration or harvesting activities will occur.

3.2 Environmental Impact Assessment Development

CIC is partnering with world-leading scientists to review and develop environmental plans, conduct baseline studies, and progress towards an EIA, including developing and testing methods to mitigate and minimise environmental impacts. Collaborating academic research scientists will be free to publish their findings, ensuring that CIC is transparent and is prioritising the contribution to the body of knowledge of environmental studies, biodiversity and ocean processes. Additionally, CIC intends to collaborate with appropriate Cook Islands' Government ministries and other stakeholders to interpret and share with the public environmental data acquired during exploration.

CIC intends to structure its EIA similarly to the EIA template found in Annex III of the ISA recommendations for the assessment of environmental impacts from exploration (ISBA/25/LTC/6/Rev.1), modified as necessary by Annex IV of the ISA's Draft Exploitation Regulations (ISBA/24/LTC/WP.1/Rev.1). This EIA template has been developed over several years with a multi-stakeholder approach and is considered representative of international good practises.

The International Seabed Authority (ISA), the governing body for the mineral resources of the international seabed area, has established seven recommended avenues for the baseline studies and EIAs: Physical Oceanography, Geology, Chemical Oceanography, Sediment Properties, Biological Communities, Bioturbation, and Fluxes to Sediment. The protocols have thus far been developed through a transparent process and multi-stakeholder approach, and the ISA is setting a world-recognised standard for deep-water EIA requirements.

To ensure CIC takes an approach in line with leading global standards, CIC, under supervision of the Environmental Chief Scientist and Qualified Person (QP) Dr. Charles Morgan and the CIC Technical Advisory Board (TAB), intend to take into consideration the most up-to-date template that the ISA has provided for baseline studies and EIA development.

A summary of the ISA recommended baseline studies and their objectives is presented in Table 1. Of these, Physical Oceanography, Chemical Oceanography, Biological Communities, and Sedimentation involve long-term field studies with one to three years of data collection. CIC will make every effort to collaborate with other sea users who may be interested in forming partnerships to complete, for example, the seasonal and/or regional studies.

Table 1. Summary of ISA Recommended Environmental Baseline Studies

Study Area	Details
Physical Oceanography	**Aim:** Estimate extent and duration of plumes that may be formed during full-scale operations and estimate magnitude and direction of predominant surface currents to provide operational constraints for commercial operations and to permit estimation of the dispersion of potential accidental spills from surface vessels. Determine baseline noise levels at the surface, at the seafloor, and within the deep sound channel (~700 – 1,500 m depths). **Study requirements:** Study of currents, temperature, and turbidity required. **Methods and Equipment:** Installation of moorings of current metres, ADCP (Acoustic Doppler Current Profiler), sediment traps, CTDs (Conductivity, Temperature and Depth) and other equipment, followed by hydrodynamic (plume) modelling which are at-sea requirements. Deploy untethered lander packages to measure currents, oxygen levels, and other variables over time.
Geology	**Aim:** Determine heterogeneity of the environment and assist with placement of suitable sampling locations; collect information on the potential for heavy metal and trace element release during full-scale mineral operations. **Study requirements:** Map the seabed and sample the seabed geology. **Methods and Equipment:** High-resolution bathymetry, box corers/multiple corers, and laboratory analysis.
Chemical Oceanography	**Aim:** Understand baseline water chemistry conditions in the water column and within sediment pore water; understand the potential impact of metal release during the extraction process. **Study requirements:** Water column: multiple CTD profiles and water sampling efforts over two years, capturing at least two summer/winter seasons (seasonal studies); sample and analyse pore waters. **Methods and Equipment:** multiple corers, mega corers, laboratory analysis.

Sediment Properties	**Aim:** To study baseline sediment conditions and predict the behaviour of mineral extraction on sediment composition to determine the basic properties of the sediment, including measurements of soil mechanics and composition to adequately characterise the surficial sediment deposits which are the potential source of deep-water plume. **Study requirements:** Acquire adequate samples to determine uniformity in the Exploration Licence area of particle size distribution and various geotechnical parameters. **Methods and Equipment:** Box corers, multiple corers, and laboratory analysis.
Biological Communities	**Aim:** Evaluate the effects of activities on biota. Studies to include microfauna, meiofauna, macrofauna, megafauna, demersal scavengers, nodule fauna, video/photo surveys, pelagic community assessment (water column and near bottom), baseline tissue metal concentrations, marine biota observations, temporal variation studies, regional distribution/genetic connectivity studies, etc. **Study requirements:** Characterise observed and collected flora and fauna and report on species diversity. Measure benthic community respiration rates. **Methods and Equipment:** Photographic/video transects and biota sampling, use of multiple corer, box corer, hydrophones moored time lapse cameras (TLC), plankton nets, ROV, *in situ* respirometer and other methods, laboratory analysis.
Bioturbation	**Aim:** Gather data on the mixing of sediments by organisms to predict the impact of extractive activities on biological communities. **Study requirements:** Determine oxygen profile and flux, directly or by analyses of pore fluids, near and within seabed sediments. **Methods and Equipment:** Multiple cores, chemistry e.g., ^{210}Pb analysis in core samples.
Fluxes to Sediment (Sedimentation)	**Aim:** To gather time series data on the flux and composition of materials from the upper water column to the deep sea. To understand baseline sedimentation rates and to evaluate the effects of mineral extraction activities (especially plumes) on these rates. **Study requirements:** Spatially distributed sediment traps in terms of water depth and surface area at sites within the region, with site determination approved by Cook Islands government representatives. **Methods and Equipment:** Moored time lapse sediment traps installed for a cumulative minimum duration of 12 months, and laboratory analysis.

ROV = Remotely operated vehicle; AUV = Autonomous underwater vehicle; ADCP = Acoustic doppler current profiler, CTD = Conductivity, temperature, depth with additional environmental sensors

4. Resource Assessment

Industry-accepted exploration multibeam surveys and sampling methodologies will be employed to help determine mineral deposit characteristics by using standard, accepted scientific sampling methods (e.g., box core collectors) within the coverage of continuous survey techniques (e.g., photographic and high-resolution acoustic surveys of the seafloor). This will enable the quantitative determination of any existing correlations between acoustic and/or photographic coverage of nodules on the seafloor and the samples collected with box cores.

In order to achieve such an assessment, CIC will follow the guidelines developed by JORC or the Canadian National Instrument 43-101 (NI 43-101), regulatory frameworks designed to ensure that commercial developers of mineral properties comply with uniform procedures and reporting requirements to establish credible and verifiable evaluations of the mineral resources. CIC selected these frameworks because they have been under constant evaluation, improvement and review for more than 15 years, they are familiar to mining companies and investors worldwide, and they are compliant with the existing international standards for the reporting of mineral resource assessments. In concert with developing a resource report within these frameworks, a Qualified Person (QP, CIM terminology) or Competent Person (CP, JORC terminology) with sufficient knowledge and experience is required to define the resource, adding veracity to the reported mineral endowment of the exploration area. Dr. Charles Morgan is certified as a Qualified Person by the Society for Mining, Metallurgy and Exploration (SME); JORC recognises this certification as also certifying him as a Competent Person for JORC resource assessments.

The first exploration surveys will collect sufficient box core samples within the acoustic and photographic survey areas to provide adequate ground-truth data for establishing and verifying the necessary correlations. Subsequent surveys will refine and modify these correlations and quantitatively map the deposits with sufficient accuracy to delineate the specific area for mine planning, including designation of environmental reserve areas where appropriate. The box core and bulk sample collections will provide nodule samples for metallurgical analysis and processing development as well as collection and documentation of important specimens of the flora and fauna that inhabit the seafloor. The photographic surveys will obtain significant environmental data to help characterise the megafauna (>2 cm) communities within the CBGs. Dr. Charles Morgan will provide a detailed protocol for sample collection and data acquisition with the purpose of defining a resource in CIC's licence area of the Cook Islands' EEZ.

Survey and sampling efforts will support the development of the necessary systems for extraction, transport, and metallurgical processing of nodules into marketable products. Engineering testing, including vane-shear and other tests of collected samples from the seabed will be included as well as *in situ* testing such as penetrometer deployment to support these developments. Collections of nodule samples will be undertaken to provide sufficient ore for metallurgical processing, testing and development.

The company has also instituted a study into the use of blockchain or distributed ledger technology that will allow industrial end users to trace cobalt and other energy metals back to their origin. As such, end users can determine whether metals resulted from environmentally friendly, socially responsible production such as would occur from the Cook Islands.

Where possible, historical data will be incorporated to assist in defining resource extents and characteristics. These data can represent a time and resource savings over the course of the comprehensive programme, though they cannot be used in formal resource assessment. Mineralogical sampling will occur in the licence area. It is anticipated that the preferred sampling apparatus will be a 0.75 m^2 box core. Sample weights will allow for extrapolation of nodule abundance in terms of mass of nodules per CBG (on a basis of kg of nodules per m^2 of seabed).

Representative samples will be methodically isolated for shipment to a shore-based assay facility. Weight loss during sample drying will be used to define moisture content allowing for wet and dry densities to be differentiated. The samples will be assayed per laboratory procedure to generate values for ascribed analytes, predominately copper, iron, manganese, nickel, cobalt, titanium, Scandium, Yttrium and Rare Earth Elements (lanthanides). The metal content and abundance will provide data necessary for the formulation of a detailed JORC or NI 43-101 compliant resource estimate.

Areas of influence will be determined through sample result heterogeneity, in spatial terms, and error analysis based on geostatistical modelling. Empirical sampling and geostatistics will confirm the resource to inferred, indicated and measured levels of confidence as demonstrated by the geospatial consistency of sample results. Completion of Preliminary and Detailed Feasibility Studies for the project, including determination of the efficiencies of the adopted extraction, transport, and metallurgical processing technologies will permit the upgrading of indicated and measured resources to probable and proven reserves.

CIC is confident that during the course of the five-year term of the Exploration Licence period, a mineral resource of a sufficient confidence level to serve as a basis for validation of the reserves will be defined.

5. Equipment, Technology and Methodologies Planned for the EWP

The general technical approach for survey, sampling and assessment is as follows:

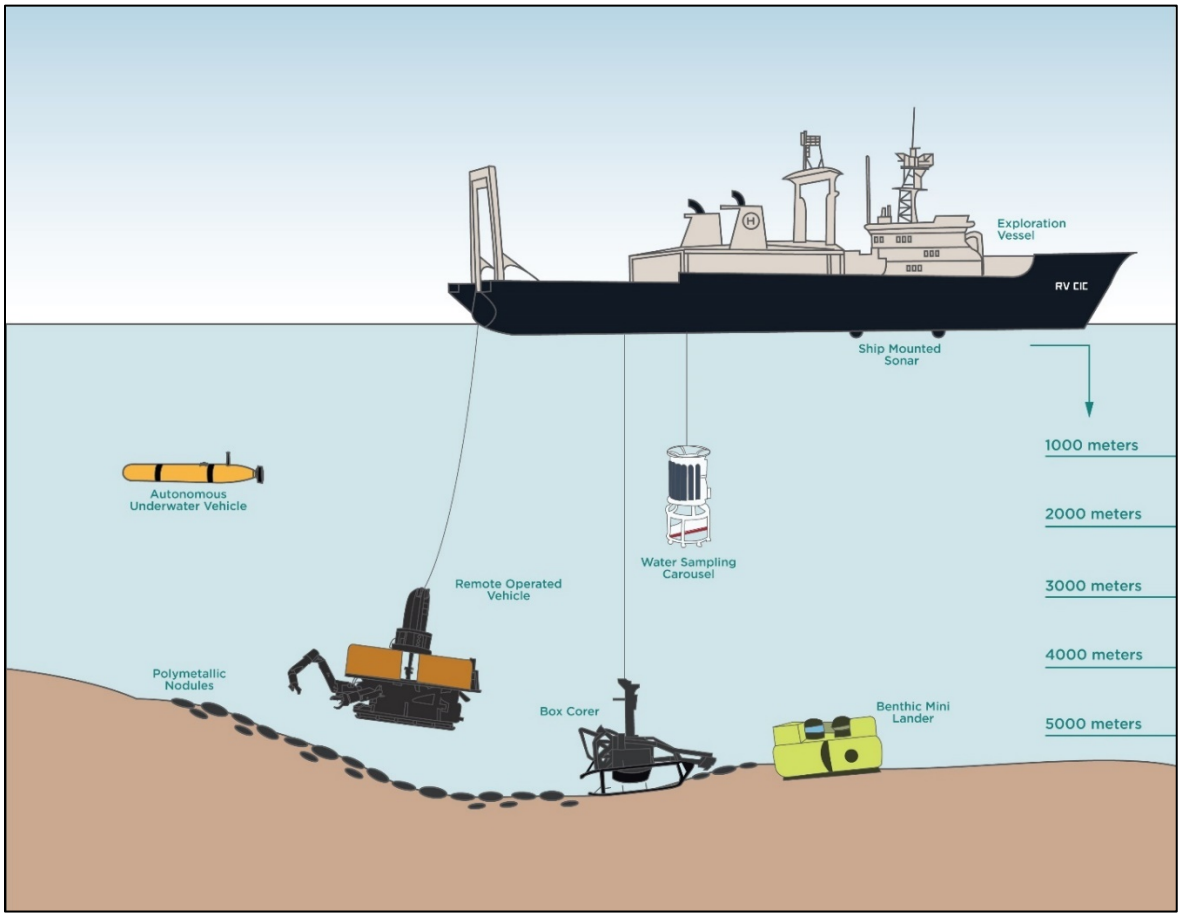
Exploration Technique	Purpose
Hull-Mounted Multibeam Survey	Uses sound waves to calculate water depth and characterize seafloor characteristics so a detailed map of the seabed in the area can be created, and nodule presence and abundance can be estimated.
Towed Multibeam Survey	Creates high-resolution bathymetry map to allow imaging of bottom features; also provides acoustic backscatter intensity which can be used to identify nodule presence and abundance.
Autonomous Underwater Vehicle (AUV)	Provides for high resolution mapping and photography that can be accomplished between completed box core sampling stations; the ship is free to conduct other simultaneous operations since the AUV is untethered.
Remotely Operated Vehicle (ROV) Survey and Sampling Tools	Visual surveys and sampling conducted at the direction of the on-board technical team. The ROV's tools include manipulator arms for collecting samples, video and still cameras, and a range of specialised, close-proximity sensing tools for both seafloor and water column survey.
Gravity / Box Coring Equipment	Collects samples for mineral resource estimation, extracts pore water samples to determine the basic chemistry of the sediments and collects biological samples for environmental baseline measurement and geotechnical data.
Bulk Sampling Equipment	Gathers sufficient nodule sample material to complete metallurgical studies.
Vane Shear and Cone Penetration Testing Equipment	Measures seabed and sediment properties in various locations over the licenced area to verify that the seabed has sufficient bearing capacity for a nodule collector.
Water Sampling Carousel/Rosette, CTD (Conductivity, Temperature and Depth)	Assesses baseline water chemistry conditions in the water column overlying the exploration licence area - CTD data can be acquired by casting equipment from the ship or deploying it on a stationary mooring line; data from at least two summer/winter seasons (i.e., seasonal studies) at mooring locations in potential harvesting areas will be captured.

Deep-Ocean Moorings	Will provide data that gives a detailed understanding of the currents around designated areas of interest - also enables long-term modelling of the extent and duration of plumes that may be formed as a result of nodule harvesting. Particle traps will be included in the moorings to measure the actual sedimentation rates delivered to the seafloor.
Plankton Nets, Fishing Instruments	Provides baseline plankton assessments within the water column, including baseline metal concentrations and fish populations.
Marine Biota Observers	Records sightings of marine mammals, other near-surface large biota (such as turtles, fish schools and whales) and bird aggregations, identifying the relevant species and behaviours where possible.
Moored Hydrophones	Provides acoustic data - incorporated into the moorings or landers used for physical oceanography studies, or as stand-alone moorings.
Moored (and some Baited) Time Lapse Cameras	Provides visual information to help analyse baseline biological conditions at and immediately above the seafloor and predict the impact of harvesting activities on biological communities.
Benthic Mini-Landers	Monitors physical transport and biogeochemical processes that combine to control distributions of both suspended particulates and dissolved chemical parameters within the benthic boundary layer (BBL).
Genetic Metabarcoding	With the advent of modern, ultra-high throughput sequencing platforms, conducting deep sequencing metabarcoding surveys with multiple DNA markers will enhance the breadth of biodiversity coverage, enabling comprehensive, rapid bioassessment of all the organisms in a sample.

The Applicant may alter the listed general technical approach based upon guidance from CIC's TAB, QP, scientists and other industry consultants provided there is not a material change in scientific and research deliverables. Scheduling and budgets may vary based on issues relating to the COVID pandemic, and availability of ships and technology.

5.1 Major Equipment Packages

Vessels



Two vessels with ocean survey capabilities that can work in remote oceans will be used to conduct offshore exploration operations. Both vessels will accommodate a technical and environmental crew allowing for multi-faceted operations across many disciplines as well as accommodating a combination of both Cook Islands' trainees, employees, and Government observers/regulators during offshore exploration campaigns.

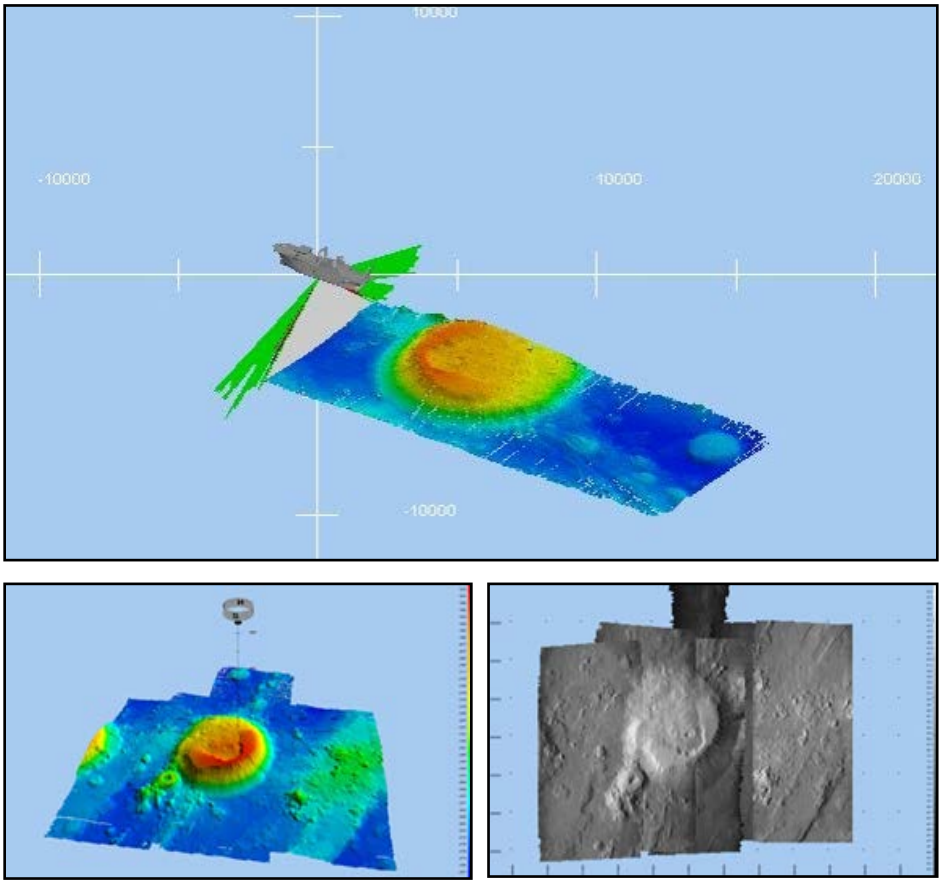
A larger vessel will be one of several ships currently under consideration and will be an 80 to 90 metre dynamically positioned ship mobilised with a full-ocean depth multibeam sonar system. The ship will incorporate different technologies as dictated in the project plans, which may include box corers, bulk-sampling equipment, a 6,000-metre remotely operated vehicle (ROV), and geotechnical and oceanographic/environmental sampling tools. This ship will likely be used for five cruises lasting 30 to 45 days each.

A second vessel (the CAT research vessel) will be smaller catamaran, approximately 40 metres in length that will be stationed in the Cook Islands and used for multiple shorter (5 to15 day) research cruises to monitor sensors, deploy equipment, and maintain and manage scientific research and data acquisition technology. It is anticipated that this smaller vessel will primarily be used for periodic monitoring of environmental conditions and other marine scientific research in the licenced area.

The vessels, ship management agency, ship company, and crew staffed through a crewing agency will be required to be in good standing with applicable national, international and trade association codes and compliant with standards for safeguarding health, safety, and the environment (HSE) including those set by the International Organization for Standardization (ISO). All companies in the CIC Consortium involved with offshore operations have impeccable records related to health, safety, and environmental performance.

Cook Islanders will be employed as either crew members or technicians and will be given an opportunity to participate in offshore training and science programs where possible.

Proposed Sonar: Multibeam echo sounder system (RESON 7150F Seabat) Large Vessel



Multibeam data examples

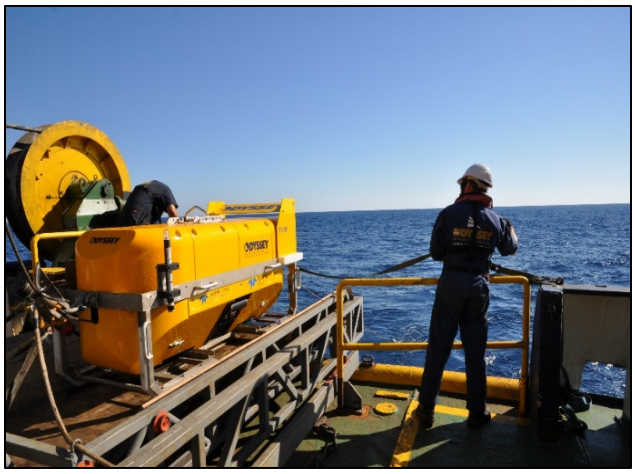
The 7150F and similar systems are capable of working at full ocean depth with a swath width of 150°. Featuring an integrated modular dual frequency design, the system can be configured for either 12kHz or 24kHz operation, providing a choice of both ultra-high resolution in shallow water and extended range in deeper waters.

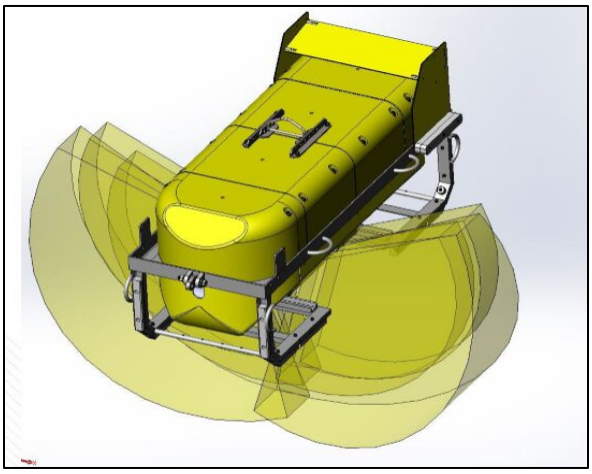
Multibeam echo sounding includes bathymetric and backscatter products allowing for geological geomorphological interpretation.

These data will allow for detailed geological mapping of terrains, seafloor composition, and nodule distribution and relative nodule abundance. The multibeam echosounder and backscatter results should further support the continuous nature of mineralisation across CBGs.

CTD (conductivity-temperature-depth) soundings or SVP (sound velocity profile) will be performed at each of the MBES survey areas. The primary reason for this is that the multibeam system requires an accurate full water column sound velocity profile with which to perform real-time beam steering and location calculations.

Proposed Towed Multibeam Sonar: *ARES* Deep Tow Survey System Large Vessel



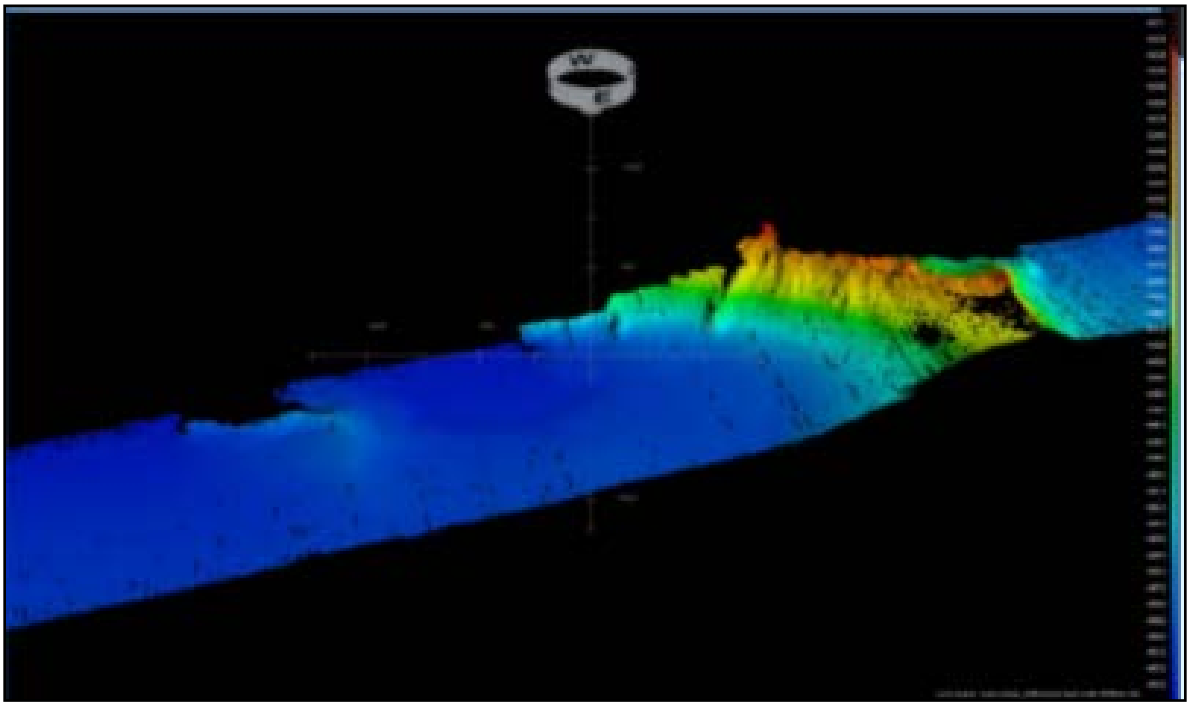


ARES, a 6,000-metre-deep tow survey system is made up of a Dynacon traction winch with 10 km of 0.68 umbilical, launch and recovery system (LARS), depressor and neutrally buoyant towfish. The system primary sensors are two Reson 7125 multibeam 200 or 400kHz sonars. The extremely stable towfish platform surveys at speeds between one and five knots. A proprietary feature is the ability to undertake Inverted USBL (iUSBL) tracking of towfish over long laybacks.

Deep-tow mapping will produce Geographic Information System (GIS) regional maps with high-resolution bathymetry showing major geological and geomorphological features to reflect the heterogeneity of the environment.

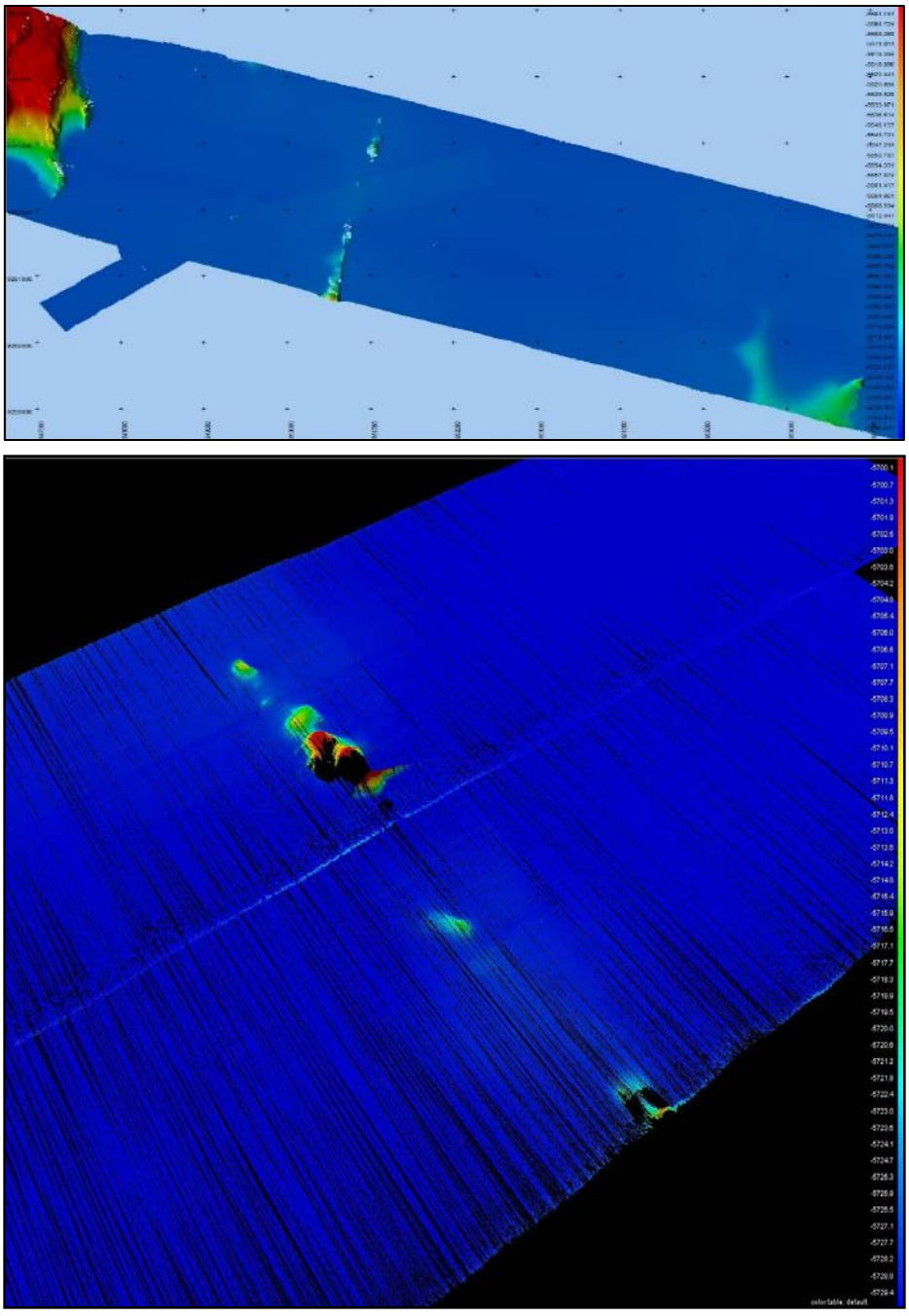
These maps will be produced at a scale appropriate to habitat variability. This information will also assist with the placement of study locations and mooring installations. By mapping prospective areas with legacy photo profiling estimating abundance and coverage, an understanding of correlations between nodule abundance and decameter-scale morphological changes in the Deep Tow mapped areas can be made. This mapping should accrue to data and knowledge about the seafloor between legacy photo profiling points and between legacy and newly completed sample points.

Semi-quantitative relationships between nodule abundance and acoustic response have been postulated for many years. The backscatter response (or acoustic reflection intensity) can be used in many cases to discriminate between rock and sediment, between sediment types (e.g., calcareous versus siliceous), sediment with or without nodules present, and sediment with larger or smaller nodules (areas with larger nodules often result in higher abundance). Ground-truth verification is always required to calibrate acoustic response with these interpretations. Mapping of 5 km x 5 km mooring placement areas with the Deep Tow mapping system allow for best selection of appropriate seafloor locales for placement of the long-term moorings.



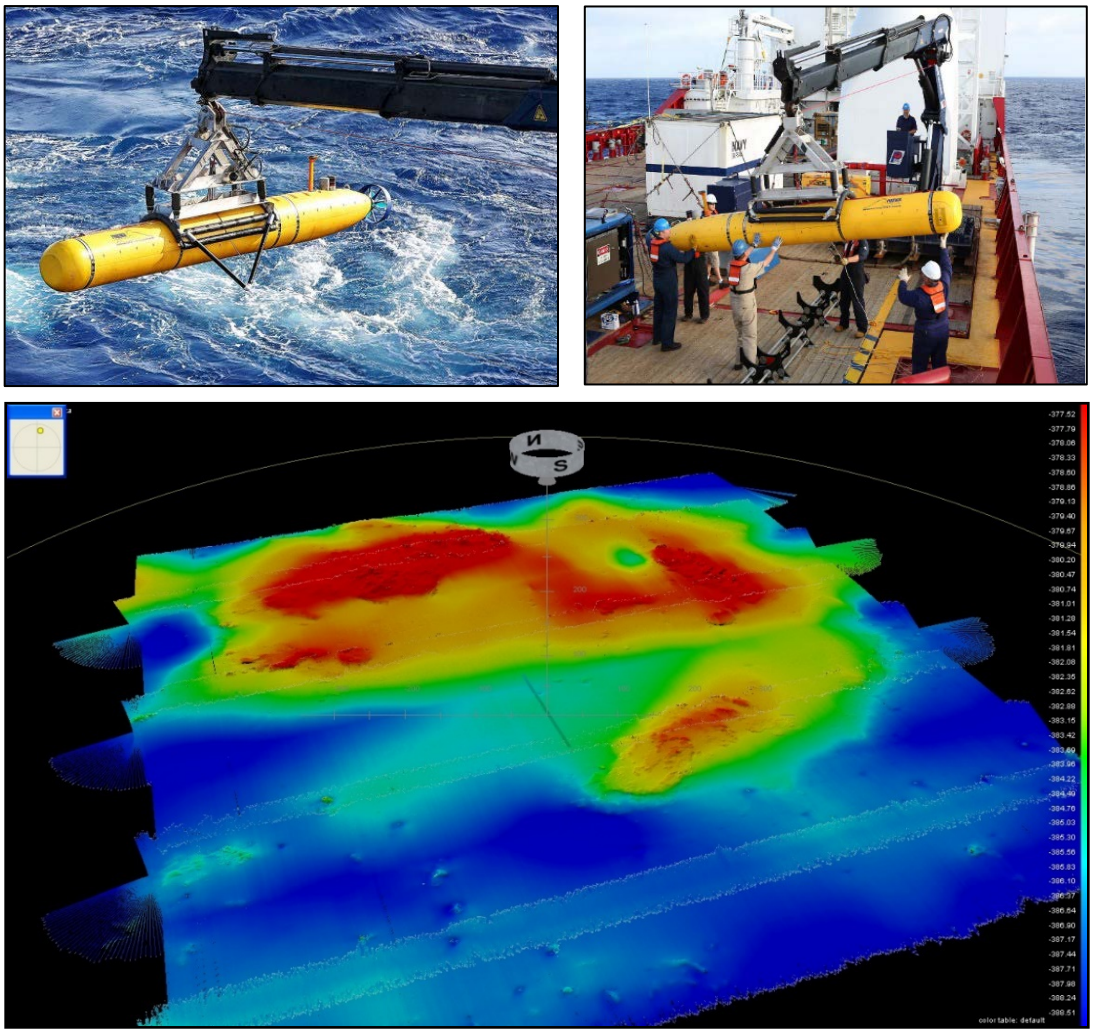
Example of data collected by ARES.

The deep tow collected multibeam data can be processed to a horizontal resolution of 1-5 m (depending on altitude, frequency used, and swath achieved).



Examples of data collected by ARES.

Proposed AUV: Artemis 5,000 Small Vessel



Images and specifications courtesy of Phoenix

The Artemis AUV, a Bluefin-21, is the ideal system for quality survey work requiring precision navigation and terrain following capabilities, is highly portable, and has three mission payload configurations: Acoustic, Optical and Geophysical.

Artemis is 5.4 metres long, 0.5 metre diameter, weighs 800 kg in air and has an endurance of 20 hours at 3 knots operating speed. Manufactured by Bluefin Robotics Corporation, Artemis will be considered for conducting hi-resolution acoustic and video surveys in select areas of the CBGs after the initial operations are completed in Campaign 1 and where considered appropriate with its 5,000-metre depth rating. By using an AUV, higher resolution (sub metre) mapping can be accomplished untethered between newly completed 15 NM spaced box core sampling stations and determined potential nodule harvesting areas and frees up ship time for other simultaneous operations. In cases where this needs to be done deeper than 5,000 m, Clio ROV with mounted Reson 7125 multibeam and cameras will be utilised.

Artemis AUV has the following AUV subsystems:

Navigation

Inertial Navigation System - Kearfott Custom KN-6053
ADCP/Doppler Velocity Log - Teledyne RDI workhorse navigator 300kHz
Ring Laser Gyro - Kearfott T24 Monolithic RLG
Acoustic Positioning System - Loadstar Gyro USBL (8084)
Depth Sensor - Paroscientific 8CB7000-I
GPS - Thales/Astech DG14
Sound Velocity Sensors - Valeport Mini SVS
Backseat Control Architecture - Bluefin Robotics

Communications

Acoustic Modem - Sondardyne AvTrak 6 (8220)
RDF Beacon - Bluefin-RDF
RF Serial Link - Freewave FGRMT
Iridium Satellite Modem - NAL 9601-D-1
Ethernet Direct Cyrix-CPU 1232 Ethernet 1 x Laser ranging system 1 x Pinger locator

Acoustic Payload

Multibeam Echosounder - Reson 7125 (400kHz)
Side Scan Sonar - Edge Tech 2200-M (120/410 kHz)
Sub-bottom Profiler - Edge Tech DW2-16 (2-16kHz)

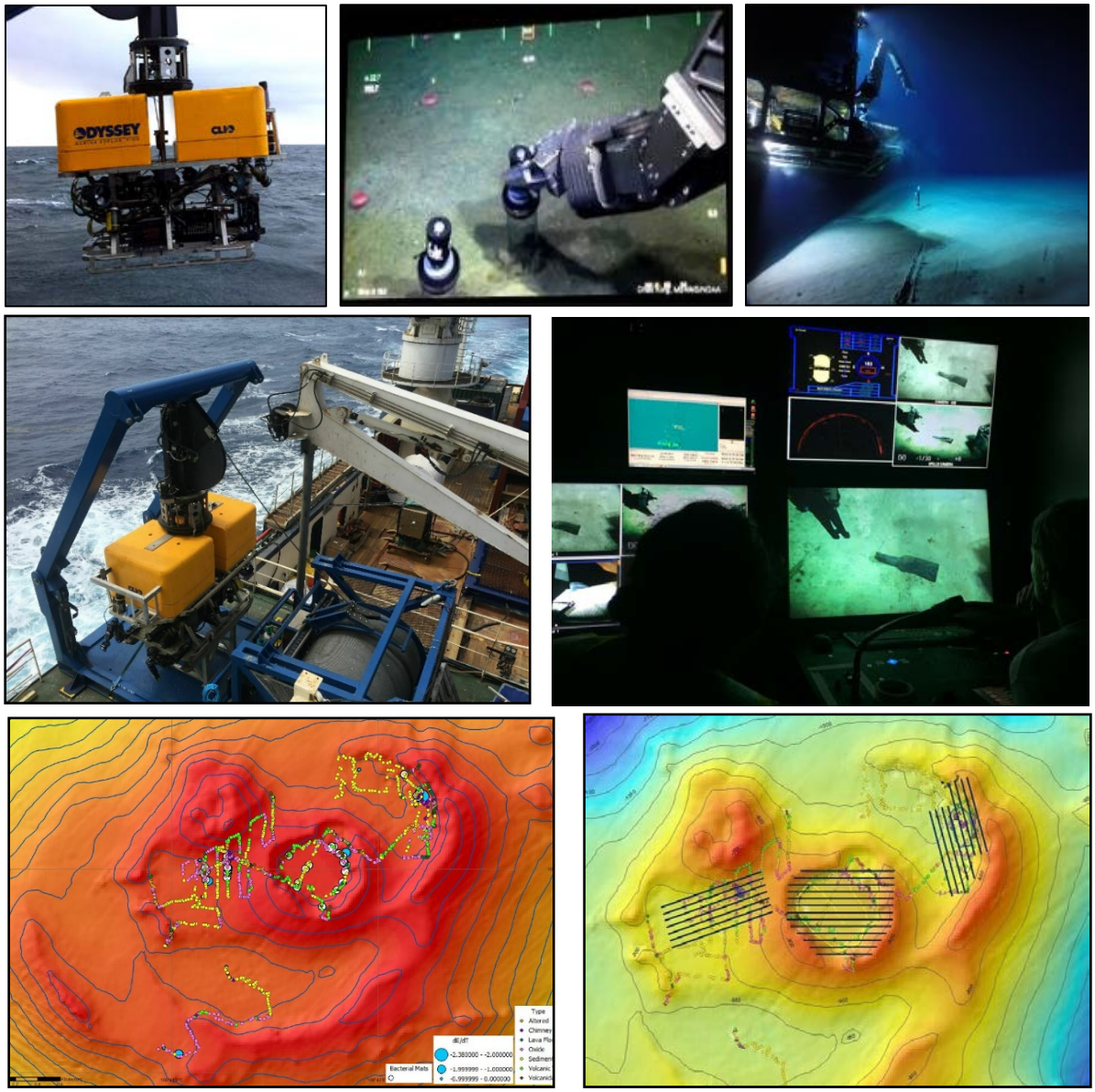
Optical Payload

Camera - Prosilica GX1920
Sensor - Sony ICX674
Resolution - 1936 X 1456 pixels

Geophysical Payload

Magnetometer - Honeywell HMR2300 3-axis magneto-resistive
Self-Potential Sensor - Ultra Electronics (Ag-AgCI)
CTD - AML Oceanographic SmartX
Multi-beam Echosounder - Reson 7125 (bathymetry & backscatter)

Proposed ROV: Clio 6,000 Metre rated light work-class survey and intervention ROV Large and Small Vessel



Example images of ROV high resolution mapping observations (video and stills cameras)

The ROV will be configured to perform precision survey work and light work-class ROV intervention tasks. The ROV is driven by four horizontal and two vertical thrusters and is rated to operate down to depths of 6,000 metres. It is fitted with a suite of LED lights to illuminate deep-ocean sites to enable high-definition still and broadcast-quality video capture.

The system is equipped with up to five cameras depending on the application. They include a Kongsberg full broadcast quality HD (dedicated fibre) camera, a Kongsberg digital stills camera and composite surveillance cameras. The ROV also has two Hydro-Lek five function manipulators for sampling and tool management. Sampling is guided by the high definition colour video cameras.

Photo profiling along 15 NM long transect lines will be conducted between newly acquired box core sampling locations in order to study the homogeneity of nodule abundance within the transect area. Photo profiling images will be analysed for nodule coverage on the seafloor (percent coverage) and nodule size distribution. Derived quantitative values are georeferenced so they can jointly be analysed with shipborne collected multibeam and backscatter data as well as any deep tow collected high-resolution bathymetry and backscatter data collected in the areas.

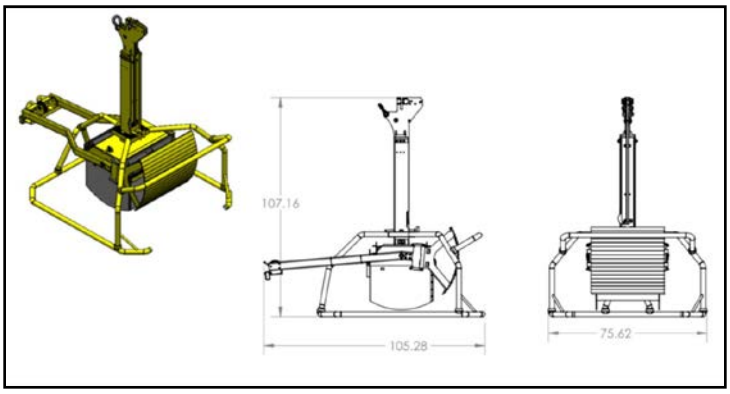
ROV photo profiling and sampling will also provide data to understand baseline biological conditions at and immediately above the seafloor and predict the impact of mineral extraction on biological communities. Follow pre-established transect lines and record observed biota. Assess density and biodiversity of megafauna (biota >2 cm). Samples of fauna to be representative of variability of habitats, bottom topography, depth, seabed and sediment characteristics, abundance, and mineral resource. Transects will be run over multiple years to assess natural variability.

The plan is to carry out scientific exploration of the biodiversity in nodule areas with the ROV and of selected seamounts. The techniques to be applied include video-transecting and fauna sampling. One of the geological scientific questions is whether manganese nodules show the same strength at *in situ* depths as they do on board. For this, a device called a nodule crusher will be used. The device will operate from the hydraulics of the ROV.

Experiments will be video recorded. Five-litre Niskin bottles can be mounted on the ROV in order to sample the sediment plume after causing a disturbance with the ROV. Tools to be used with the ROV include but not limited to slurp gun with sampling containers, biology box with segregated sampling compartments, push cores, hand nets, shovels, nodule scoop, 5-litre Niskin bottles, lasers, autonomous MAPRs and nodule crusher. Additionally, it is anticipated a Mini Cone Penetrometer for collecting geotechnical data will be deployed via ROV after campaign 1.

Example Sampling Tools: Large and Small Vessel

Box Corer: 0.1225 m^2 (35 x 35 x 60 cm deep) to 0.56 m^2 (75 x 75 x 60 cm deep)



Photos and Specifications are courtesy of Ocean Instruments

The bottom sampling tool is designed for minimum disturbance of sediment surface and any associated nodules. It is deployed from the vessel with a deep-sea wire. Upon contact with seafloor, the outer shovel is released and then a sample is taken. The design of the system allows for exceptional preservation of the sample which is critical for quantitative investigations of the benthos micro- to macrofauna, geochemical processes, sampling of bottom water or sedimentology. The box corer can be outfitted with additional instrumentation such as altimeters, CTD's, and penetrometers.

The box corer is used to sample the macrofauna as well as nodules. The box corer is a type of gravity corer that sinks into the bottom. Its path is guided at its upper end by a column that sinks through a sleeve which is part of a frame that rests on the bottom.

In addition to the sampling, the sea floor will be photographed just prior to the sampling by a deep-sea camera mounted on the box corer. The ultimate distance between sampling stations will be 15 NM in the majority of CBGs.

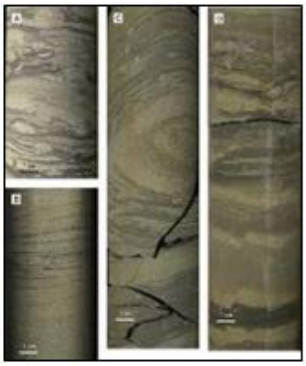
Opportunistic biological-sediment baseline samples will be collected from the majority of box core samples and nodule-associated fauna will be collected and preserved for expert analysis. If CIC is to proceed to harvesting technology testing, these samples will play a role in the environmental impact assessment of the proposed mine site(s).

Samples will be collected to obtain an understanding of the infauna (biota that live within the sediments) and epibenthic (biota that live on the sediment surface) community composition and sediment characterisation within the CBGs. A variety of sample types will be collected from each core sample, which will be fixed and preserved separately for morphological and molecular taxonomy. Sample types collected and planned analysis include overlying water fauna; megafauna (biota greater than 2 cm); nodule fauna, microfauna (biota smaller than 32 µm); meiofauna (biota greater than 32 µm and less than 250 µm); macrofauna (biota greater than 250 µm and less than 2 cm); sediment and pore-water chemistry; sediment particle size distribution. A multi-corer can be utilised for collection of core samples to be used specifically for environmental characterisation and sampling.

Water column profiles will be collected as part of the environmental baseline characterisation of the CBGs in order to meet the recommendations per the ISA document: ISBA/25/LTC/6/Rev.1 and its updates: *Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area*. The majority of water column data will be collected via a Mini Autonomous Plume Recorder (MAPR) with the following sensors: conductivity; temperature (°C); turbidity (NTU); depth (m); photosynthetically active radiation (PAR); chlorophyll (chl-a); dissolved oxygen (DO); pH; transmissivity. The MAPRs will be deployed during most operations by attaching it to either the box core cable (50 m above the box corer) or the umbilical of the Deep-tow or ROV at 50 m above either vehicle. The idea is to get as many temperature recordings as possible to see temporal and spatial variability during the offshore campaigns and acquire a comprehensive data set for water turbidity close to the seafloor. Along with the MAPRs, a single-point current sensor or L-ADCP may be deployed on a select number of box core deployments. This will complement the same data collected through the water column using the rosette.

Example Multi-Corer: Large Vessel






A multi-corer is a bottom sampling tool used for sampling in chemical, geochemical and biological applications. The coring head is hydraulically damped to ensure undisturbed samples. It is deployed from the ship with a deep-sea wire. The design of the system allows for multiple cores to be retrieved from a single deployment/retrieval cycle.

The multi-corer will be used to record and analyse baseline water chemistry conditions in sediment pore waters and to collect information on metal and other elements that may be released during the nodule extraction process. Importantly, it is also used in meiofauna, macrofauna and bioturbation studies. A key characteristic of multi-corer samples is that the sediment-water interface is preserved which is where most biological activity occurs. For this reason, multi-corers will be used in the majority of CBGs.

Cores are brought up to surface, sectioned and preserved following best practise technique. Following standard QA/QC procedures, core samples may be sectioned and will be preserved appropriately on board the exploration vessel.

The multi-corer should also allow study of baseline sediment conditions and predict the behaviour of mineral extraction on sediment composition and to determine the basic properties of the sediment, including measurements of soil mechanics and composition to adequately characterise the surficial sediment deposits which are the potential source of deep-water plumes.

It will also aid in understanding baseline biological conditions within the seafloor sediments and predict the impact of mineral extraction on biological communities and gather data on the mixing of sediments by organisms. Samples of fauna will be representative of variability of habitats, bottom topography, depth, seabed and sediment characteristics, abundance and mineral resource.

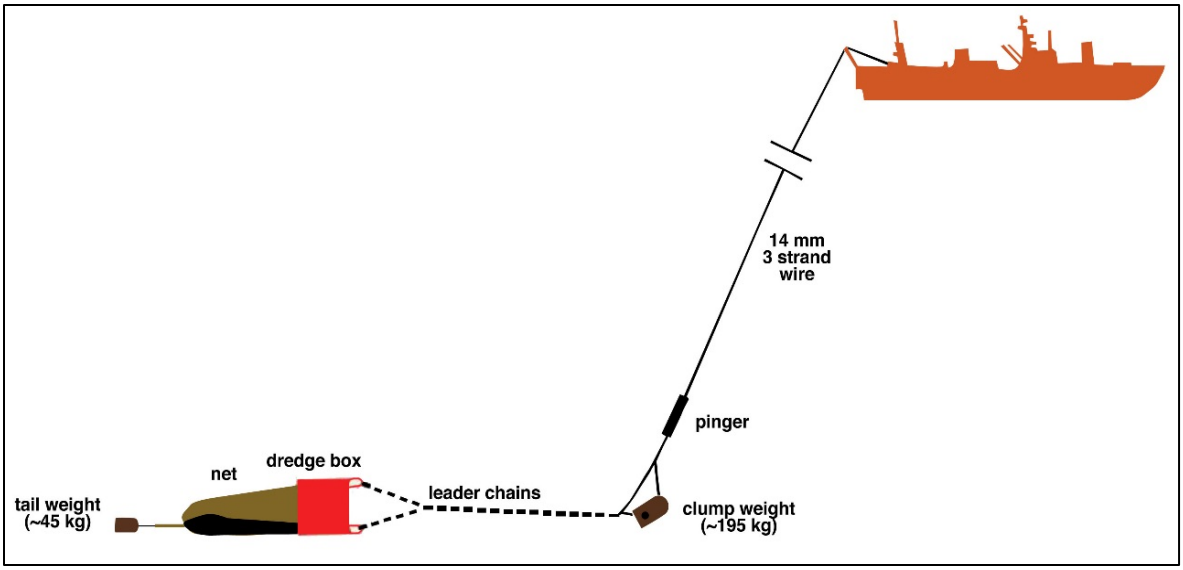
Example Cone Penetration Test (CPT) Large and Small Vessel

Cone penetration testing (CPT) provides a rapid, *in situ*, versatile and safe way to edify understanding of seafloor geotechnical properties. These properties will be taken up to 2 m or more below the seafloor and will be used to determine the bearing capacity of the seabed sediment. This information is important as input for the design of the harvesting collector propulsion and to ensure that the harvesting collector has sufficient traction and does not sink too deeply into the seabed.

For the first campaign, a gravity CPT will be deployed from the vessel to provide indications of the bearing capacity and variations thereof over the area (seabed properties are expected to be fairly constant, to be proven by testing). In subsequent exploration campaigns and when deemed necessary, a mini-CPT (small size penetration rod of 2 cm^2) will be deployed from an ROV to verify the results from the first campaign.

Image courtesy of TDI-Brooks International Ltd.

Example Dredge: ***Large Vessel***



The dredge is lowered to the seafloor and then dragged a short distance to collect nodules from the seafloor. A typical dredge recovers a maximum of 2 tonnes of nodules per dredge haul and can be deployed 4 to 5 times per day. A reasonable expectation is five tonnes of nodules per day. Nodule samples will be collected in each of the CBGs.

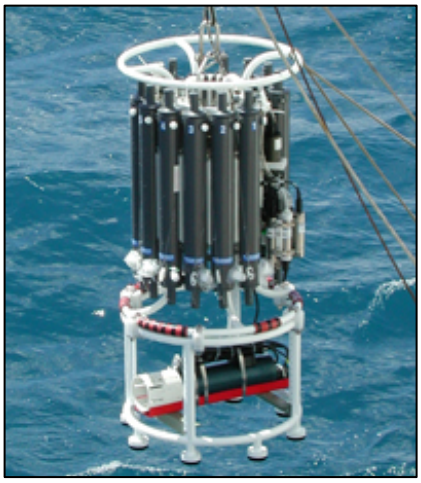
Photos and Specifications are courtesy of
Yuzhmorgeologiya

Dredge sample data include grade characterisation and some size distribution data. It is expected there will be a sufficient quantity of nodules to complete initial metallurgical studies. The samples will be taken for preliminary chemical investigation and metallurgical test-work and will not be collected in a manner that can support any type of quantitative assessment of the mineral resource estimate – rather, this will be achieved through box coring.

Area of the seafloor disturbance is a path about 2 m wide and 10s to 100s of metres long depending on the length of the drag. An epibenthic sled for this work was considered and while it typically impacts a smaller area of the seafloor, it cannot practically achieve the tonnage of nodules required for metallurgical test studies.

Example Oceanological Survey Tools: Large and Small Vessel

CTD Water Sampling



"Niskin" Water sampling bottles are arranged in a rosette formation around other sensors (e.g., CTD). The instrument package is tethered to the ship by a long cable and is used to obtain water column samples and profiles in a simple vertical down and up cast. Each bottle can be triggered individually to enable sampling from various locations.

Water column samples will be collected as part of the environmental baseline characterisation of the CBGs in order to meet ISA recommendations. Water samples will be collected using the Niskin bottle rosette. Samples will be collected for both infield and onshore laboratory analysis.

The water sampler (Niskin rosette) will be programmed with the selected depth strata for full water sampling programme to be conducted in the CBGs. The water-sampling programme is designed to collect samples from varying depth strata across all areas where box coring will be conducted.

Moorings - Physical Oceanography – Long-term Studies

Large Vessel (maintenance from Small vessel)

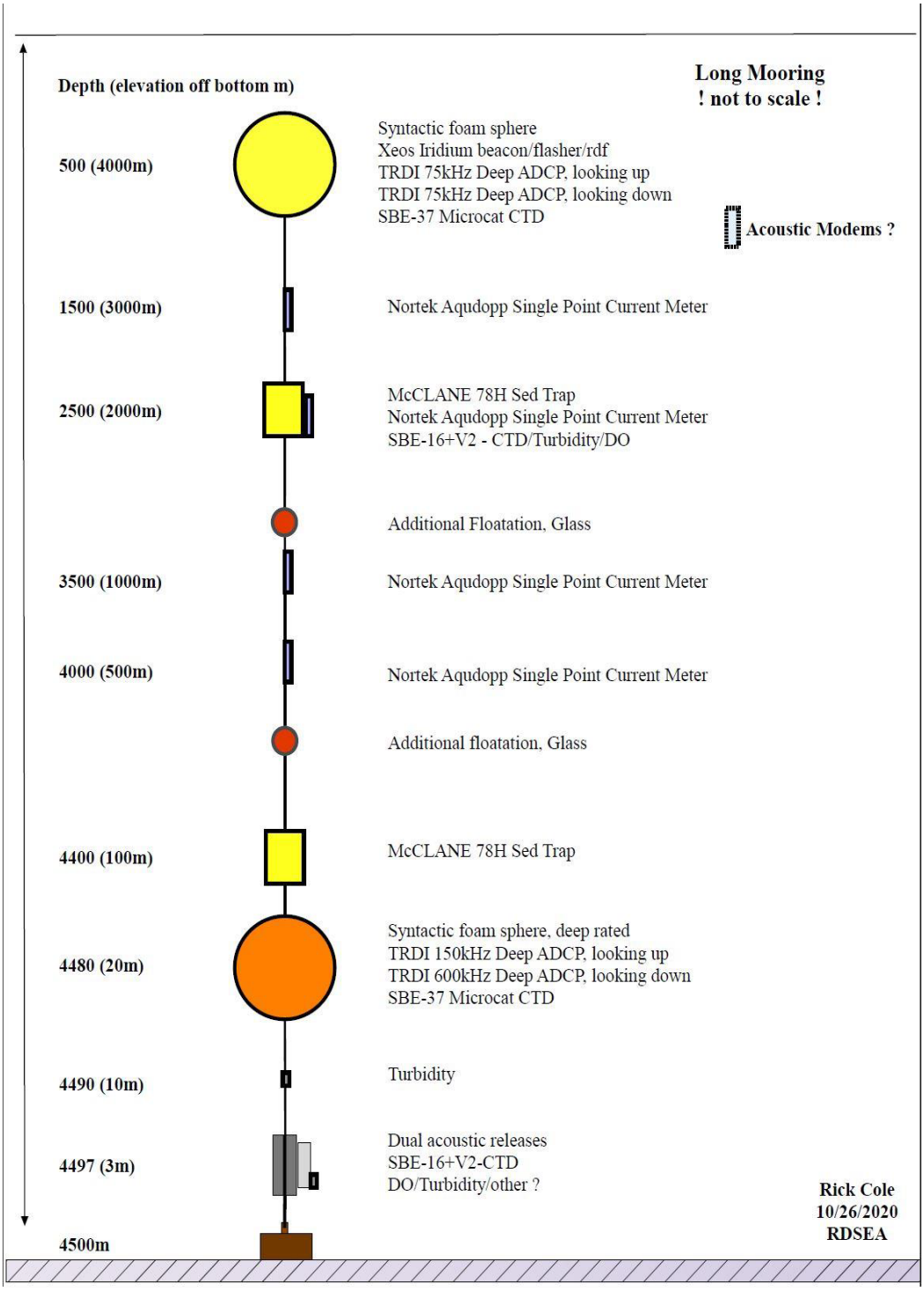


Illustration from RDSea

Subsurface moorings are fixed moorings that allow for the collection of vast amounts of data from multiple stratigraphic layers of the water column in a small defined area. They can be fitted with a variety of different oceanographic research instruments such as ADCPs Single Point Current metres, Sediment Traps, CTDs, dissolved oxygen sensors, turbidity sensors, and hydrophones.

It is currently envisaged that one full water column mooring (from seabed to 500 metres below sea level) would be installed near the primary site of interest for commercial operations as part of an array consisting of pressure sensors, landers, and two additional near-bottom moorings. Moorings will be retrieved on a ~6 to 12-month basis for data download, equipment maintenance and mooring reinstallation. Concurrent with and following data acquisition, hydrodynamic modelling of plume extent and duration will be performed.

Moorings are usually anchored using iron weights. The moorings will be affixed to the anchor with dual acoustic releases, which are triggered from the ship using a "Deck Box" when equipment retrieval is necessary. The instrumentation is affixed to a mooring line using standard techniques and buoyancy (by way of glass floats, syntactic foam buoys and other devices) will also need to be placed on the line to ensure the mooring remains upright.

Area of the seafloor disturbed will be quite small and corresponds to the size of the anchor which is typically less than 2 m x 2 m. The depth of the shallowest instrument will need to be determined in consultation with the Cook Islands government and local fisheries to ensure there is no chance of entanglement by fishing nets or lines, though 500 metres water depth at shallowest is currently planned.

Photos and specifications for moorings and equipment are courtesy of RDSea International.

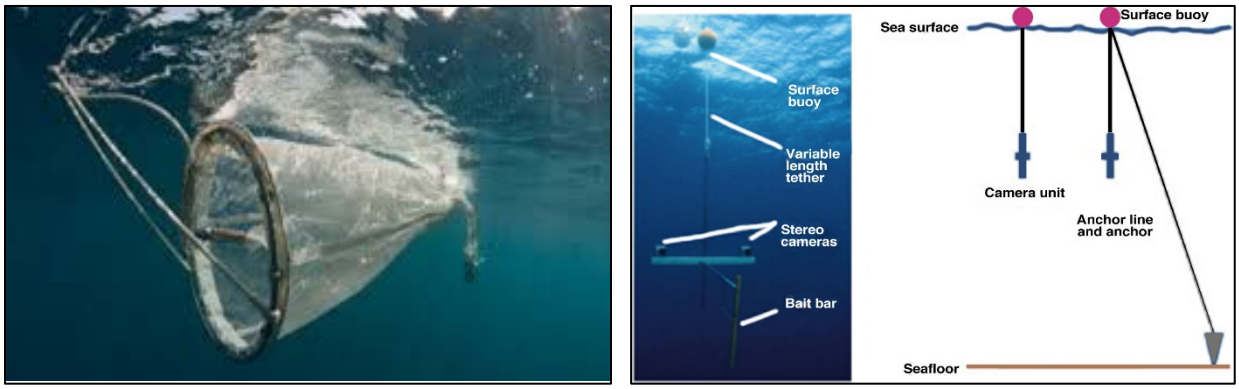
L-ADCP (Lowered Acoustic Doppler Current Profiler)

Photo (left) courtesy of Teledyne Marine, photo (right) courtesy of Census of Marine Life

A Lowered-Acoustic Doppler Current Profiler (L-ADCP) is tethered to the ship by a long cable and is used to obtain water column current (speed and direction) profiles in a simple vertical down and up cast.

Data needs to be carefully processed following collection to remove interferences from ship movements and deployment method (e.g., the movement associated with the instrumentation traveling through the water column).

Plankton nets, fishing gear, etc. (Biological Communities – Pelagic Communities)

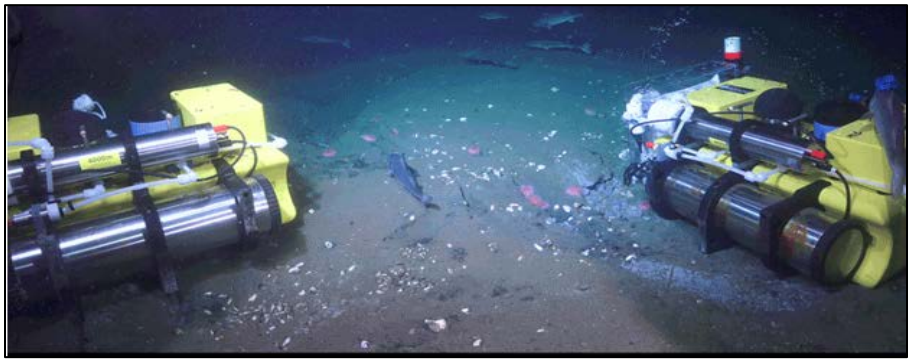


Plankton net with flow meter / © Peter Verhoog

A nylon mesh plankton net is deployed from a winch to collect either vertical or horizontal samples of plankton. This allows for plankton to be analysed both quantitatively and qualitatively. A variety of net and mesh sizes can be used depending on which organisms are being targeted for sampling. Water conditions will be taken into consideration before choosing net/mesh dimensions to ensure optimal sampling.

Deep-water pelagic monitoring moorings will be deployed and comprise of a buoyed camera unit to monitor a separate baited/weighted line suspended in the water column. Minimal impact on the seafloor to an area where the TLC anchor has contact with seafloor, estimated to be less than 2 m x 2 m.

Benthic Mini-Landers Large and Small Vessel



As recommended by the TAB, CIC will incorporate benthic Mini-Landers (MLs) into its environmental data collection programme. These equipment suites are unmanned sensor arrays, which after deployment are untethered to the seabed. They collect data over time and then shed a metal ballast point to return to the surface. It is anticipated that 4 of the units would be used during exploration. Each unit is about 60x85x90 centimetres in size and weighs about 90 kilograms, with the ballast drop plate weighing approximately 90 kgs. Sensors allow for measuring current speed, current direction, turbidity, dissolved oxygen, water temperature, conductivity (as proxy for salinity), and depth. Measurements are made near the seabed surface, with select sensors recovering data to about 25 metres above the seabed. Collected data, in concert with data collected from moorings will assist in both establishing an environmental baseline and determining the current. Such information is necessary for plume modelling and characterising sedimentation rate. CIC will communicate with the data systems on each ML in near real-time using a USBL surface and communication system with 8000m range including system control software.

This communications capability allows the team to determine the state of all ML systems upon their arrival on the seafloor plus allows us to collect data from the ML on-board computers whenever a surface ship is overhead on station. So preliminary results can be periodically collected before the ML deployment is ended with a return to the sea surface.

During the initial two years of exploration operations, CIC plans to produce a minimum of two six-month time-series data sets from ML-based measurements at sites chosen. The primary goals are to obtain continuous benthic boundary layer (BBL) measurements of water transport and biogeochemical parameters at a minimum of every 15 minutes in order to determine naturally occurring temporal and spatial variabilities in turbidity and dissolved oxygen as a function of current speed and direction.

Photos and specifications for Mini-Landers are courtesy of UNC-CH.

Marine Biota Observations (Biological Communities) Large and Small Vessel

During offshore campaigns, personnel will monitor and record sightings of marine mammals, other near-surface large biota (such as turtles and fish schools) and bird aggregations, identifying the relevant species and behaviours where possible. Details will also be recorded in transit to and from areas of exploration and on passage between stations.

All crew of the research ship will be instructed to notify the onboard environmental team of all opportunistic sightings (use of binoculars where possible) of marine biota while at sea. Sightings will properly be recorded by personnel in a Marine Biota Observation Log.

Hydrophone

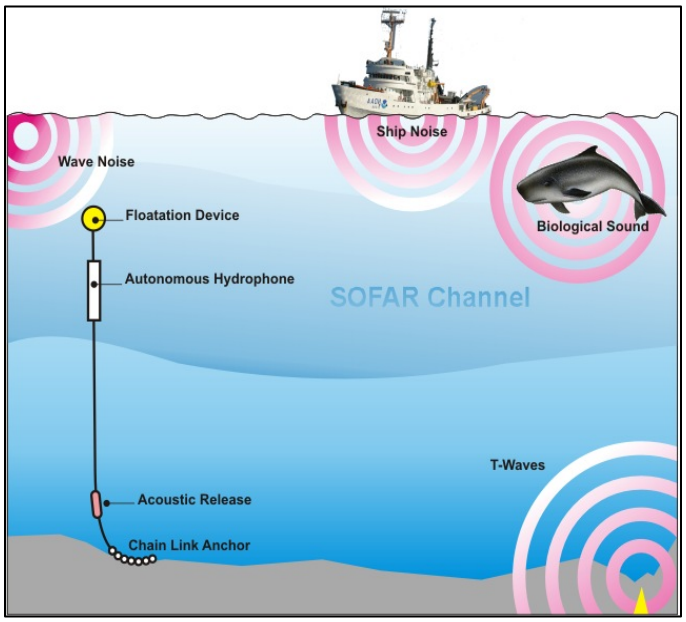


Image courtesy of Kompasiana

Hydrophones will be incorporated into the moorings or Mini-Landers used for physical oceanography studies, or as stand-alone moorings. The equipment has minimal impact to the seafloor, except for the area of an anchor or buoy used to keep it in place.

Moored Time Lapse Sediment Traps (Fluxes to the Sediment - Sedimentation)

As advised by the TAB, time lapse sediment traps will be incorporated into the moorings used for physical oceanography studies. Besides weight/volume, the material collected in the traps will also be analysed for nutrient and trace element transport to deep sea environments.

Recovered cups from a sediment trap

In addition to providing sedimentation data, analysis of trace elements can help with understanding local upwelling phenomena potentially correlated to productive fishing areas.

Photos and specifications for sediment traps and related equipment are courtesy of RDSea International.

Moored and Baited Time Lapse Camera (Biological Communities – Demersal Scavengers)

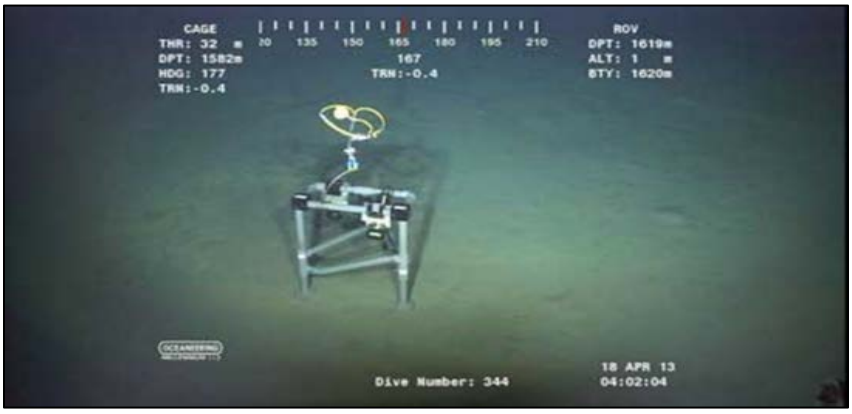


Photo courtesy of Hellovenus

This recording device is deployed within a suitable distance of the TLC (Time Lapse Camera) anchored bait to observe behaviour of demersal scavengers.

These are likely to be deployed during ROV operations. Seafloor impact is minimal, confined to area where TLC anchor has contact with seafloor, estimated to be less than 2 m x 2 m.

6. The Proposed Exploration Cruise Schedule

Offshore exploration operations will be divided into campaigns. Campaigns consist of either a single cruise or multiple back-to-back cruises with each cruise having a duration of approximately 15 - 45 days, depending on the vessel. During the Exploration Licence period of five years, CIC would conduct multiple campaigns, with the first to commence 90 – 120 days after the grant of an Exploration Licence, subject to constraints created by the current COVID-19 pandemic and availability of ships.

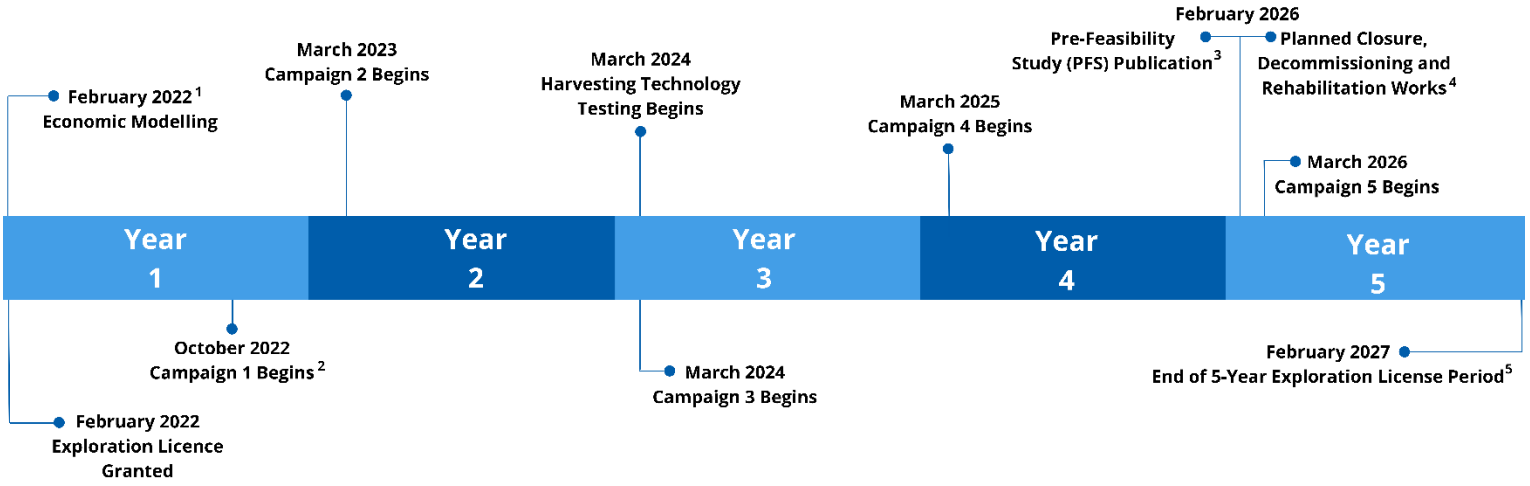
Prior to initiation of exploration cruises, communication will be established between CIC and the Cook Islands Ports Authority to ensure there is a clear understanding of the scheduling and location of where exploration activities will occur and what those activities will entail. CIC will use the lessons learned from completed cruises to refine future operations to assure offshore work and research activities are effective and efficient.

For exploration operations, CIC plans to take a collaborative approach with regard to interfacing with Cook Islands' offshore support businesses. Where commercially reasonable and in line with the nation's and community's interest, every effort will be made to support and utilise the services of Cook Islands' businesses.

While Pago Pago (American Samoa) has the closest suitable infrastructure to provide CIC's exploration work with a location for port calls of large vessels, mobilisation, crew changes, provision/fuel, and de-mobilisation, CIC intends to incorporate Cook Islands' landside support to whatever extent Cook Islanders deem it appropriate, logistically possible and acceptable.

While undertaking operations with the large multibeam vessel, Avatiu Harbour (Rarotonga) and Arutanga Harbour (Aitutaki) may only be utilised in the case of transporting specialised technical scientists, priority parts needed for operations, and medical emergencies unless it can be determined that the large vessel can safely utilise the services of Avatiu Harbour. CIC intends to collaborate with communities and representatives of the Cook Islands to better understand the level of involvement Rarotonga and Aitutaki communities desire in terms of interface with the vessel during exploration activities. All landside port support will seek to pay close attention to sensitive cultural issues and concerns between ship operators and the port communities.

Additionally, CIC is planning on the constant presence of a smaller research vessel (30-50 metres) that will mostly operate out of Avatiu Harbour, availing itself of the port facilities there. If conditions and logistics permit, this smaller vessel will be undertaking year-round research expeditions of up to 15 days per month, which enables it to accommodate shorter expeditions and to provide a research platform for guest scientists from around the world. It may also call on different islands in the Pa Enua for educational purposes, public outreach and to transport people and supplies as may be required or requested by the Cook Islands Government.



[1] CIC has been developing economic models for the resource over the past several years, however, the assumptions will be refined over the course of the Exploration period as more data are gathered from the resource analysis, metallurgical testing, harvesting technology, global mineral supply/demand and various other critical inputs.

[2] Campaigns will include, but are not limited to, seabed mapping, geological, geochemical, and biological sampling and processing as well as geostatistical and quantitative resource determination.

[3] In our experience, terrestrial projects of this scale typically take three to five years to be in a position to undertake the PFS (depending on how this is defined). Traditionally in terrestrial mining, the critical path in a PFS is orebody drilling and definition. For Cook Islands' nodules, the existing data and the homogeneous nature of the nodules suggests this can be done well within the first three years. However, if a thorough PFS is to be published in this timeframe, the harvesting system and processing flowsheet would need to move past proof-of-concept fairly quickly and these will need to be engineered and trialled at the design scale.

[4] Due to the low expected environmental impact of exploration activities, CIC does not anticipate a long period of time will be needed for this. However, CIC will follow whatever regulatory requirements that may apply to the proposed exploration activities, including closure, decommissioning and rehabilitation.

[5] Analysis of the data is expected to continue beyond the five-year licence period. Reports will be provided to the SBMA periodically.

Years 1 & 2: Multibeam Mapping of CBGs, Box Coring, Dredging, Hi-Resolution Mapping, Environmental Data Collection and Environmental Moorings Deployment

Start:	90 – 120 days following the grant of Exploration Licence (If COVID issues permit)
Duration:	Five 30 – 45-day cruises totaling 150-225 days including transit times and port calls utilizing large vessel (Year 1) 15 days per month, year-round utilizing small local vessel (Year 2)
Location / Priorities for Campaign 1:	• All CBGs: Bathymetric mapping; • All CBGs: Intensive focus and comprehensive survey and studies in select areas of the CBGs to complete sufficient mineral and environmental operations to fulfil the objectives. • Surface environmental, sea state, and meteorological observations at all times collected during survey operations.
Offshore Activities:	• Bathymetric mapping of all CBGs. • Box Cores collected in select areas of CBGs per a methodical protocol under direction of project Qualified Person (QP). It is anticipated that between 150 and 300 box cores will be collected in Year 1, with the majority of sampling intervals being 15 NM apart. • Less than 100 tonnes of sample collection in select areas of the CBGs covering ≤0.02 km^2. • Deep-tow mapping of select areas of CBGs in both 200 and 400kHz mode and with backscatter processing. • 5 km x 5 km detailed deep-tow survey of areas for environmental moorings. • ROV visual survey of specific locations for environmental moorings. • Installation of moorings of current meters, ADCPs, sediment traps, CTD (Conductivity, Temperature and Density) Water Sampling Carousel and other equipment, and hydrodynamic (plume) modelling with ROV. • Photographic/video transects and biota sampling via ROV and additional methods as necessary use of shovels, scoops, nets, push-cores, slurp gun, use of multi-corer and deeper penetration corers, MAPRs (Mini Autonomous Plume Recorders), Niskin water sampling bottles, moored time lapse cameras, plankton nets and other methods, with laboratory analysis. • 15 NM video transects using ROV between selected newly completed box core sample points. • ROV geotechnical measurements and tests performed on the seafloor using ROV tools and manipulators. • Environmental measurements to be made in select areas of CBGs including but not limited to CTD Water Sampling Carousel with oxygen, turbidity, and other sensors, Mini-Landers, and hydrophones.
Onshore Activities:	CIC will initiate the community and sea users outreach programs outlined in the Annex 3 – CIC LTD – Environmental Management Programme (EMP) (CIC066) in the best national interests of Cook Islanders and the environment.

Years 3-5: Box Coring, Bulk Sampling, Hi-Resolution Mapping, Environmental Data Collection and Environmental Moorings Maintenance and Recovery

Start:	Years Three through five of the Exploration Licence to be determined after First Term
Duration:	15 days per month, year-round utilizing small local vessel (Years 3-5)
Location / Priorities for Subsequent Campaigns:	• Survey of CBGs • Surface environmental, sea state, and meteorological observations at all times in all areas
Offshore Activities	• Box Cores collected per a methodical protocol under direction of QP. It is anticipated that between 100 and 150 box cores will be collected in each year, with the majority of sampling intervals being 15 NM apart. • 100 - 200 tonnes of sample collection (dependent on results from Term 1 and requirements for extraction and processing requirements). • Deep-tow and/or AUV (Autonomous Underwater Vehicle) mapping of select areas of CBGs in both 200 and 400kHz mode and with backscatter processing. • 5 km x 5 km detailed deep-tow and/or AUV survey of areas for any additional environmental moorings deemed necessary. • ROV and/or AUV visual survey of specific locations for environmental moorings. • Installation of moorings of current meters, ADCPs, sediment traps, CTDs and other equipment, and hydrodynamic (plume) modeling. • Photographic/video transects with ROV and/or AUV and biota sampling via ROV, and additional methods as necessary including use of shovels, scoops, nets, push-cores, slurp gun, use of multi-corer and deeper penetration corers, MAPRs (Mini Autonomous Plume Recorders), Niskin water sampling bottles, moored time lapse cameras, plankton nets and other methods, with laboratory analysis. • 15 NM video transects using ROV and/or AUV between selected newly completed box core sample points. • ROV geotechnical measurements and tests performed on the seafloor using ROV tools and manipulators including a Mini Cone Penetrometer. • Environmental measurements to be made in select areas of CBGs including but not limited to CTD Water Sampling Carousel with oxygen, turbidity, and other sensors, Mini-Landers, hydrophones. • Extraction Component Testing. • Geo-technical activities performed in this section will provide critical information for extraction system design
Onshore Activities	On-going community and sea users outreach programs outlined in the Annex 3 – CIC LTD – Environmental Management Programme (EMP) (CIC066) in the best national interests of Cook Islanders and the environment.

Please see attached CIC LTD - Exploration timeline (CIC 2021-2026) V2-1 (CIC008rev1).

7. Financing Plan

CIC is financially capable of both carrying out its EWP and fulfilling the financial obligations of the Exploration Licence.

The proposed EWP budget includes but is not limited to:

- Management of the project.
- Implementation of the environmental management program and resource assessment operations.
- Hiring of qualified personnel with the technical skills and expertise necessary to conduct the proposed regulated activity.
- Development of outreach programmes related to assuring the project is aligned with the national interests and the goals of the National Sustainable Development Plan (NSDP) of the Cook Islands, its people and sea users.
- Development and engineering of the nodule harvesting programmes, including the development of specialised technology and logistics programmes.
- Development of a strategy for nodule processing and commercial programmes for realizing maximum economic value for extracted metals.

In total, the project is estimated to have an investment in the first year of offshore exploration operations of NZD $22,934,160 followed by approximately NZD $12,116,160 for each of the following four years of the Exploration Licence.

See the table below and attached *CIC LTD - Exploration timeline (CIC 2021-2026) V2-1 (CIC008rev1)* for details and estimated costs required to implement the EWP. The expenditure totals for each cruise stated in this attachment include costs associated with technical specialists, experts and qualified personnel that would be involved in the regulated activities.

Estimate of Expenditure NZ$	**Year 1**	**Subsequent 12 Month Periods**
Campaign Operations: LARGE SHIP, Research, Laboratory, Reporting, Community Outreach	$21,636,000	$ -
Campaign Operations: SMALL SHIP, Research, Laboratory, Reporting, Community Outreach	$ -	$10,818,000
CIC Local Overhead Expenses (CI employees, offices, professional services, etc.)	$1,298,160	$1,298,160
Total	$22,934,160	$12,166,160

The CIC Consortium was formed to support the project both operationally and financially. The members include industry-leading marine companies and investors with specific ties, interests and experience in every aspect of offshore mineral exploration, extraction, environmental assessment, community programmes and mineral processing/commercial programmes. The Consortium members are all stakeholders in CIC through a combination of equity investments and contractual relationships. All members bear financial responsibility for their contributions to the joint effort to undertake the complete development of the EWP from initial planning and exploration, through environmental assessment and monitoring, to implementing programmes to protect and serve Cook Islands' communities, sea users and national interests.

CIC's Consortium members include:

- Searock Resources, LLC
- Odyssey Marine Exploration, Inc. (NASDAQ: OMEX)
- Boskalis International B.V. member of Royal Boskalis Westminster N.V. (EuroNext: BOKA)
- 20,000 Leagues, LLC
- Cobalt Capital Partners, LLC
- DYNE Capital Pty Ltd

CIC is funding the EWP by exchanging equity shares for both cash and noncash consideration from Consortium members. To date, CIC has committed funding arrangements outlined in section 7.1 below totaling NZD $79,337,500 in exchange for CIC shares to finance the proposed regulated activity.

7.1 Initial Funding

A. Odyssey Marine Exploration

Since becoming a member of CIC's Consortium, Odyssey has invested and committed approximately NZD $9,375,600 to CIC Limited. Pursuant to Services Agreements between the parties, Odyssey agreed to supply services to CIC in the total amount of NZD $9,375,600 in cash value as consideration for CIC non-voting shares. The Odyssey services include project management, resource analysis, exploration programme development, and professional services related to desktop research, financial modelling and commercial programme research and operations. As of 1 September 2021, Odyssey had performed NZD $4,220,451 of such services, leaving a future services balance of NZD $5,155,149 to be performed.

This work accrues to the long-term success of the project and specifically to the development and execution of CIC's Cook Islands Seabed Mineral Resource Exploration Programme.

B. Boskalis International B.V.

Boskalis, a world leader in subsea operations, dredging and engineering, is an important member of the Consortium. Pursuant to the Memorandum of Understanding between the parties, Boskalis agreed to supply services to CIC LTD in the total amount of NZD $7,212,000 in cash value as consideration for CIC non-voting shares. The Boskalis services include utilising its engineering and scientific expertise to assist in evaluating the viability of the Cook Islands subsea excavation project and to undertake engineering studies to supply designs and feasibility studies for mineral extraction, recovery and transport services. As of 1 September 2021, Boskalis had performed NZD $2,239,066 of such services, leaving a future services balance of NZD $4,972,994 to be performed.

C. Dyne Capital Pty Ltd

Financial Partner Dyne Capital Pty Ltd has made a funding commitment sufficient for funding company and marine exploration operations. As of 30 September 2021, the Dyne Group had transferred the sum of NZD $5,048,400 to CIC LTD as evidenced by a Convertible Promissory Note, as amended.

Pursuant to the terms of the CIC LTD – Dyne Group Securities Purchase Agreement, upon CIC LTD obtaining a satisfactory Cook Islands exploration licence, the NZD $5,048,400 Convertible Promissory Note will be converted to CIC non-voting shares.

In addition, upon CIC's receipt of a satisfactory Exploration Licence, the Dyne Group has a commitment to invest an additional NZD $57,646,000 for CIC non-voting shares, which CIC will allocate to support operational expenses, research expedition costs and overhead associated with the project through year five of the planned operations.

D. CIC LLC

As of 1 September 2021, CIC had cash reserves of approximately NZD $1,442,400 through a total NZD $2,884,800 credit line with its affiliate CIC LLC.

E. Additional Sources

CIC does not have plans to borrow any amount from banks or other financial institutions at this time. There are no contingent liabilities that would materially affect the applicant's financial capability to meet its licence obligations. Additionally, CIC has no plans for mergers, acquisitions, dispositions or medium-term plans which would be expected to alter materially the financial status of the applicant or financial guarantor.

7.2 Funding for the Full Exploration Licence Period

CIC is fully prepared to financially support the Exploration Licence fees and Work Programme to complete the activities contemplated and proposed in this Application through the funding capabilities of the members (which will be fully activated upon granting of the CIC Exploration Licence). Odyssey, the primary operational partner during the exploration phase of the project, has successfully demonstrated funding of more than NZD $144,240,000 in marine mineral exploration, environmental study, sampling, geophysical and geotechnical activities specifically related to ocean mineral projects.

Projects completed by Boskalis, CIC's partner for mineral extraction, represent thousands of individual works and billions of dollars' worth of operations funded and successfully completed, including the development of one of the world's first deep-ocean nodule harvesting technologies. In cooperation with the Ocean Minerals Company (OMCO) consortium a working nodule harvesting system was successfully tested by Boskalis in 1978-79.

8. Risk Assessment

CIC presents general statements related to risks and benefits of the EWP to the Cook Islands. Areas considered include social/cultural, environmental, and economic/financial. The following table is by no means exhaustive and will be expanded collaboratively with the SBMA and with interested parties, including sea users, during early-stage outreach programmes.

The EWP uses standard and proven methodologies for mineral exploration and environmental baseline data collection and assessment with limited risks and defined mitigation programmes. Even so, a detailed risk assessment will precede each offshore campaign to ensure appropriate risk management occurs and that risks are minimised as reasonably practicable at every stage of project development. This approach to risk management, along with the work done to understand the baseline environment and expected impacts, accrues to the application of the precautionary approach for extraction programme development.

CIC proposes that an annual risk review process be established, in line with the Seabed Minerals Authority's Annual Reporting requirement, to assess overall risks of the project at regularly scheduled intervals. These reviews will consider both the work that has been done on the project and the upcoming Work Programme. The reviews will seek to incorporate new ways to mitigate risks in all aspects of the project.

Please see Annex 4 – CIC LTD - Incident Response Management Plan (CIC071) for more robust information about CIC's risk assessment protocols.

Table 2. Risks, Mitigation and Benefits Overview

Risk Area	Risks	Mitigation	Benefit
Social / Cultural	• Community concerns about subsea mineral exploration.	• Investment in community and sea user outreach and collaboration programmes. • Prioritisation of transparent and meaningful, effective communication with the public and stakeholders about the EWP.	• Early, frequent and on-going engagement with Cook Islanders intended to create an environment where the community is engaged in the Exploration activities undertaken by the contractor, the data it is generating and ways to use that data to better understand the marine environment.

Environmental	• Concerns that Ecosystem health and function may be adversely impacted.	• Employ only proven methodologies for Exploration Programmes and minimally invasive interaction with the seabed. • Partner with the scientific community, including objective deep-sea ecology experts, to conduct studies and design environmental programmes. • Open sharing of environmental data.	• Significantly increase the Cook Islands' data and knowledge regarding their EEZ environment.
Economic / Financial	• Concerns that the programme may negatively affect core economic drivers including tourism and fisheries. • Concerns that investment in the Cook Islands (businesses and employment of people) may not meet expectations.	• Nothing from the proposed EWP will have any measurable impact on tourism or fisheries. All work being proposed will take place at least 50 nautical miles away from any island. • CIC is committed to finding a variety of ways to employ, train and provide valuable data to Cook Islanders throughout the entire Exploration period.	• In addition to the value-based commitment of CIC to engage businesses, there is a budget commitment to this endeavour as well as a Trust that has already been established to invest in local traditional, cultural and educational programmes.

List of Attachments

- CIC LTD - Exploration timeline (CIC 2021-2026) (CIC008rev1)

Proposed Schedule
Subject to Change Based on Adaptive Management

Exploration Licence (60 months) Month	Campaign / Cruise #	Vessel	Principle Activity	Box Core and Bulk Sampling	Duration	Budget (NZD)
1			Exploration Licence granted			
2						
3						
4						
5			Preparations for Campaign#1 (commence moorings development and build)		30 days	
6			Preparations for Campaign#1		30 days	
7			Preparations for Campaign#1. Large Vessel arrives S.Pacific		30 days	$1,153,920
8	Campaign#1 / Cruise#1	Large vessel (~60-80m)	Shipborne multibeam mapping of approximately 100,000 km2		30-45 days	$3,158,856
9	Campaign#1 / Cruise#2	Large vessel (~60-80m)	Shipborne multibeam mapping of approximately 112,000 km2		30-45 days	$3,158,856
10	Campaign#1 / Cruise#3	Large vessel (~60-80m)	Box Coring, Bulk Sampling with dredge	75-150 box cores, up to 50 tonnes of bulk sample	30-45 days	$3,721,392
11	Campaign#1 / Cruise#4	Large vessel (~60-80m)	Box Coring, Bulk Sampling with dredge, High resolution mapping and sampling with Deeptow and ROV (visual and biota sampling)	75-150 box cores, up to 50 tonnes of bulk sample	30-45 days	$4,644,528
12	Campaign#1 / Cruise#5	Large vessel (~60-80m)	High resolution mapping and sampling with Deeptow and ROV, Moorings, mini-Landers deployments, additional Environmental baseline data collection		30-45 days	$4,644,528
12		Large vessel (~60-80m)	Large Vessel departs S.Pacific			$1,153,920
13		Large vessel (~60-80m)	Small vessel arrives Rarotonga			$576,960
13	Campaign#2 / Cruise#1	Small vessel (~40m)	Box Coring and possibly bulk sampling	15-25 box cores, bulk sample material if required	15 days	$829,380
14	Campaign#2 / Cruise#2	Small vessel (~40m)	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection		15 days	$1,009,680
15	Campaign#2 / Cruise#3	Small vessel (~40m)	Box Coring and possibly bulk sampling	15-25 box cores, bulk sample material if required	15 days	$649,080
16	Campaign#2 / Cruise#4	Small vessel (~40m)	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection		15 days	$1,189,980
17	Campaign#2 / Cruise#5	Small vessel (~40m)	Box Coring and possibly bulk sampling	15-25 box cores, bulk sample material if required	15 days	$649,080
18	Campaign#2 / Cruise#6	Small vessel (~40m)	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection		15 days	$1,009,680

19	Campaign#2 / Cruise#7	Small vessel (~40m)	Box Coring and possibly bulk sampling	15-25 box cores, bulk sample material if required	15 days	$829,380
20	Campaign#2 / Cruise#8	Small vessel (~40m)	High resolution mapping and sampling with AUV and/or ROV, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection		15 days	$1,009,680
21	Campaign#2 / Cruise#9	Small vessel (~40m)	Box Coring and possibly bulk sampling	15-25 box cores, bulk sample material if required	15 days	$649,080
22	Campaign#2 / Cruise#10	Small vessel (~40m)	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection		15 days	$1,189,980
23	Campaign#2 / Cruise#11	Small vessel (~40m)	Box Coring and possibly bulk sampling	15-25 box cores, bulk sample material if required	15 days	$649,080
24	Campaign#2 / Cruise#12	Small vessel (~40m)	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection		15 days	$1,009,680
25	Campaign#3 / Cruise#1/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling / utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$829,380**
26	Campaign#3 / Cruise#2/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection / utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,009,680**
27	Campaign#3 / Cruise#3/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**
28	Campaign#3 / Cruise#4/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,189,980**
29	Campaign#3 / Cruise#5/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**

30	Campaign#3 / Cruise#6/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,009,680**
31	Campaign#3 / Cruise#7/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$829,380**
32	Campaign#3 / Cruise#8/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,009,680**
33	Campaign#3/ Cruise#9/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling / utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**
34	Campaign#3 / Cruise#10/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,189,980**
35	Campaign#3 / Cruise#11/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling / utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**
36	Campaign#3 / Cruise#12/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance / utilise harvesting tech testing vessel for engineering/environmental harvest technology tests and data recovery, additional Environmental baseline data collection		15 days	$1,009,680**
37	Campaign#4 / Cruise#1/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$829,380**

38	Campaign#4 / Cruise#2/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests and data recovery, additional Environmental baseline data collection		15 days	$1,009,680**
39	Campaign#4/ Cruise#3/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**
40	Campaign#4 / Cruise#4/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection / utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,189,980**
41	Campaign#4 / Cruise#5/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**
42	Campaign#4/ Cruise#6/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,009,680**
43	Campaign#4 / Cruise#7/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$829,380**
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45	Campaign#4 / Cruise#9/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**

46	Campaign#4 / Cruise#10/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,189,980**
47	Campaign#4 / Cruise#11/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**
48	Campaign#4 / Cruise#12/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,009,680**
49	Campaign#5/ Cruise#1/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$829,380**
50	Campaign#5 / Cruise#2/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection / utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,009,680**
51	Campaign#5/ Cruise#3/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**
52	Campaign#5 / Cruise#4/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,189,980**
53	Campaign#5 / Cruise#5/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**

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59	Campaign#5 / Cruise#11/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	Box Coring and possibly bulk sampling/ utilise harvesting tech testing vessel for engineering/environmental harvest technology tests	15-25 box cores, bulk sample material if required Engineering/environmental harvest technology tests	15 days	$649,080**
60	Campaign#5 / Cruise#12/ Harvesting Tech Testing	Small vessel (~40m)/ Harvesting Tech Testing Vessel*	High resolution mapping and sampling with AUV and/or ROV visual and biota sampling, ROV geotechnical sampling and measurements, Moorings, mini-Landers maintenance and data recovery, additional Environmental baseline data collection / utilise harvesting tech testing vessel for engineering/environmental harvest technology tests		15 days	$1,009,680**
			Campaign cruise days		945 days	$64,908,000**

* Pre-existing vessel may be used for Harvesting Tech Testing pending the vessel's capabilities and data required.
** Harvesting tech testing budget not included (to be determined)

CIC Limited's Environmental Management Programme for Exploration Licence EL1 (CIC066)

As of January 25, 2022

"Responsible Exploration of Seabed Resources of the Cook Islands"

APPROVAL(S)

Name & Title	Signature	Date
Gregory P Stemm Managing Director CIC Ltd		January 25, 2022

AUTHOR(S)

Name & Title	Signature	Date
Adam Stemm COO CIC Ltd		November 8, 2021
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Charles Morgan Chief Environmental Scientist CIC Ltd		November 8, 2021

REVIEWER(S)

Name & Title	Signature	Date
Elizabeth Shows Corporate Communications Manager Odyssey Marine Exploration		January 25, 2022
John Longley COO Odyssey Marine Exploration		January 25, 2022

CHANGE HISTORY

Date	Change Req No.	Revision	Description of Change
November 8, 2021	N/A	0	Issued
January 5, 2022	N/A	1	Added a section on Scoping, clarified eDNA information, added to marine mammal observation protocols, minor edits to tables
January 25, 2022	N/A	2	Conform EMP to Exploration Regulations Schedule 3

Table of Contents

1. Environmental Management Programme Introduction

CIC LIMITED (CIC) (Registration #C3864) is a privately held Cook Islands' company formed to pursue seabed mineral exploration opportunities in the Cook Islands. CIC's Environmental Management Programme (EMP) (CIC066) draws upon the collective marine and terrestrial mineral exploration and resource management experience of the CIC Consortium (the 'Consortium'), a partnership of individuals, organisations and investors led by CIC that formed an alliance with the purpose of exploring and harvesting (if research indicates that harvesting can be accomplished with no serious harm to the environment) polymetallic (also known as manganese or ferromanganese) nodules within the Cook Islands' Exclusive Economic Zone (EEZ).

This EMP is subject to the requirements of the Cook Islands Environment Act 2003 and its associated regulations and applicable guidelines. CIC recognises that the Cook Islands' National Environment Service (NES) has the authority to require either consent or a project permit for any activities. In addition, under section 20 of the Environment Act 2003, the National Environment Council (NEC) is convened to act as permitting authority for any part of the Cook Islands other than Rarotonga or an Outer Island. Thus, CIC will work collaboratively with both the NES and the NEC to satisfy all requirements and obtain all environmental approvals necessary before engaging in any exploration activities.

2. Environmental Management Programme (EMP)

CIC will assist the Cook Islands to develop their marine mineral resources with a clearly understood responsibility for environmental stewardship. The environmental aspects of this project will remain prioritised at the forefront of each step of the strategic and tactical decision-making processes of the project.

2.1 Objectives of the EMP

The key objectives of CIC environmental data acquisition are to:

- Conduct environmental baseline studies in order to characterise the existing environment at the seafloor, underlying sediment, and overlying water column;
- Enable the development of an Environmental Impact Assessment (EIA) that will define the expected environmental effects from a nodule harvesting operation which will allow a determination to be made as to whether harvesting can be accomplished with no serious harm to the environment;
- Evaluate and develop strategies to prevent where possible, or otherwise minimise, impacts to the environment from a nodule harvesting operation;
- Allow the development of a robust Environmental Management Plan (EMP) and Monitoring Plan for the Cook Islands in the event the Cook Islands' Government decides to allow a nodule harvesting operation;
- Conduct ongoing environmental monitoring to ensure that no serious harm is caused to the marine environment from activities during exploration;
- Address the critical environmental points that Gerald McCormack has articulated in his publication *Cook Islands Seabed Minerals: A Precautionary Approach to Mining*, including *inter alia*:
    - Application of the precautionary approach at every stage of exploration;
    - Comparing the seafloor environment (biomass, biodiversity, seafloor morphology, ecosystem, physical properties and much more) within the license area, EEZ, South Pacific region, and other regions of the world;
    - Plume management, including determination of relevant sediment properties, long-term measurement of benthic current velocities and modelling of plume dispersion;

- Constraint of water and sediments to their respective stratified layers;
- Extensive regional mapping of species distributions throughout the licenced area;
- Representative Biodiversity and Protected Areas established where no impacts from exploration or harvesting activities will ever occur.

2.2 Methodology Used

The International Seabed Authority (ISA), the governing body for the mineral resources of the international seabed area, has established seven recommended avenues for the baseline studies and EIAs: Physical Oceanography, Geology, Chemical Oceanography, Sediment Properties, Biological Communities, Bioturbation, and Fluxes to Sediment.

The protocols have thus far been developed through a transparent process and multi-stakeholder approach, and the ISA is setting a world-recognised standard for deep-water EIA requirements.

To ensure that CIC takes an approach consistent with leading global standards, CIC, under the supervision of the Environmental Chief Scientist and Qualified Person (QP) Dr. Morgan and the CIC Technical Advisory Board (TAB), will take into consideration the most up-to-date template that the ISA has provided for baseline studies and EIA development.

A summary of the ISA recommended baseline studies and their objectives is presented in Table 1. Of these, Physical Oceanography, Chemical Oceanography, Biological Communities, and Sedimentation involve long-term field studies with one to three years of data collection. CIC will make every effort to collaborate with other sea users who may be interested in forming partnerships to complete, for example, the seasonal and/or regional studies. More details about each of these studies and the methodologies to be used can be found in *Attachment: 3a. List of Environmental Baseline Studies and Approaches (CIC068).*

Table 1. Summary of ISA Recommended Environmental Baseline Studies

Study Area	Details
Physical Oceanography	Aim: Estimate extent and duration of plumes that may be formed during harvesting full-scale operations and estimate magnitude and direction of predominant surface currents to provide operational constraints for commercial operations and to permit estimation of the dispersion of potential accidental spills from surface vessels. Determine baseline noise levels at the surface, at the seafloor, and within the deep sound channel (~700 – 1,500 m depths) Study requirements: Study of currents, temperature, and turbidity required. Methods and Equipment: Installation of moorings containing current metres, ADCPs to profile the entire water column, sediment traps, CTDs and other equipment, followed by hydrodynamic (plume) modelling. Deploy untethered lander packages to measure benthic currents, oxygen levels, and other variables over time.

Geology	Aim: Determine heterogeneity of the environment and assist with placement of suitable sampling locations; collect information on the potential for heavy metal and trace element release during mineral harvesting operations. Study requirements: Map the seabed and sample the seabed geology. Methods and Equipment: High-resolution bathymetry, box corers/multiple corers, and laboratory analysis.
Chemical Oceanography	Aim: Understand baseline water chemistry conditions in the water column and within sediment pore water; understand the potential impact of metal release during the harvesting process. Study requirements: Water column: multiple CTD profiles and water sampling efforts over two years, capturing at least two summer/winter seasons (seasonal studies); sample and analyse pore waters. Methods and Equipment: multiple corers, mega corers, laboratory analysis.
Sediment Properties	Aim: To study baseline sediment conditions and predict the behaviour of mineral harvesting on sediment composition to determine the basic properties of the sediment, including measurements of soil mechanics and composition to adequately characterise the surficial sediment deposits which are the potential source of deep-water plume. Study requirements: Acquire adequate samples to determine uniformity in the Exploration Licence area of particle size distribution and various geotechnical parameters. Methods and Equipment: Box corers, multiple corers, and laboratory analysis.
Biological Communities	Aim: Evaluate the effects of activities on biota. Studies to include microfauna, meiofauna, macrofauna, megafauna, demersal scavengers, nodule fauna, video/photo surveys, pelagic community assessment (water column and near bottom), baseline tissue metal concentrations, marine biota observations, temporal variation studies, regional distribution/genetic connectivity studies, etc. Study requirements: Characterise observed and collected flora and fauna and report on species diversity. Measure benthic community respiration rates. Methods and Equipment: Photographic/video transects and biota sampling, use of multiple corers, box corers, hydrophones, moored time lapse cameras (TLC), plankton nets, ROV, *in situ* respirometer and other methods, laboratory analysis.

Bioturbation	Aim: Gather data on the mixing of sediments by organisms and to predict the impact of harvesting activities on biological communities. Study requirements: Determine oxygen profile and flux, directly or by analyses of pore fluids, near and within seabed sediments. Methods and Equipment: Multiple cores, chemistry e.g., ^{210}Pb analysis in core samples.
Fluxes to Sediment (Sedimentation)	Aim: To gather time series data on the flux and composition of materials from the upper water column to the deep sea. To understand baseline sedimentation rates and to evaluate the effects of mineral harvesting activities (especially plumes) on these rates. Study requirements: Spatially distributed sediment traps in terms of water depth and surface area at sites within the region, with site determination approved by Cook Islands government representatives. Methods and Equipment: Moored time lapse sediment traps installed for a minimum of 6 months, and laboratory analysis.

2.3 Why Methodology is Appropriate

Over the past 40 plus years, there has been a significant body of information obtained on polymetallic nodules and the environmental impacts of recovering nodules from the seafloor. A summary of the key studies is provided in *Attachment: 3b*. *Key Environmental Impact Assessment Work for Nodule Provinces in the Deep Sea (CIC069).* The work conducted to date highlights the complexity associated with conducting research in the deep sea and supplies valuable guidance for future exploration activities.

The methodology described in *Attachment: 3a. List of Environmental Baseline Studies and Approaches (CIC002)* has been developed through a transparent process and multi-stakeholder approach, which included scientific experts, regulators, sponsoring states, contractors (developers), and NGOs (non-governmental organisations), among others.

2.4 How Proposed Work Relates to Advancement of Knowledge for Recovery Operations and Ecological Setting

By conducting thorough baseline studies of the seafloor, water column and surface waters at various locations throughout the proposed CBGs, CIC will provide a detailed understanding of the environment and an in-depth assessment of the impacts that would be expected from nodule harvesting. This will allow CIC, along with the Cook Islands' Government, the NES, the NEC, and other key stakeholders to develop strategies to help avoid or otherwise minimise impacts.

Detailed baseline studies will be conducted at the proposed mineral harvesting sites (once they have been identified through exploration work) and at other sites in order to establish a reference area, or areas, as needed, separated from the impact of nodule harvesting.

The purpose of these reference areas is two-fold: (1) to study natural variability in harvesting areas with no extraction activity and (2) to ensure the protection of habitats and biota representative of what may be lost or impacted due to harvesting.

CIC is partnering with world-leading scientists to review and develop environmental plans, conduct baseline studies, and progress towards an EIA, including developing and testing methods to mitigate and minimise environmental impacts. Collaborating academic research scientists will be free to publish their findings, ensuring that CIC is transparent and is prioritising the contribution to the body of knowledge of environmental studies, biodiversity and ocean processes. Additionally, CIC will collaborate with appropriate Cook Islands' Government ministries and other stakeholders to interpret and share with the public environmental data acquired during exploration.

2.5 Scoping

Scoping is the process used to determine the appropriate contents of an EIA. Public participation is an integral part of scoping, specifically public interest groups and indigenous communities that have concerns about possible impacts to environmental, social, or economic resources. This Scoping Report considers the potential issues relating to the proposal and discusses which issues are likely to be significant. It then outlines how the EIA will deal with each of the issues raised, providing the scope for further desk-based study and site surveys as required.

When granted an exploration licence, CIC will commission an initial Gap Analysis. This is a purely technical assessment that considers the planned environmental baseline surveys within the context of Harvesting Technology Testing, which would be concurrently developed by CIC to describe a proposed system test to be conducted during the five-year exploration licence period or shortly thereafter. The results of the Gap Analysis will be incorporated into an updated Environmental Baseline Survey Plan and be used also in the drafting of a Test Monitoring Plan that will be designed to document the environmental impacts caused by the system test.

The Scoping process will include close collaboration with and guidance from SBMA to:

1. Distribute the Harvesting Technology Test Plan, the Baseline Survey Plan, and the Test Monitoring Plan to stakeholders and public groups; and
2. Publicise and hold Scoping Hearings to accept written submissions and oral comments from stakeholders and the public at large; and
3. Complete and submit to SBMA a draft Scoping Report that includes the methodology used in compiling and processing the submissions and comments, and a summary of the issues raised with respect to the relevant environmental, social, and economic resources; and
4. Finalise the Scoping Report based on SBMA review and make it available to the public.

CIC will update and modify the Harvesting Technology Testing, Baseline Survey, and Test Monitoring Plans as appropriate in response to the issues raised in the process and will specify how these issues will be examined in the EIA to be completed for seeking approval of the System Test.

2.6 Environmental Management System

CIC is committed to adopting an environmental management system in accordance with the following principles:

- Complying with the environmental laws and regulations of the Cook Islands Environment Act 2003.
- Developing an ecosystem-based environmental management framework that centralizes our environmental knowledge base, identifies project environmental risks, prioritizes environmental studies, and operationalizes this policy in Environmental Impact Assessments.
- Respecting traditional knowledge and customary practices of environmental management and incorporating these cultural environmental aspects into our environmental management framework.
- Applying the Precautionary Principle where appropriate in our operations.
- Recognizing the significant potential for deep-sea harvesting to contribute to economic development in our areas of operation and the responsibility to adhere to global and jurisdictional Sustainable Development Goals and Policies.
- Developing and nurturing a culture of environmental management across the company and implementing programs of employee awareness, energy and emissions reduction and sustainable supply chains.
- Developing an environmental awareness plan to be communicated to all CIC personnel engaged in the Exploration Work Programme.
- Fostering a culture of corporate environmental stewardship and collaboration among regulators, stakeholders and research partners and installing an adaptive management approach to continually improve environmental performance.
- Applying best available scientific and technological approaches to environmental management.

The environmental management system for vessels that CIC utilizes is the joint responsibility of the COOs of CIC and Odyssey. CIC's Environmental Management System protocols are enforced by the project manager, ship's captain and/or safety officer in conjunction with Corporate Health, Safety and Environmental Policies and Procedures set forth in CIC's Annex 5 - Incident Response and Management Plan (CIC071). Daily Toolbox Talks are held with the team during each shift to ensure, among other topics, that the personnel fully understand the environmental awareness plan and the environment management system.

2.7 Description of the Geology and Topography of the CBGs

Areas targeted for exploration consist of abyssal seafloor of low slope (<~7°) and low sedimentation rate in the Penrhyn Basin, Aitutaki Passage and Southwest Pacific Basins in the Cook Islands' EEZ at an approximate water depth of 5,000 metres. A fine grain size characterises the primarily inorganic sediments on which the polymetallic nodules form. Nodules vary in size but generally average ~4 cm diameter.

Historical data suggest nodule abundances on the order of 30 kg/m^2 may be encountered, with general chemistry of select analytes as follows:

Analytes	% by weight
Cobalt (Co)	~0.45
Nickel (Ni)	~0.33
Copper (Cu)	~0.19
Manganese (Mn)	~15.6
Rare Earth Elements and Yttrium (REE+Y)	~0.16

2.8 CIC Technical Assessment of Cook Islands Nodule Resource

CIC has not conducted a site visit or undertaken initial prospecting in the CBGs. However, desktop prospectivity analysis and review of available results from past exploration campaigns undertaken by external organisations have led to the determination of the CBG areas of interest. These CBG areas offer high prospectivity for hosting commercially viable polymetallic nodule resources.

Oceanographic and geologic survey efforts date back to the mid-1970s, with a guided effort to characterise nodule resources in the Cook Islands conducted between 1985 and 2000 during four offshore cruises organised by the Japan International Cooperation Agency (JICA) and the Pacific Applied Geoscience Commission (SOPAC). Additional reporting and publications produced between 2000 and 2015 provided additional insight on the setting and chemistry of potential resources.

The JICA/SOPAC efforts provided numerous sample points including nodule chemistry, physical characteristics and extrapolated abundance. Additionally, a commissioned geospatial data analysis by the Cook Islands' Government and executed by a contract agency (Kenex) examined historical empirical samples and investigated correlations between multiple variables included geology, volcanogenic feature proximity, seafloor slope, bathymetry, the water depth of the carbonate compensation depth (CCD), sedimentation rate and sediment thickness, and geochemistry to determine prospective areas of the Cook Islands' EEZ for nodule exploration.
The Consortium members supporting CIC have been analysing the nodule resource in the Cook Islands since 2014. This understanding has evolved over that span as new data has emerged. Analysis of available historic survey data supports the conclusion that these deposits are patchy with high abundance areas interspersed with areas with minimal or low abundance of polymetallic nodules.

This conclusion has been supported by the following activities that demonstrates CIC's knowledge of the resource and environmental setting:

1. CIC conducted extensive desktop analyses of the Cook Islands' nodule resource. This includes:
   a. Analysis of the data obtained from four specific cruises organised by JICA and SOPAC.
   b. Consideration of the low slope (<~7°) and low sedimentation rate in the Penrhyn Basin, Aitutaki Passage and Southwest Pacific Basins in the Cook Islands' EEZ at an approximate water depth of more than 4,000 metres which is critical for nodule mineralisation.
   c. Consideration of other data provided by the Seabed Minerals Authority (SBMA) and data published from other research cruises.
2. CIC ran existing sample data through standard geostatistical modeling software.
   a. The primary tool used is cluster analysis, a group of statistical procedures used to separate multivariate environmental variables into distinct groups, or clusters, that share common values. The seabed area examined in the cluster analysis consists of the areas for which satellite derived and transit multibeam data are available and that also have one or more legacy sample stations where nodule abundance (kg/m^2) estimates are available.
   b. A grid of points and associated blocks with 5' X 5' latitude X longitude spacing were created in ArcGIS in the seabed area selected for analysis (not including restricted or reserved blocks). Bathymetry and backscatter values were extracted from the rasters into the study grid point attribute table, and then the grid points lacking complete blocks within the EEZ were eliminated. Values for the other variables used in the analysis were then extracted to the grid points in a similar manner, and the grid attribute table was converted to an Excel table for the cluster analysis. Rows containing missing data for any variable were deleted from the table.
   c. The NCSS Data Analysis statistical software package was used here for the cluster analysis. Medoid Partitioning was used to calculate silhouette width and average distance for each cluster size from two to fifteen. An optimal cluster size of four was selected, based on maximising silhouette width and minimising average distance. The technique of K-means analysis was used to calculate the final cluster compositions and spatial distributions using the entire study grid.
   d. The environmental variables considered for the cluster analysis are: nodule abundance in kg/m^2 from legacy sampling data available, using Empirical Bayesian kriging to each grid point; depth in metres from available satellite derived and transit multibeam data in the study grid; slope in degrees determined by the maximum absolute difference between each depth pixel and the eight adjacent pixels; Bathymetric Position Index (BPI) data sets created through a neighborhood analysis function; and aspect in compass degrees which determines the compass direction that the downhill slope faces for each location.
3. CIC incorporated environmental metrics. Please see *Attachment: 2a. CBGs and Currents Map(CIC067*).
4. CIC performed preliminary sample assaying for accurate elemental composition with an industry recognised laboratory partner.

2.9 General Timing and Offshore Operations Description

Offshore exploration operations will be divided into campaigns. Campaigns consist of either a single cruise or multiple back-to-back cruises with each cruise having a duration of approximately 15 - 45 days, depending on the vessel. During the Exploration Licence period of five years, CIC will conduct multiple campaigns, with the first to commence 90 – 120 days after an Exploration Licence is granted, subject to constraints created by the current COVID-19 pandemic and by the availability of ships.

CIC will use the lessons learned from completed cruises to refine future operations to assure offshore work and research activities are effective and efficient. Some offshore work will take place on a large research vessel, most likely calling on American Samoa for shoreside support, unless it can be determined that this vessel can safely and efficiently use the port of Avarua. Another smaller research vessel will also be used and will be operated from ports in the Cook Islands. It is anticipated that this smaller vessel will primarily be used for periodic monitoring of environmental conditions and other marine scientific research in the licenced area. Whenever possible during the entirety of the Exploration Licence period CIC will preferentially seek services and support from Cook Islands' companies and facilities.

First Term (Years 1 & 2): Multibeam Mapping of CBGs, Box Coring, Dredging, Hi-Resolution Mapping, Environmental Data Collection and Environmental Moorings Deployment

Start:	90 – 120 days following the grant of Exploration Licence
Duration:	Five 30 – 45-day cruises totaling 150-225 days including transit times and port calls utilizing large vessel (Year 1) 15 days per month, year-round utilizing small local vessel (Year 2)
Location / Priorities for Campaign 1:	• All CBGs: Bathymetric mapping; • All CBGs: Intensive focus and comprehensive survey and studies in select areas of the CBGs to complete sufficient mineral and environmental operations to fulfil the objectives. • Surface environmental, sea state, and meteorological observations at all times collected during survey operations.
Offshore Activities:	• Bathymetric mapping of all CBGs. • Box Cores collected in select areas of CBGs per a methodical protocol under direction of project Qualified Person (QP). It is anticipated that between 150 and 300 box cores will be collected in Year 1, with the majority of sampling intervals being 15 NM apart. • Less than 100 tonnes of sample collection in select areas of the CBGs covering ≤0.02 km^2. • Deep-tow mapping of select areas of CBGs in both 200 and 400kHz mode and with backscatter processing. • 5 km x 5 km detailed deep-tow survey of areas for environmental moorings. • ROV visual survey of specific locations for environmental moorings. • Installation of moorings of current meters, ADCPs, sediment traps, CTD (Conductivity, Temperature and Depth) Water Sampling Carousel and other equipment, and hydrodynamic (plume) modelling with ROV. • Photographic/video transects and biota sampling via ROV and additional methods as necessary use of shovels, scoops, nets, push-cores, slurp gun, use of multi-corer and deeper penetration corers, MAPRs (Mini Autonomous Plume Recorders), Niskin water sampling bottles, moored time lapse cameras, plankton nets and other methods, with laboratory analysis. • 15 NM video transects using ROV between selected newly completed box core sample points. • ROV geotechnical measurements and tests performed on the seafloor using ROV tools and manipulators. • Environmental measurements to be made in select areas of CBGs including but not limited to CTD Water Sampling Carousel with oxygen, turbidity, and other sensors, Mini-Landers, and hydrophones.
Onshore Activities:	CIC will initiate the community and sea users outreach programs outlined in this Annex 3 – CIC LTD – Environmental Management Programme (EMP) (CIC066) in the best national interests of Cook Islanders and the environment.

Second Term (Years 3-5): Box Coring, Bulk Sampling, Hi-Resolution Mapping, Environmental Data Collection and Environmental Moorings Maintenance and Recovery

Start:	Years Three through five of the Exploration Licence to be determined after First Term
Duration:	15 days per month, year-round utilizing small local vessel (Years 3-5)
Location / Priorities for Subsequent Campaigns:	• Survey of CBGs • Surface environmental, sea state, and meteorological observations at all times in all areas
Offshore Activities	• Box Cores collected per a methodical protocol under direction of QP. It is anticipated that between 100 and 150 box cores will be collected in each year, with the majority of sampling intervals being 15 NM apart. • 100 - 200 tonnes of sample collection (dependent on results from Term 1 and requirements for extraction and processing requirements). • Deep-tow and/or AUV (Autonomous Underwater Vehicle) mapping of select areas of CBGs in both 200 and 400kHz mode and with backscatter processing. • 5 km x 5 km detailed deep-tow and/or AUV survey of areas for any additional environmental moorings deemed necessary. • ROV and/or AUV visual survey of specific locations for environmental moorings. • Installation of moorings of current meters, ADCPs, sediment traps, CTDs and other equipment, and hydrodynamic (plume) modeling. • Photographic/video transects with ROV and/or AUV and biota sampling via ROV, and additional methods as necessary including use of shovels, scoops, nets, push-cores, slurp gun, use of multi-corer and deeper penetration corers, MAPRs (Mini Autonomous Plume Recorders), Niskin water sampling bottles, moored time lapse cameras, plankton nets and other methods, with laboratory analysis. • 15 NM video transects using ROV and/or AUV between selected newly completed box core sample points. • ROV geotechnical measurements and tests performed on the seafloor using ROV tools and manipulators including a Mini Cone Penetrometer. • Environmental measurements to be made in select areas of CBGs including but not limited to CTD Water Sampling Carousel with oxygen, turbidity, and other sensors, Mini-Landers, hydrophones. • Extraction Component Testing. • Geo-technical activities performed in this section will provide critical information for extraction system design
Onshore Activities	On-going community and sea users outreach programs outlined in this Annex 3 – CIC LTD – Environmental Management Programme (EMP) (CIC066) in the best national interests of Cook Islanders and the environment.

2.10 General technical approach

Table 2. The general technical approach for survey, sampling and assessment.

Exploration Technique	Purpose	Description
Hull-Mounted Multibeam Survey	General Bathymetry / Mapping of Large Areas	Geophysical instruments are mounted directly on the ship's hull or pole-mounted on the ship's side. The most common technique used is the multibeam sonar system which emits an array of sound in a fan-like pattern and then measures the time taken for the sound waves to reflect off the sea floor which can then be used to calculate the seafloor depth. By making many measurements at different places a detailed map of the seafloor depth (bathymetry) can be created. These systems emit only low power sound waves and are non-intrusive.
Sound Velocity Profilers (SVPs)	For general 12kHz MBES data collection	Accurate full water column sound velocity profiles are needed every 24 hours to perform real time beam steering and location calculations for shipborne multibeam. These activities are non-intrusive.
Towed Multibeam Survey	Hi-resolution Bathymetry / Mapping of specific target areas	Deep-tow methods employ an underwater sled that is tethered to the ship by a long (fibre-optic) cable. The sled is towed 60-120 metres above the seafloor and operates at depths up to 6,000 metres. Deep-tow system is a Dual Head 7125MB 200/400kHz mapping system. It is used for high-resolution bathymetry mapping, which will allow CIC to map bottom features to 1-5 m grid resolution and provide for backscatter interpretation of nodule presence and abundance. The sonars emit low power sound waves, which are reflected off the seafloor and recorded by receivers on the Deep Tow. These activities are non-intrusive.
AUV (Autonomous Underwater Vehicle)	Hi-resolution Acoustic / Video Mapping of specific target areas	5,000 m rated position tracked untethered vehicle which can survey pre-programmed track lines at low altitudes (5-25 m) above the seafloor. Payloads may include: Reson 7125 400kHz multibeam, Edgetech 120/410Khz sidescan sonar, Edgetech sub-bottom profiler, high resolution 1936 X 1456 pixels optical camera, and other sensors. The sonars emit low power sound waves, which are reflected off the seafloor and recorded by receivers on the Deep Tow. These activities are non-intrusive.
ROV Survey and Sampling Tools	Visual survey and observation (biological communities, Seafloor and near-bottom Megafauna), precision survey data collection, geological and environmental sampling	The 6000 m rated ROV is lowered to the seafloor and surveys are completed and discrete samples can be taken using a suite of tools that it carries. These tools include hydraulic manipulator arms for collecting samples, video and still cameras, and a range of specialised, close-proximity sensing tools for both seafloor and water column survey. The ROV is powered by electricity and is hydraulically controlled from the support ship using an umbilical. Additionally, it is anticipated a Cone Penetrometer for collecting geotechnical data will be deployed via ROV.

Gravity/Box Coring Equipment	Resource estimation, biological sampling, environmental and geotechnical measurements	Box-coring will be undertaken to collect samples for mineral resource estimation, to extract pore water samples to determine the basic chemistry of the sediments, and to collect biological samples for environmental baseline measurement and to collect geotechnical data.
	Sediment coring to determine depth of the oxic/anoxic redox boundary	Gravity corers will be used to sample the upper several metres of sediment to analyse pore fluids to locate the depth of the redox boundaries that will be essential in determining whether the release of toxic metals will be an issue if harvesting operations are permitted.
Bulk Sampling Equipment	Proof of Concept, metallurgical testing	Gathers sufficient nodule sample material to complete initial metallurgical studies.
Vane Shear and Cone Penetration Testing	Measure sub-seabed soil properties (bearing capacity)	To verify that the seabed has sufficient bearing capacity for the mining collector. The seabed properties will be measured in various locations over the area to verify the variability of the properties. Testing is envisaged to be done by a gravity CPT (winch deployed) and a mini-CPT deployed from an ROV.
Water Sampling Carousel / Rosette, CTD (Conductivity, Temperature and Depth)	To understand baseline water chemistry conditions in the water column overlying the site targeted for nodule extraction, capturing at least two summer/winter seasons (seasonal studies).	Niskin sampling bottles are arranged in a rosette formation around other sensors (e.g., CTD). The instrument package is tethered to the ship by a long cable and is used to obtain water column samples and profiles in a simple vertical down and up cast. Each bottle can be triggered individually to enable sampling from various locations throughout the water column. A CTD, which is commonly attached to the water sampling carousel, provides profiles of chemical and physical parameters through the entire water column by detecting its conductivity and temperature (which in turn relates to concentration of salt and other inorganic compounds in seawater). By analysing these parameters, inferences about the occurrence of certain biological processes can be made. The rosette commonly houses a variety of sensors, including most importantly dissolved oxygen, turbidity, as well as other sensors.
Deep-Ocean Moorings	To understand the currents around the extraction site over a 12 to 24-month period (depending on the mooring). Study enables modelling the extent and duration of plumes that may be formed during full-scale operations.	Moorings will be anchored to the seafloor and will include instrumentation such as single point current metres, ADCPs, sediment traps, CTDs, transmissometers, and other instruments. It is currently envisaged that three moorings would be installed around the primary site of interest for commercial operations. Moorings will be of multiple lengths, and most will focus on bottom-water currents, with some envisaged to cover the entire water column below the mixed layer. Moorings will be retrieved on a ~6 to 12-month basis for data download, equipment maintenance and mooring reinstallation. Following data acquisition, hydrodynamic modelling of plume extent and duration will be performed.

Plankton Nets, Fishing Instruments	To understand baseline plankton conditions within the water column, including baseline metal concentrations. To understand baseline fish populations within the water column and near-bottom (in the benthic boundary layer) that may be impacted by operations (e.g., the operational and discharge plumes).	Nylon mesh net is deployed from winch to collect either vertical or horizontal samples of plankton. Allows for plankton to be analysed both quantitatively and qualitatively. Pelagic monitoring moorings will be deployed opportunistically and will be comprised of a buoyed camera unit to monitor a separate baited/weighted line suspended in the water column at several levels to obtain representative data on pelagic communities.
Marine Biota Observations	To record sightings of marine mammals, other near-surface large biota (such as turtles and fish schools) and bird aggregations, identifying the relevant species and behaviours where possible.	Details to be recorded in transit to and from areas of exploration and on passage between stations. Temporal variability should be assessed.
Moored Hydrophone	To determine the baseline noise levels and estimate impact of mineral harvesting activities.	Hydrophones will be incorporated into the moorings or landers used for physical oceanography studies, or as stand-alone moorings.
Moored (and some Baited) Time Lapse Cameras (TLC)	To understand baseline biological conditions at and immediately above the seafloor and predict the impact of mineral harvesting on biological communities.	Recording device is set up within suitable distance of TLC anchored bait to observe behaviour of demersal scavengers. Likely to be deployed during ROV operations. Time Lapse Cameras may also be implemented onto the Mini-Landers.

Benthic Mini-Landers (MLs)	Continuously monitor physical transport and biogeochemical processes that combine to control distributions of both suspended particulates and dissolved chemical parameters within the benthic boundary layer (BBL).	Time-series measurements of current speed and direction, turbidity, dissolved oxygen (DO), temperature and other relevant parameters from 1 to 25 metres above the seafloor.
Genetic Sequencing and Metabarcoding	Use trace DNA to identify organisms that have come in contact with a defined area.	With the advent of modern, ultra-high throughput sequencing platforms, conducting sequencing and metabarcoding surveys with multiple DNA markers will enhance the breadth of biodiversity coverage, enabling comprehensive, rapid bioassessment of all the organisms in a sample.

2.11 Technical Team

CIC's associate Odyssey Marine Exploration Inc. (Odyssey) is CIC's exclusive provider of marine operations services for the Cook Islands' Exploration Licence EL1. The Odyssey Operations Team and associated partners consist of leading academic researchers, project managers, ROV pilots, surveyors, geophysicists, subsea engineers, geologists and environmental scientists from all corners of the globe. The team works alongside and in alignment with the CIC Technical Advisory Board (TAB).

Some of the most qualified individuals and experienced professionals in the offshore industry collaborate on Odyssey projects and have done so as a team for over 15 years. From operating, modifying, and maintaining each element of Odyssey's subsea equipment to analysing results and developing new tools, this dedicated team works on a results-driven basis, rather than a group of independent contractors pulled together for a single project. This team approach has resulted in successful outcomes in scores of operations throughout the world that have resulted in many deep ocean record-setting accomplishments and results that have not been achieved by any other company in the world.

Under the direction of Dr. Adrian Glover, the Natural History Museum of London will provide full at-sea sample processing service for box core samples including megafauna and macrofauna from sediments and nodule samples collected from box cores, multi/mega core samples, and baited-trap collections of scavenger species. This will include macrofauna and megafauna characterization at species levels, based on taxonomic examinations and DNA sequencing of specimens collected. Metabarcoding (eDNA analysis) of the sediment samples collected will also be conducted to augment the specimen community characterization work.

Under the direction of Professor Andrew Sweetman of Heriot-Watt University of Edinburgh, Scotland, sediment community oxygen consumption, CO_2 production, and nutrient fluxes will be quantified using a benthic chamber lander system equipped with 3 or 4 benthic chambers.

Pulse-chase experiments using isotopically enriched substrates will be used to quantify the metabolic activities of different sediment-dwelling organisms. DNA/RNA stable isotope probing analysis will be carried out to determine the identities of the active microbes fixing inorganic C and organic C in the sediment samples. Microbial metabarcoding will be conducted on selected sediment samples to augment the characterization of microbial communities.

2.12 Meeting Good Industry Practise Over the Extent of the Exploration Project

The full extent of the seabed for which mineral exploration rights are granted will be subject to CIC's exploration activities. Exploration comprised of sample sites from the entire geographic extent of the CBGs will be necessary to quantify the extent and character of any present mineral resources and to develop environmental baseline data necessary for the generation of an environmental impact report.

The proposed Exploration Work Programme will be conducted in accordance with standard industry practises. Exploration methodologies addressed above detail the methods and equipment considered for exploration and environmental baseline studies. These methods and equipment have been utilised successfully in the past by the Licence Holder's Associates: Odyssey and Boskalis and CIC's other supporting organisations for both seabed mineral exploration and environmental data acquisition.

The methods and equipment outlined are those commonly used for exploration in the international seabed area administered by the International Seabed Authority (ISA), including the Clarion-Clipperton Zone (CCZ) Exploration Areas for Polymetallic Nodules. These methods are regarded as good practise within the industry and by industry experts.

Exploration, analysis and assessment activities will be overseen by experienced industry scientists and professionals. The mineral resource assessment effort is being supervised by Dr. Morgan to ensure that the assessment is accurate and compliant with mining industry standards (JORC or NI 43-101).

Dr. Morgan has worked on various private and government-sponsored seabed mineral resource assessment efforts for more than 40 years, including extensive studies of the polymetallic nodule deposits in the Clarion-Clipperton region of the North-eastern Tropical Pacific and a formal resource assessment effort, working with the East-West Center of Hawaii, for the nodule deposits in the Cook Islands' EEZ. He is a Registered Member of the Society of Mining, Metallurgy, and Exploration (SME, #4041112) and is a Qualified Person (QP) for the assessment of deep seabed polymetallic nodule resources/reserves.

2.13 Minimum Expenditure (Investment) for Stages of the Project

The following table provides estimated projected annual investment for CIC's Exploration Work Programme, which encompasses the EMP in its entirety.

Table for Exploration License Application Section 14:		
ESTIMATE of Expenditures US$	**Year 1**	**Subsequent 12 Month Periods**
Campaign Operations: LARGE SHIP, Research, Laboratory, Reporting, Community Outreach	$15,000,000	$ -
Campaign Operations: SMALL SHIP, Research, Laboratory, Reporting, Community Outreach	$ -	$ 7,500,000
CIC Local Overhead Expenses (CI employees, offices, professional serves, etc..)	$ 900,000	$ 900,000
Total	$15,900,000	$ 8,400,000
ESTIMATE of Expenditures NZ$	**Year 1**	**Subsequent 12 Month Periods**
Campaign Operations: LARGE SHIP, Research, Laboratory, Reporting, Community Outreach	$21,252,479	$ -
Campaign Operations: SMALL SHIP, Research, Laboratory, Reporting, Community Outreach		$ 10,626,240
CIC Local Overhead Expenses (CI employees, offices, professional serves, etc..)	$ 1,275,149	$ 1,275,149
Total	$22,527,628	$ 11,901,388
1.4168 conversion rate.		

The costs and activities stated in the table above are only approximations based on previous experience and analogous exploration work programmes. These are likely to change as both the proposed Exploration Work Programme and the EMP are finalised and subject to the ongoing adaptive management protocols and recommendations of the Technical Advisory Board and QP.

Every effort will be made to invest via Cook Islands' businesses during the project.

2.14 Potential environmental impacts and proposed mitigation

The techniques used for mineral and environmental exploration are the same as those used by international marine scientific research organisations and most activities are low or very low impact. Many of these proposed methods, the relevant environmental considerations, the potential risks (including potential sea user interactions), and the proposed mitigation thereof, are summarised below:

Table 3. Potential Environmental Impacts and Proposed Mitigation

Study / Method	Environmental Impact of normal operations	Potential Risks including Potential Sea User Interactions	Proposed Mitigation
Vessel Operations	Standard vessel operations (low impact)	None in addition to vessel operations. Potential interactions with other sea users (e.g., fisheries) during transits.	Ensure relevant local and international regulations are met or exceeded (e.g., MARPOL). Early and regular engagement with other sea users. Standard communications with other vessels during operations.
Hull-Mounted Bathymetry Survey	Negligible. No physical contact made with the seafloor. Sound levels are not of a frequency or intensity high enough to cause serious harm or physical damage to marine biota.	See Vessel Operations	See Vessel Operations
Bulk Sampling	Low to Medium, depending on sampling equipment tow length. Impact to seafloor is typically 2 m wide by 10s to 100s m long. Not expected to impact more than 10,000 m^2.	Winch/wire failure resulting in equipment loss to the environment (small impact). Potential accidental spillage of sample contents into water column upon retrieval.	Learn from other operators in terms of winch and wire type and speed of deployment, use marine scientific research standard sampling procedures.
Opportunistic current profiles, and other casts (e.g., CTD, SVP) and water sampling using carousel / rosette	Negligible, no impact with seafloor, short term presence of wire/instrumentation in the water column.	See Vessel Operations	N/A

High Resolution Bathymetry Mapping (AUV/Deep Tow)	Negligible. No physical contact made with the seafloor. Sound levels that are not of a frequency or intensity high enough to cause physical damage to marine biota.	Accidental collision with the seafloor, disturbing the seafloor at the point of impact. May result in equipment loss.	Instrumentation equipped with tracking beacons.
High Resolution Acoustic and Video Mapping, sampling and geotechnical measurements	Negligible impact from high resolution acoustic and video mapping. Low impact from both sampling and geotechnical measurements. Impact on seafloor for both will likely be less than $1m^3$ per sample site.	Accidental collision with the seafloor, disturbing the seafloor at the point of impact.	Instrumentation equipped with tracking beacons.
Multi-Corer	Varies depending on how many corers, but the diameter of the base of a mega-corer (twelve core tubes) is ~2.8 m. Very small impact, restricted to area where sample is taken.	Winch/wire failure resulting in equipment loss to the environment (small impact).	Learn from other operators in terms of winch and wire type and speed of deployment, use standard procedures.
Box Corer	Maximum area of 0.75 m x 0.75 m with 0.60 m depth penetration per sample if largest known box corer is utilised. Minimal impact restricted to an area where the sample is taken.	Winch/wire failure resulting in equipment loss to the seabed (small impact).	Learn from other operators in terms of winch and wire/rope type and speed of deployment, use standard procedures.
Moored Time Lapse Camera (TLC)	Minimal, confined to area where TLC anchor has contact with seafloor, estimated to be less than 2 m x 2 m.	Accidental mooring release/floating to the surface.	Redundant release systems. Moorings equipped with tracking beacons which trigger upon surfacing.
Plankton Nets / Fishing Gear	Negligible, no impact with seafloor, short term presence of sampling devices in the water column.	See Vessel Operations.	N/A
Marine Biota and Bird Observations	None	See Vessel Operations.	N/A

Mini-Landers (long term deployments)	Negligible impact – equivalent to size of lander (~1 m x 1 m). Short term (≤1 year) presence of sampling devices on the seabed.	Accidental ballast release/floating to the surface.	Redundant release systems. Landers equipped with tracking beacons which trigger upon surfacing.
Moorings (short and long, long term deployments)	Minimal, confined to area where anchor has contact with seafloor, estimated to be less than 2 m x 2 m. Short- and long-term presence of sampling devices in the water column.	Accidental mooring release/floating to the surface.	Redundant release systems. Moorings equipped with tracking beacons which trigger upon surfacing.

Current plans provide that no single exploration activity which disturbs the seabed will impact an area of the seafloor greater than 10,000 m^2. Should such an activity become required pursuant to the advice of the TAB, a project permit application will be submitted to the Cook Islands' National Environment Service (NES) and the National Environment Council (NEC). Any activity requiring consent, or a project permit, will only take place with approval by both the NES and the NEC. Prior to commencement of offshore operations, CIC's TAB will submit to the SBMA a detailed exploration plan outlining the work to be accomplished and the equipment to be utilised. As advised by the SBMA, collaboration with both the NES and the NEC, and other stakeholders, will take place to ensure that CIC is adequately addressing any requirements or concerns pertaining to activities planned for the exploration work.

2.15 Exploration Objectives

The first exploration objective is to identify and map mineral resources in order to determine whether it is economically feasible to justify commercial harvesting. For this purpose, CIC will use the protocols and general guidelines of either the Australasian Joint Ore Reserves Committee (JORC)[1] or the Canadian Institute of Mining, Metallurgy and Petroleum (CIM). The CIM guidelines are defined in the Canadian National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* (NI 43-101).[2]

The second, and most important, exploration objective is to obtain sufficient environmental data to permit the completion of a detailed Environmental Assessment to determine whether seabed mineral harvesting can be accomplished without serious harm to the environment and, if it is determined harvesting can be conducted, development of a comprehensive and effective EMP satisfying all requirements of the Environment Act 2003, and its associated regulations and applicable guidelines.

The third exploration objective is to recover sufficient samples of polymetallic nodules and sediment to support metallurgical processing development and to provide additional environmental baseline information.

[1] The standards for JORC can be viewed at the following website http://www.jorc.org/

[2] The CIM Definition Standards can be viewed on the CIM website at www.cim.org

The fourth exploration objective is to complete the necessary geotechnical engineering testing on the seafloor and to collect samples from the seafloor to support development of a nodule harvesting system that can reliably, and with minimal environmental impact, meet the production goals required for a feasible nodule harvesting program from the seabed within the Cook Islands' EEZ.

If approved, the fifth exploration objective would be testing the harvesting system, which would provide valuable data that will in turn contribute to CIC's comprehensive EIA. *In situ* data collected on plume dispersion, benthic impact, light emission, the lift system as it relates to seawater isolation and many other critical variables would be measured at a level of accuracy that can best be accomplished during a harvesting technology testing phase. Gathering this data is one way that CIC would incorporate the precautionary approach.

Discoveries made during harvesting technology testing would also have the benefit of shaping a clear understanding of how a full-scale harvesting operation would work in the Cook Islands. CIC recognises that Environmental Project Permits will be necessary from both the Cook Islands National Environment Service (NES) and the National Environment Council (NEC) prior to planning any harvesting technology testing.

Additionally, harvesting technology testing is an opportunity for the Cook Islands to realise a revenue source prior to the conclusion of the five-year Exploration Licence, taking into account that it would be dependent on the SBMA and other Cook Islands regulatory authorities granting permission for CIC to proceed with this activity.

Mineral processing for harvesting technology testing will take place at a brownfield site and/or an existing facility (outside of the Cook Islands) that is retrofitted for nodule intake. Metal recovery may not be optimised in this scenario, but CIC's goal would be to recover at least the cobalt, nickel, copper and hopefully some rare earth elements (REE) or manganese product to gauge efficacy and economic value for the eventual investment or joint venture in a full-scale processing facility.

2.16 Methodology Used

Analysis of available historic survey data supports the conclusion that these Cook Islands' EEZ nodule deposits are patchy with high abundance areas interspersed with areas of minimal or low abundance of polymetallic nodules. CIC is committed to developing an accurate and credible Resource Assessment for the polymetallic nodule mineral resources within the licenced area. To accomplish this goal, industry-accepted exploration multibeam surveys and sampling methodologies will be employed to help determine the deposit characteristics by using standard, accepted scientific sampling methods (e.g., box core collectors) within the coverage of continuous survey techniques (e.g., photographic and high-resolution acoustic surveys of the seafloor). This will enable the quantitative determination of any existing correlations between acoustic and/or photographic coverage of nodules on the seafloor and the samples collected with box cores.

The first surveys will collect sufficient box core samples within the acoustic and photographic survey areas to provide adequate ground-truth data for establishing and verifying the necessary correlations. Subsequent surveys will refine and modify these correlations and quantitatively map the deposits with sufficient accuracy to delineate a specific area for nodule harvesting, including designation of environmental reserve areas where appropriate.

The box core and bulk sample collections will provide nodule samples for metallurgical analysis and processing development as well as collection and documentation of important specimens of the flora and fauna that inhabit the seafloor.

The photographic surveys will obtain significant environmental data to help characterise the megafauna (>2 cm) communities within the licence area.

As noted above in order to achieve such an Assessment, CIC will follow the guidelines developed by JORC or the Canadian National Instrument 43-101 (NI 43-101), regulatory frameworks designed to ensure that commercial developers of mineral properties comply with uniform procedures and reporting requirements to establish credible and verifiable evaluations of the mineral resources.

2.17 Why Methodology is Appropriate

CIC and its Technical Advisory Board (TAB) have extensive experience working on the development of the polymetallic nodule resources in the Clarion-Clipperton Zone (CCZ) of the North-eastern Pacific Ocean seabed, and in the case of Dr. Hein, Dr. Morgan and Dr. Usui, significant experience with the evaluation and study of Cook Islands' resources. The methodology for the Exploration Programme has been designed in collaboration with the CIC TAB and takes into account the additional information provided by well-developed databases describing the deposits and provided by the Cook Islands' Government.

3. Technical and Environmental Capability

Mr. Greg Stemm, the founder of CIC, has assembled a world-class group of technical experts to guide and manage the technical and environmental aspects of the Cook Islands' Exploration Programme. CIC, the Consortium members, and the experts listed below shall be responsible to ensure that all regulated activities are implemented in accordance with the EMP.

In addition to broad access to the technical capabilities and resources of the Consortium, CIC is underpinned by a Technical Advisory Board which provides guidance, detailed reviews and approves all technical and environmental aspects of the project. The TAB will also scrutinise:

1. JORC or NI 43-101 compliance on resource and reserve estimates.
2. QP review and signoff of geological and environmental reports.
3. CIC and its supporting companies with regards to methodologies, processes and procedures assuring they meet and exceed international industry and environmental standards.

3.1 Technical Advisory Board (TAB)

The TAB will report directly to the executive management of CIC and their work product will be incorporated into all reports to the Cook Islands' Government to help provide assurance that the project is being conducted with the highest possible level of technical integrity that can be achieved.

The TAB recognises that responsible environmental stewardship is placed at the forefront of all project activities and has a remit to reinforce this value.

Currently the members of the TAB include:

- **Dr. James Hein** – 48 years of experience as a marine geologist at USGS, author/co-author of 560+ papers, abstracts and books; associate editor of Marine Geology and Marine Georesources and Geotechnology. Past scientific advisor to the Department of State and was part of their delegation to the International Seabed Authority.
- **Dr. Charles Morgan** – 20 years as an Environmental Planner in Hawaii with a focus on permitting and environmental impact assessments for renewable energy projects and past President of the International Marine Minerals Society and past Chairman of the Underwater Mining Institute.
- **Mr. Robert Goodden** – A deep-sea drilling pioneer and subsea mining consultant with 30+ years at the forefront of new technologies in seabed excavation and drilling with an eye for what works in that environment both practically and commercially.
- **Dr. Mark Luther** – Associate Professor of Physical Oceanography, USF-CM and Director of the Ocean Monitoring and Prediction Lab at USF-CM. Dr. Luther's research involves the combination of real-time ocean observations with numerical models of ocean currents and processes and their application to various problems ranging from maritime safety and security to water quality in estuaries to variability in large-scale ocean circulation and its relation to climate change.
- **Mr. David Weight** – Past President of the Cobalt Institute with involvement in the metals mining industry for 40+ years with 20 years focused on providing technical and commercial services to one of the world's largest refined copper and cobalt producers, Zambia Consolidated Copper Mines Ltd.
- **Dr. John Wiltshire** – Professor Emeritus, University of Hawai'i at Manoa: School of Ocean & Earth Science & Technology. Exploration geologist for Noranda Mines, Chevron and Petro-Canada. Ocean Resources Manager for the State of Hawaii in the Department of Business, Economic Development and Tourism and Director of Hawaii Undersea Research Laboratory (HURL).
- **Mr. Jean-Noel Calon** – Founding Member of Blue Fish and Project Manager for Boulogne Seafood Cluster (Boulogne sur Mer, France), Europe's most important seafood cluster and leading logistics hub, focused on identifying drivers for consistent promotion and monitoring of safe sustainable fishing practices.
- **Dr. Akira Usui** – Professor, Kochi University, Japan. 40 years at the Geological Survey of Japan focused on the field of geology, geochemistry, and mineralogy of marine ferromanganese deposits. Published more than 100 scientific papers and maps jointly with domestic and international colleagues, based on numerous shipboard investigations.
- **Mr. Tom Albanese** – The former Chief Executive Officer of Vedanta Resources plc and Rio Tinto - two of the world's leading mining and natural resource companies. Mr. Albanese brings 40 years of global experience in the mining industry with a career focused on developing innovative modern mining systems, supply chain, corporate management and government relations. He has a history of best practise with stakeholders and environmental management groups. Mr. Albanese is also a recipient of the SW Mining Hall of Fame award in the United States.
- **Mr. Jonathan Gardner** – A Professor of Marine Biology at Victoria University of Wellington. Much of his work is focused on using molecular tools to better understand connectivity in marine species. This research is multi-disciplinary and involves ecologists and physical oceanographers and has a very applied focus to deliver management outcomes in conservation (i.e., coastal and deep-sea marine protected areas), in biodiversity studies and phylogeography, management of bioinvasions, and in aquaculture and fisheries.

In addition to the TAB, CIC, through the members of the Consortium, have direct access to and continual support from the following expert who will be directly and actively involved in the oversight, implementation, and execution of the EMP and CIC's Exploration Work Programme:

Ernie Tapanes, Senior Project Manager, Odyssey Marine Exploration

- 20+ years' offshore project management, sonar imaging and survey expertise, including specialisation in deep-water vehicle and remotely operated vehicle deployment, with significant experience managing operations to depths of 6,000 metres.
- Directs operations aboard Odyssey's research and survey vessels, as well as client and chartered project vessels.
- Led the Odyssey search teams responsible for the *SS Republic*, Balchin's HMS *Victory*, SS *Gairsoppa* (4,700 metres water depths), SS *Central America* and ET409 airliner wreckage search and recovery operations.
- Manages project planning for ExO's Phosphate Resource (phosphate sand) and Aldama (Manganese nodule) mining exploration projects off Mexico.
- Shared managerial duties during Neptune/Dorado Ocean Resources Seabed Mineral research programme throughout South Pacific.
- Led Chatham Rise project, including four separate phosphorite nodule exploration cruises.
- Previously, President for ADC International, where he managed the company's underwater survey operations, in which his team was responsible for locating the USS *Maine*, a 19th-century American warship.
- Bachelor of Computer Science from Carleton University, Ontario, Canada.

3.2 Experience in Deep-Sea Exploration, Oceanographic Data Acquisition and Environmental Operations

Odyssey Marine Exploration (Odyssey)

Odyssey will carry out CIC's Exploration Work Programme in accordance with the EMP. The company has vast experience that is directly applicable to the Cook Islands Nodule Exploration Programme.

For over 20 years, Odyssey has combined tools, team and technology to search for, study and recover a variety of marine seafloor assets and resources. Work has ranged from extensive mineral assessments to robotic archaeological excavations of shipwreck cargoes. These operations were conducted in water depths up to and exceeding those found in the nodule fields of the Cook Islands' EEZ.

The company has conducted search and recovery of base and precious metal cargos from extremely deep shipwrecks. Search operations were performed using a high-resolution dual-head towed multibeam and an ROV with depth rating of 6,000 metres. Once the recovery portion of a project commenced specialised tools including a hydraulic shear, grab, hot stab and deck plate remover were used to surgically cut open steel ship hulls and access cargo. Custom-fabricated robotic tooling was designed and constructed to recover cargos of metal ingots from the interior of the wreckage. During the past decade, Odyssey has managed and completed over 24,000 hours of complex deep ocean ROV operations at depths between 4,500 and 6,000 metres.

Additionally, Odyssey has planned and executed offshore mineral operations for projects such as ExO's Phosphate Resource, which have demanded the application of available and custom-designed technology to determine mineral resources as well as environmental and oceanographic parameters pertaining to their setting. The extent of the phosphate resource off the western coast of Mexico in 80 metres of water was determined through bathymetric survey and ore matrix sampling.

Offshore operations and subsequent management of sample description, assay and analysis led to the production of a resource statement formatted to JORC or NI 43-101 standards which outlines a geological resource of 588 million tonnes of measured, indicated and inferred phosphorite ore as empirically ground-truthed from 6-metre vibracore acquisition and the associated chain of custody procedures, laboratory assay and Quality Assurance / Quality Control (QA/QC) protocols.

Combined with geotechnical data acquisition, the project required the gathering of environmental baseline data to support engineering and environmental impact analysis. This analysis included deployment of current metres, CTD and sediment traps, and commissioning plume modelling, ecotoxicology, and sound propagation studies.

Odyssey also conducted multiple operations on South Pacific Seabed Mineral projects. Odyssey's vessels, equipment and technical personnel were deployed to conduct ship-mounted multibeam echosounder survey, side-scan sonar, Tow-Yo water chemistry, geologic and ROV multibeam, video surveys and sampling at depths ranging from <1,000 to 3,000 metres in South Pacific jurisdictions, including those of multiple Secretariat of the Pacific Community (SPC) member states.

University of South Florida - College of Marine Science (USF-CMS) and University of North Carolina-Chapel Hill (UNC-CH)

In addition to the technical experience Odyssey brings to the Exploration Programme, CIC has also partnered with the University of South Florida College of Marine Science (USFCMS - USA) and the University of North Carolina – Chapel Hill (UNC-CH - USA) for collaboration on physical oceanographic, environmental and other aspects of the project.

Project participants from this team have over a century of combined experience in oceanographic data collection and modelling, with applied experience from the Atlantic/Gulf of Mexico, Pacific and Indian Oceans. Dr. Mark Luther (USF-CMS) and Dr. Chris Martens (UNC-CH) will be leading the effort.

Activities will include modelling oceanographic currents, collecting data on sedimentation rates, ambient turbidity, sound, water current velocity and dissolved oxygen, as well as predicting sediment plumes which would occur in future nodule recovery operations.

Dr. Luther, the team member overseeing current and plume modelling, is a director of the Coastal Ocean Monitoring Prediction System, a founding member and past board chairman of the Alliance for Coastal Technologies and is presently the chairman of the International Seakeepers Society Science Advisory Council. USF-CMS, Dr. Luther's home institution, is a leader in integrated marine sciences, with research activities spanning the globe.

The institution was an active member of the Gulf of Mexico Research Initiative, an independent research programme established following the Deepwater Horizon oil spill; through the programme, USF-CMS established the Centre for Integrated Modelling and Analysis of Gulf Ecosystems (C-IMAGE), an international Consortium of academics, researchers and students representing 19 collaborating institutions. The initiative studied geological, biological, chemical and physical aspects of environment and ecosystems over the span of a decade.

Additionally, CIC will be working cooperatively with academic experts from The University of the South Pacific (Rarotonga), Eckerd College (USA), The University of Hawai'i (Manoa), Kochi University (Japan), The International Marine Minerals Society (IMMS), The United States Geological Survey (USGS), The Natural History Museum of London (UK), and The National Oceanography Centre at the University of Southampton (UK) as well as other institutions.

3.3 Odyssey Operates Under a Robust Set of Risk Assessment and Management Systems and Policies

Odyssey is CIC's exclusive marine operations partner for the Exploration Work Plan (EWP) as well as a member of the CIC Consortium. The following is a summary of their Risk Assessment Program, which is a subset the company's comprehensive Risk Management Program. An Exploration Program Specific Risk Management System and Policy will be provided to the SBMA for dissemination prior to the commencement of offshore operations. Odyssey's Risk Management system is separate and different from CIC's Annex 5 IRMP (CIC071) and both will be incorporated into each cruise plan prior to mobilisation.

Introduction

Risk Assessments are important tools used to identify significant hazards and manage risks associated with an operation. A hazard is something that has potential to cause damage or harm to personnel, equipment, the environment and/or the reputation of the company or its clients and stakeholders.

The operation may be a routine task or a one-off project activity. However, risks within each operation must be assessed to ensure that adequate control measures have been put in place to ensure the safety of the operation and that no harm will come to personnel, equipment or the environment.

Risk Assessment Methodology

Odyssey undertakes risk assessments in line with industry best practises established within the '*Step Change in Safety Task Risk Assessment Guide'*.

Risk Assessment Form & Library

QHSE-3000A is the Odyssey Task Risk Assessment template which is based on the Step Change in Safety model format. A Master Library of Risk Assessments is stored on the company's Information Management System (IMS).

Project Assessments
Prior to mobilisation of any offshore project a Project Risk Assessment will be generated as part of the review of project specific operations and constraints. The Project Risk Assessment may be reviewed in a risk assessment meeting (HIRA) which will include relevant personnel from all organisations and departments involved in the planned operations. Control measures will be identified within the Project Risk Assessment and the project manager will be responsible for ensuring that these are implemented.

The Risk Assessment Process
The purpose of the Risk Assessment Procedure is to provide tools that evaluate new risks as they arise and ensure that any changes can also be adequately assessed. Thus, helping to ensure that all reasonable, foreseeable hazards for non-routine tasks are identified and the risks are assessed and reduced to the lowest level (as low as reasonably practicable or ALARP).

The Risk Assessment process commences with an analysis of the task to allow any associated hazards to be identified. This may simply be done by listing all the activities of the task, the substances and equipment involved and any environmental conditions that may be appropriate. From the various components of the task, the hazards may be identified, analysed and then risks assessed and reduced to ALARP.

The outcome may require modification to the procedures, equipment, process, or a more detailed analysis. These in turn may require further evaluation prior to final closeout. The Risk Assessment shall be suitable and sufficient for the level and likelihood of potential damage and/or injury to personnel.

Tolerability Criteria
Odyssey's Risk Assessment process is a compilation of the "qualitative" views of the risk assessment team. The risk values given are agreed as part of the risk assessment process. They are categorized as follows:

- High Risk (RED): Task must not proceed. It should be re-defined or further control measures put in place to reduce risk. The controls should be re-assessed for adequacy prior to task commencement.
- Medium Risk (YELLOW): Task should only proceed with approval of a line manager. Where possible, the task should be redefined to take account of the hazards involved or the risk should be reduced further prior to task commencement.
- Low Risk (GREEN): May be acceptable; however, review task to see if risk can be reduced further.

3.4 Baseline Environmental Data

CIC is committed to taking an inclusive, transparent multi-stakeholder approach to environmental planning. This will include studies to acquire, analyse and compile sufficient baseline data for a robust EIA.

CIC will consider the ISA's most up to date template for baseline studies and EIA development, as this framework has benefited from input provided by a large stakeholder pool from various sectors over the course of several decades.

In addition, CIC will partner with international and local scientific experts, where appropriate, to design and conduct the studies required to establish an environmental baseline and EIA. The company will cooperate with the Cook Islands' Government, the NES, the NEC, as well as other stakeholders to develop impact minimisation and mitigation strategies and responsible environmental management measures. Unless advised by the Cook Islands Government, the NES, or the NEC that another approach is preferred, CIC will take into consideration the EIA template of the draft ISA regulations, issued in March 2020 (ISBA/25/LTC/6/Rev.1), modified as appropriate by the ISA draft mining regulations (ISBA/24/LTC/WP.1, Annex IV) when it prepares its EIA.

CIC recognises that the Cook Islands' National Environment Service (NES) has the authority to require either consent or a project permit for any activities. In addition, under section 20 of the Environment Act 2003, the National Environment Council (NEC) is convened to act as permitting authority for any part of the Cook Islands other than Rarotonga or an Outer Island. Thus, CIC will work collaboratively with both the NES and the NEC throughout the programme and will satisfy all requirements necessary before engaging in any exploration activities.

4. Impact on Other Sea Users

CIC will collaborate with the public, Cook Islands' Government departments, local businesses, and NGOs to identify all the key sea user stakeholders to ensure appropriate engagement and a clear path of communication. Suggestions or proposals from Cook Islands' stakeholders and communities will be solicited to help design an Exploration Plan that avoids issues with tourism, commercial/artisanal fisheries, submarine cable projects, marine scientific research, navigation, and other sea users.

Proposed regulated activities will seek to avoid, resolve and mitigate interference with respect to their interests and ensure that any issues relating to offshore activities will be resolved quickly and efficiently while achieving the stated goals of the Exploration Work Programme.

CIC understands that the oceans are the home and lifeblood of the people of the Cook Islands. The culture, industry, and infrastructure of the Cook Islands naturally depend on the ocean surrounding them and all will be respected accordingly.

The offshore activities will occur at a minimum of 50 nautical miles from any coastline, with a majority of the work being conducted much farther offshore. The research that will result from exploration activities will provide important new data that should be useful to a number of commercial and artisanal fishing groups as well as other stakeholders throughout the Cook Islands. While some licenced areas partially overlap known productive areas of fishing, CIC anticipates that exploration work in these overlapping areas can be planned around their respective fishing patterns, and in some cases, during off-seasons to mitigate any potential interference.

CIC also anticipates engaging with representatives from various governmental departments, local communities including churches, schools, local businesses and other stakeholders to better understand the concerns and ideas they have regarding how CIC might work collaboratively to maximise the benefits that can be derived from exploration.

Over the past three years, CIC has already had face-to-face meetings with representatives from Marae Moana, the National Environment Service (NES), the Te Ipukarea Society (TIS), Korero O Te 'Orau, the Cook Islands National Heritage Trust, as well as other key stakeholders for preliminary discussions.

Examples of organisations and stakeholders to be engaged include but are not limited to:

- Marae Moana
- Te Ipukarea Society (TIS)
- Korero O Te 'Orau
- Pacific Islands Conservation Initiative (PICI)
- Secretariat of the Pacific Regional Environment Programme (SPREP)
- Cook Islands Fisheries Field Office (CIFFO)
- Pacific Islands Forum Fisheries Agency (FFA)
- The Secretariat of the Pacific Community (SPC)
    - Pacific Islands Tuna Industry Association (PITIA)
    - Western & Central Pacific Fisheries Commission (WCPFC)

4.1 Fisheries

Exploration activities are not expected to have any measurable impact on any of the Cook Islands' fisheries. While some CBGs partially overlap known productive areas of fishing, CIC anticipates that through effective communication with communities and fishing organisations, exploration work in these overlapping areas can be planned around their respective fishing patterns and in some cases during off-seasons to mitigate any potential interference.

Pelagic fisheries have been a staple of the Cook Islands' marine resources throughout its history. The variety of tuna species that regularly migrate through the Cook Islands' EEZ have given the country international recognition as one of the premier locations for commercial and artisanal tuna fishing. Understanding commercial and artisanal fishing grounds and annual periods of greatest production is critical for avoiding any problematic interaction between CIC's exploration operations and the Cook Islands' fishing vessels.

With this knowledge, CIC will develop the Exploration Work Programme and offshore operations in collaboration with fisheries to ensure fishing and mineral exploration can successfully co-exist.

Longline and purse seine vessels represent the two major commercial methods used for pelagic fisheries within the Cook Islands' EEZ. Skipjack, albacore, yellowfin, and bigeye tuna are the species primarily targeted by commercial vessels licenced to fish within the Cook Islands' EEZ.

One exploration technique that will need consultation and coordination with various fisheries stakeholders of the Cook Islands is the installation of the deep-sea moorings. According to the Fisheries and Aquaculture Department of the Food and Agriculture Organization of the United Nations (FAO), the deepest longline and purse seine operations reach a maximum water depth of 300 metres.

The longest oceanographic mooring will extend from the seafloor to a ~500-metre water depth, giving a 200-metre buffer between the deepest predicted fishing operations and the top of the longest subsea mooring. This is an example of an opportunity for CIC to work collaboratively with other sea users to ensure there is no interference with or disruption to their activities.

Active outreach to fishing organisations and local communities will take place in advance of exploration activities to pre-empt and mitigate the risk that CIC's offshore operations interfere with any commercial, cultural, or artisanal fishing activity throughout the Cook Islands. The following is a synopsis of the company's understanding of the primary fisheries of the Cook Islands.

The summary findings indicate:

1. In most cases the proposed CBGs do not overlap with primary fishing grounds.
2. Commercial fishing is seasonal, allowing management of offshore exploration activities to assure there is no interference between the operations.
3. Permanent and long-term installations of mineral exploration equipment are deeper than fishing gear typically used.
4. Both mineral exploration and fishing vessels move and operate at slow, controlled and predictable speed and direction to easily avoid each other where and when necessary.
5. Offshore exploration activities will have very minimal impact on the seafloor and water column resulting in no commercially measurable impact on fisheries; fish stocks will not be harmed from deep-sea mineral exploration.

Based on preliminary research into the Cook Islands' fisheries and input from the TAB, CIC is proposing the following measures to ensure that both government and public stakeholders are included and engaged throughout the development of this exploration effort:

- Collaboration with regulating agencies and artisanal fishermen to assist, where possible, in the monitoring of licenced fishing vessels operating in the Cook Islands' EEZ.
- Assistance in the development of Environmental Impact Assessments that could be implemented to help determine the effects of various commercial fishing gear being used in the high seas on artisanal catches.
- Acknowledgement of the absolute, non-negotiable rights of Cook Islands' fishing communities to be involved with any developments at sea, including seabed minerals exploration.
- Commitment to engaging in proactive programmes to support and enhance local knowledge and job opportunities.
- Collaboration with public authorities (Ministry of Education) to achieve high academic standards and foster continuing education aimed at local communities, especially in the field of marine science and environmental studies. Marine research and innovation will benefit from CIC's long-term involvement in the Cook Islands.

4.2 Longline Fisheries

According to the Cook Islands Ministry of Marine Resources 2017 Annual Report, the Cook Islands' longline fleet consisted of 10 Cook Islands-flagged longline vessels operating within the Western and Central Pacific Fisheries Commission - Convention Area (WCPFC-CA). Among these, three domestically based vessels were licenced to fish within the national jurisdiction only.

Eight vessels were authorised to fish within the Cook Islands' EEZ and the High Seas, but rarely fished beyond the waters of national jurisdiction, and three were licenced to fish on the High Seas only. A total of 45 foreign-flagged vessels were licenced and authorised to operate within the Cook Islands' EEZ under charter during 2017. Foreign-flagged longline fishing in 2017 was undertaken by two Chinese companies, with Chinese-flagged vessels operating out of Pago Pago (American Samoa), Suva (Fiji), Papeete (French Polynesia) and Kosrae (Federated States of Micronesia).

In 2017, all longline vessels licenced to fish in the Cook Islands' national jurisdiction were prohibited to fish within 24 nautical miles of Rarotonga and 12 nautical miles of all the other islands. In July 2017, the Cook Islands passed the Marae Moana Act which prevents any type of commercial fishing within 50 nautical miles of all islands. The 50 nautical mile commercial fishing exclusion zones from the Marae Moana Act were implemented in 2018.

There is a strong seasonal trend in catch per unit effort (CPUE) and the calendar fishing year (Figure 1). In general, first and fourth quarter catch rates and total catch are low, with this period referred to as the off-season.

Each year, the second and third quarters represent the peak of the fishing season. Catch rates of all three key tuna species steadily decline from August/September onwards, signaling the end of the fishing season.

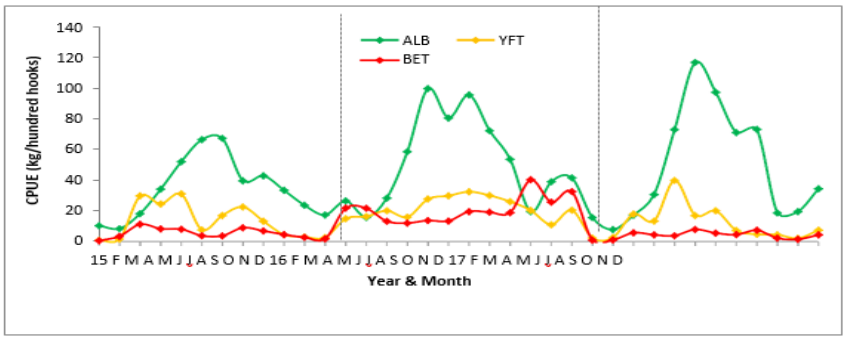


Figure 1. Monthly CPUE for albacore (green), yellowfin (yellow) and bigeye tuna (red) from 2015-2018 of all longline vessels fishing within the Cook Islands' EEZ. The dashed lines indicate a new year. Source: CIMMR 2017 Annual Report.

The longline fishery is typically active between 10° and 15° South; however, longline fishing efforts and catches continue to extend further south every year. While albacore is prevalent throughout the entire Cook Islands' EEZ, yellowfin and bigeye have the highest catch rates in the north. The proposed CBGs are mostly located around the central portion of the Cook Islands' EEZ with only three of them having any overlap with longline fishing zones.

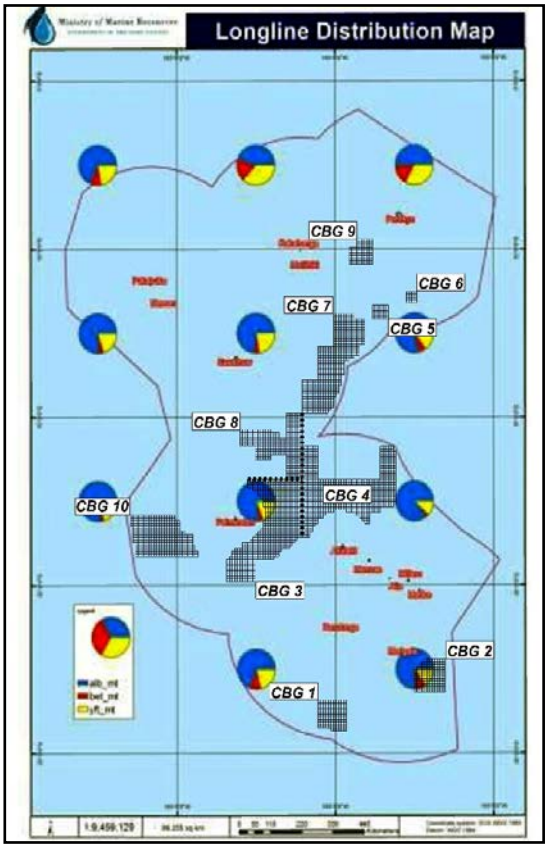


Figure 2. Longline fishing distribution of catch in metric tonnes of key tuna species in relation to CBGs. Blue=albacore, Red=bigeye, Yellow=yellowfin. Source: CIMMR 2017 Annual Report

CIC plans to mitigate any longline fishing interference with overlapping CBGs by consulting with fisheries and relevant fishermen, and if there is a concern that cannot be resolved, exploration operations for these areas will be planned during the longline off-season (generally the first and fourth quarters of the year). In addition, CIC intends to undertake community and commercial outreach efforts to better understand the concerns of all stakeholders impacted by the Cook Islands' longline fisheries sector. Understanding these concerns will help shape exploration cruises that avoid and mitigate potential interference with Cook Islands' fisheries.

4.3 Purse Seine Fisheries

The purse seine fishery is a surface fishery targeting schooling skipjack tuna in the tropical waters of the Western and Central Pacific Ocean (WCPO). The purse seine fishery operates in the northernmost waters of the EEZ targeting tuna on both free and fish aggregation devices (FAD) associated schools.

2017 was the third year the Cook Islands entered bilateral negotiations to licence foreign flagged purse seine vessels in addition to vessels under the U.S. Multi-Lateral Treaty. An additional 15 vessels from Korea, Kiribati and Spain were licenced to fish in the EEZ of the Cook Islands.

The purse seine fishery is controlled by using the Vessel Day Scheme (VDS), which monitors the days fished in a zone. A fishing day is defined as either a set (deploying the purse net) or when the vessel is actively searching for a school or deploying a FAD. In 2017, the Cook Islands declared a Purse Seine limit of 1,250 vessel days, of which 456 were used by the U.S., 76 by non-US operators and 13 by Spanish vessels.

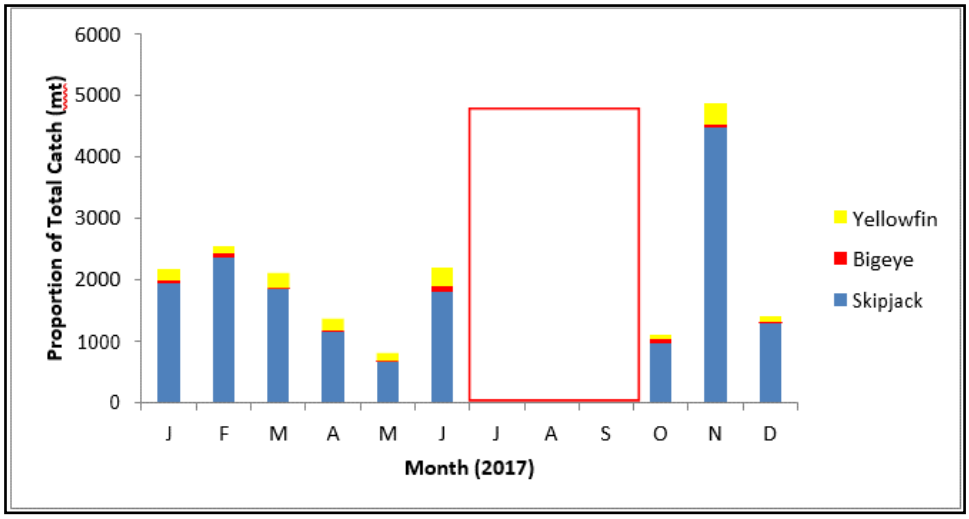


Figure 3. Purse seine catch estimates (metric tonnes) of key tuna species by month in 2017. The red shaded area depicts the four-month FAD closure. Source: CIMMR 2016 Annual Report

There is a strong seasonal trend in the purse seine fishery, with the fourth and first quarter of the year highlighting the peak season of the fishery. This is opposite to the longline fishery which operates largely through the winter months. The purse seine fishery is subject to a three-month FAD closure from July to September which prohibits the setting of nets on FADs.

It is especially unlikely that CIC exploration will interfere with purse seine fisheries. The majority of CBG area is in the central or southern parts of the Cook Islands' EEZ except for CBG5, CBG6, CBG7 and CBG9.

CIC will take extra precautions when planning offshore exploration activities in these CBGs to not affect the purse seine fisheries by exploration activities. It should be noted that during years of *El Niño* Southern Oscillation (ENSO) events, purse seine activity shifts toward the eastern tropical portion of the Cook Islands' EEZ (such was the case in late 2015-early 2016).

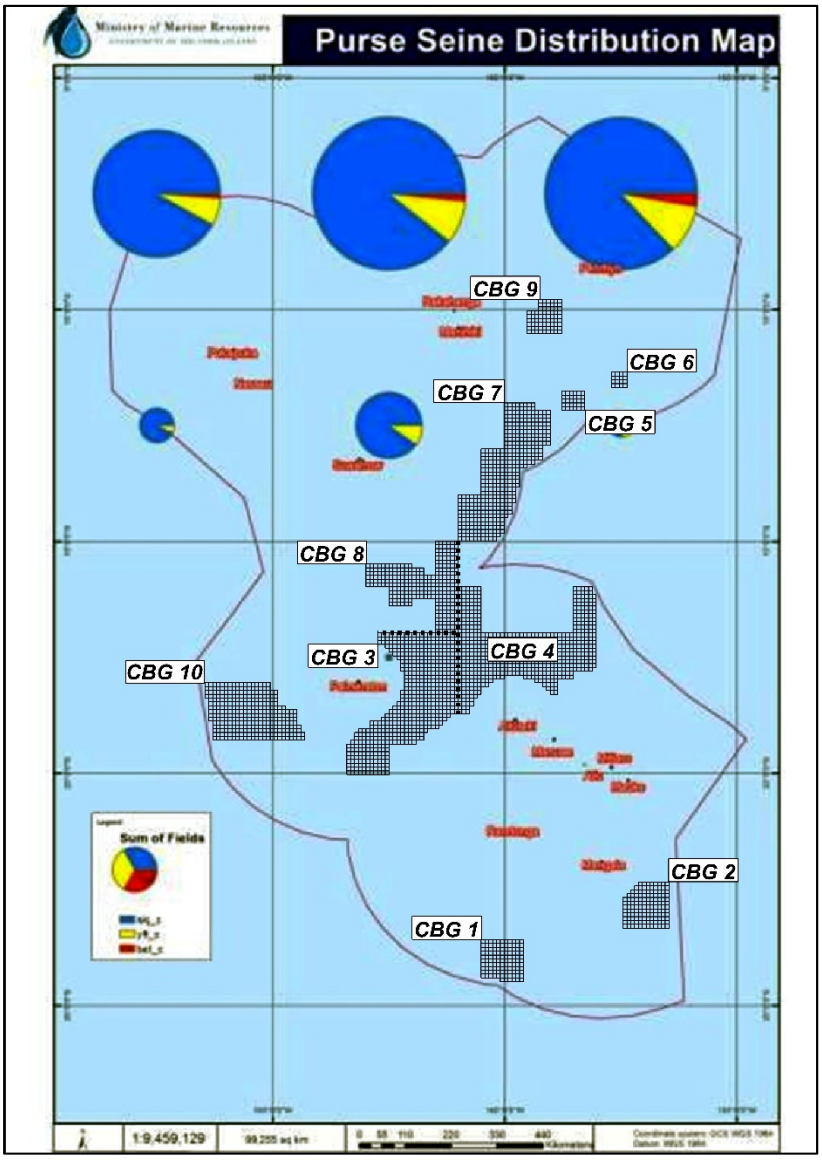


Figure 4. Purse seine catch (mt) distribution of key tuna species in relation to CBGs. Blue=albacore, Red=bigeye, Yellow=yellowfin. Source: CIMMR 2017 Annual Report

4.4 Artisanal Fishing

The Cook Islands' artisanal fishery occurs on all inhabited islands, primarily targeting tuna and pelagic species. In 2017 there were 265 active artisanal vessels reported, of which 96% were small, powered boats with outboard motors, 3% were sport or recreational vessels, and 1% were unpowered canoes. While small, powered boats are generally known to fish for subsistence, recreational/sport fishing boats target selling fishing charters and tours to tourists.

Trolling is the main fishing practise used to target billfish, tuna, and other pelagic species. Charter trolling generally takes place within 10 nautical miles of the islands' coasts, ensuring that exploration activities will not cause any interference.

Rarotonga and Aitutaki lead the rest of the islands in infrastructure, population, and tourism which in turn explains the exponential difference in artisanal fishing hours spent throughout 2014, 2015, and 2016 (Figure 5).

The fishing charters that exist throughout the Cook Islands are primarily based out of Rarotonga, with a few exceptions in Aitutaki. All CBGs are at least 50 nautical miles from Aitutaki and Rarotonga.

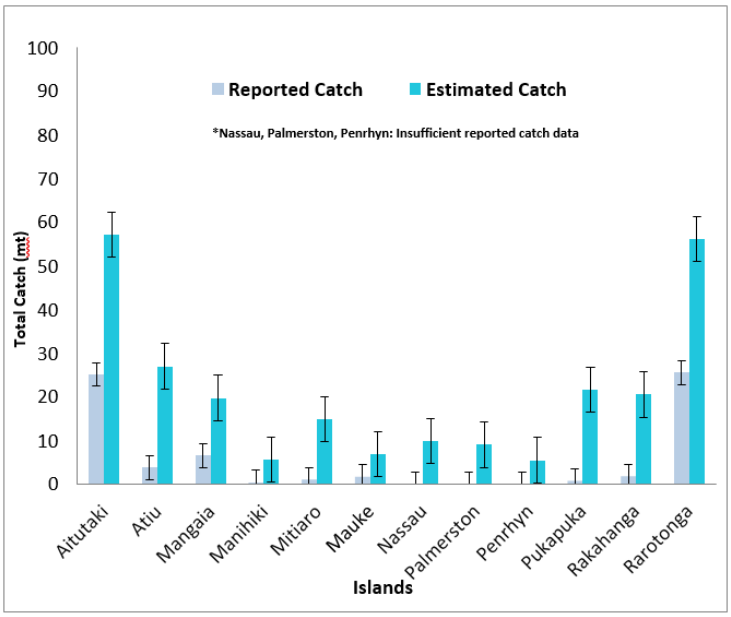


Figure 5. Artisanal reported and estimated catch totals (metric tonnes) per island for 2017. Source: CIMMR 2017 Annual Report

4.5 Submarine Cabling

Exploration activities will not interfere with submarine cabling. Detailed project planning assures that exploration operations conducted in the proposed CBGs will not interfere with the installation, maintenance, or positioning of any submarine cable.

CIC is aware that a regional fibre-optic cable system was installed in 2019 which currently is planned to connect Rarotonga and Aitutaki to high-speed broadband internet.

It is highly unlikely that CIC will encounter any conflicts with the work proposed for cable maintenance throughout the Cook Islands. The physical impact to the seafloor is extremely minimal and limited. In fact, the survey data collected during exploration will benefit the design of cable routes that may be installed in the future and will provide useful high-resolution bathymetric data to the Cook Islands that will potentially be useful in cable route surveys. CIC intends to plan exploration in coordination with any submarine cable contractors, so the activities do not impact or interfere with maintenance of submarine cable operations.

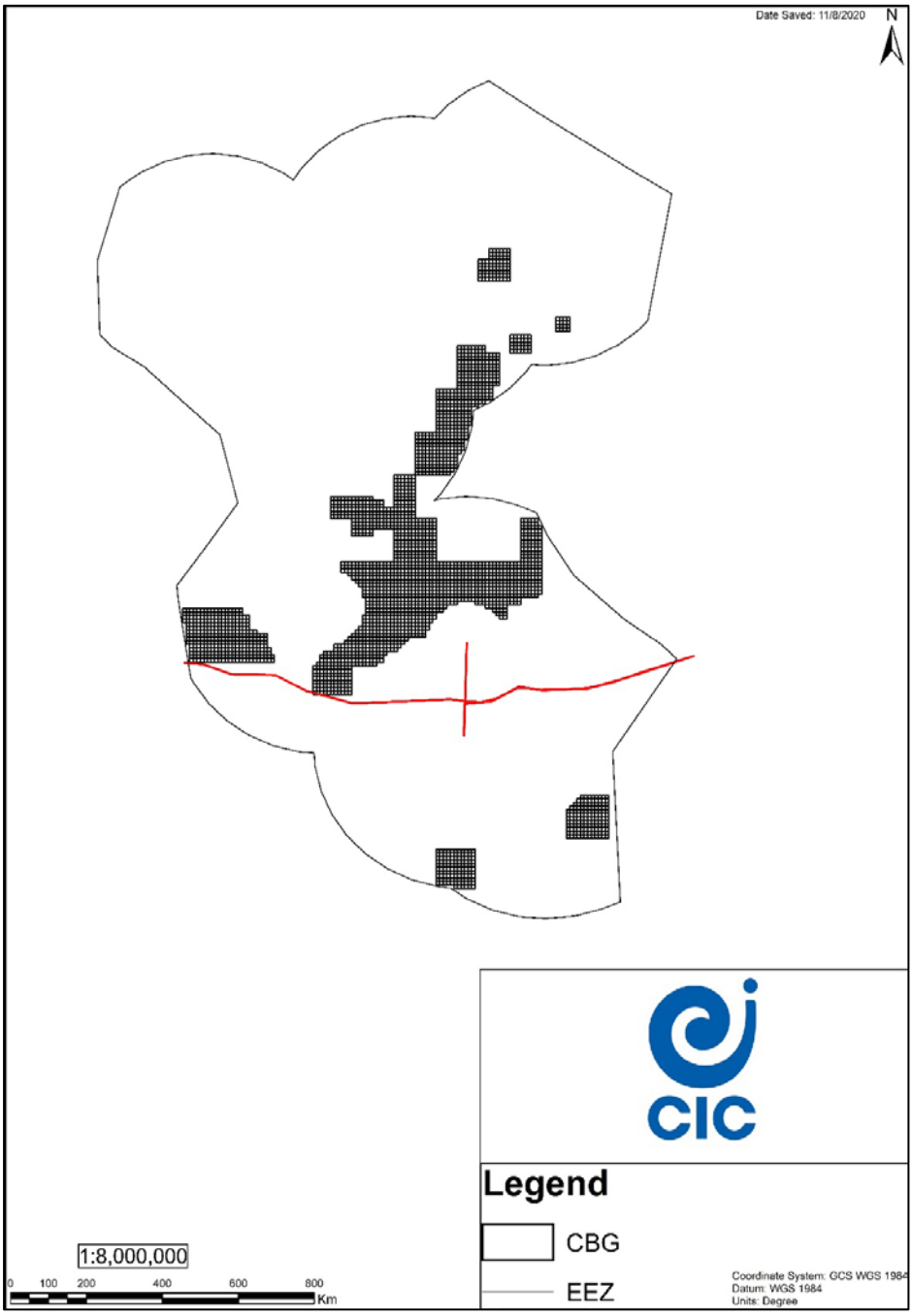


Figure 6. Map showing the approximate cable route (red lines) in relation to CBGs proposed for exploration.

4.6 Marine Scientific Research

Exploration activities present an opportunity to significantly enhance marine scientific research in the Cook Islands' EEZ. CIC will provide extensive biological, geological, and physical oceanographic data that will contribute to the growth and overall understanding of the Cook Islands' national jurisdiction.

Throughout the term of an Exploration Licence, CIC will provide the Cook Islands (as well as any credentialed academic affiliates) with significant data relating to all fields of oceanographic science. A key CIC goal is to partner with local, regional, and international academic institutions that have performed marine research within the Cook Islands in the past, as well as institutions that want to be involved in the future of the Cook Islands' marine scientific research.

Rather than inhibit oceanographic research in the Cook Islands, CIC plans to be a catalyst for local/international scientific institutions to conduct new scientific research in the deep-sea environment.

Additionally, CIC intends to collaborate with the Cook Islands' Government departments to interpret the environmental data acquired during exploration in a way that can be understood and is accessible to all Cook Islanders.

While CIC is currently unaware of any Cook Islands marine scientific research expeditions occurring during the preliminary exploration cruises, adjustments to CIC's Work Programme as well as direct communication with potential research expeditions will take place to ensure that CIC's exploration does not interfere with, and where possible, complements, other marine scientific research.

4.7 Navigation

Exploration vessels and equipment will not impede any shipping lanes or the navigation of other seagoing vessels. CIC has partnered with Odyssey to conduct exploration operations planned for this Licence. Odyssey has an extensive history of working in coastal waters where it is critical to be aware of shipping routes and other vessels near the vicinity of operations.

Odyssey has performed scores of maritime operations near the following ports with no incidents:

- Auckland, New Zealand
- Wellington, New Zealand
- Port Moresby, Papua New Guinea
- Rabaul, Papua New Guinea
- Honiara, Solomon Islands
- Port Vila, Vanuatu
- Apia, Samoa
- Suva, Fiji
- Pago Pago, American Samoa
- Nuku'alofa, Kingdom of Tonga
- Brisbane, Australia
- Portland, UK
- Bristol, UK
- Falmouth, UK
- Hull, UK
- Cork, Ireland
- San Diego, USA
- Jacksonville, USA
- Charleston, USA
- Praia, Cape Verde

Exceptional navigational compliance and communication was demonstrated while operating in all the listed territorial waters. During its 26 years of operations, Odyssey has never had an accident resulting from impeding other vessels.

It should be noted that research vessels, fishing vessels, and cargo ships move and operate at controlled and predictable speeds and directions making it logistically easy to avoid each other. Nonetheless, communication of planned offshore work and shoreside logistics with the Cook Islands' Ports Authority (as well as the Cook Islands' Ministry of Transport) will take place to ensure that all maritime navigational conflicts are avoided.

4.8 Tourism

CIC's exploration activities are located well away from any tourism interests (a minimum of 50 nautical miles from any island). Furthermore, there will be no measurable environmental impact to tourism areas from exploration activities. CIC understands that tourism is vital to the Cook Islands' economy; the pristine lagoons and ocean surrounding them draws tourists from around the world to experience numerous water activities including:

- Snorkeling
- Boating/Cruising
- Paddle boarding
- SCUBA Diving
- Whale watching
- Diving with Sea Turtles
- Kitesurfing
- Surfing
- Fishing
- Lagoon Cruises

While most tourism activities take place within the islands' sheltered lagoons, away from the open seas of the Pacific Ocean surrounding them, CIC acknowledges the interconnected relationship between these lagoons and the ocean. The company plans to incorporate the precautionary approach and will maintain a priority of environmental awareness throughout all phases of its seabed minerals work to avoid negatively affecting the ocean or lagoons.

4.9 Marae Moana

The implementation of Marae Moana in 2017 was a significant accomplishment by the Cook Islands that will help ensure the preservation and sustainability of its national waters. It is currently the largest commitment by a single country for integrated conservation management from ridge to reef and reef to ocean.

CIC recognises the foresight of the Cook Islands in their proactive approach to protecting its oceans. CIC intends to develop a strong relationship with representatives from Marae Moana to understand and adapt operations as needed to meet the organisation's goals and the standards set in the legislation relating to this marine park.

All exploration activities are outside of the defined 50 nautical mile Marae Moana exclusion zones and so these activities will have negligible - if any - environmental impact within the exclusion zones. Furthermore, research garnered from the exploration activities will accrue to a greater understanding of the surrounding ocean systems and will contribute to future Marae Moana spatial planning and management.

CIC will carefully and responsibly adhere to the nine principles of ecologic sustainability outlined in the Marae Moana Act 2017 and listed below (Table 4).

Table 4: CIC Measures to Follow Marae Moana Nine Principles of Ecologic Sustainability

Marae Moana Principles of Ecologically Sustainable Use	Examples of Compliance by CIC
1. **Principle of protection, conservation, and restoration**	The extensive Exploration Programme being proposed by CIC will collect essential baseline environmental data to help establish measures and protocols that can be implemented to protect and conserve marine biodiversity within the Cook Islands' EEZ as well as develop future measures for monitoring and managing seabed areas affected by deep-sea nodule harvesting.
2. **Principle of sustainable use to maximise benefits**	The primary goal of CIC is to assist the Cook Islands in developing a successful and environmentally sustainable Seabed Mineral Harvesting Project that not only contributes to realising the economic benefits of the nodule resource, but also serves as the catalyst for collecting critical environmental data needed for the continued development of Marae Moana spatial planning that will ensure a healthy ecosystem and pristine waters for future generations of Cook Islanders.
3. **Precautionary Principle**	CIC is completely committed to the precautionary approach and is in full agreement that it is essential that this approach is at the forefront of every stage of the project, including the baseline environmental data collection that will take place during exploration. CIC recognises the work and research that went into the publication of *Cook Islands Seabed Minerals: A Precautionary Approach to Mining* by Gerald McCormack and has developed the environmental data collection and monitoring portion of the Work Programme to align with both Mr. McCormack's considerations as well as suggested areas of environmental study by the ISA.
4. **The Principle of Community Participation**	CIC understands that for a successful seabed mineral project to take place within the Cook Islands, it must inform and include all stakeholders at every stage of the project. The licencing process implemented by the SBMA does an excellent job of including the comments and opinions of community representatives and a wide array of stakeholders before any Exploration Licences are granted. CIC believes this is an important first step in abiding by this principle but is also aware that it is the responsibility of the contractor to continue engaging and informing stakeholders once an Exploration Licence is granted and the Work Programme has been initiated.

5. **The Principle of Transparency and Accountability**	The robust tender process announced by the SBMA in October 2020 is the first step in assuring that this principle is being adhered to by not only the contractors submitting applications, but also the Cook Islands' Government. By having all Tender Exploration Applications reviewed by various government agencies, independent technical experts as well as the Advisory Committee, CIC is confident that it will uphold this principle. Similarly, to the Principle of Community Participation, it will be CIC's responsibility to perpetuate transparency throughout the proposed Work Programme by collaborating with the relevant Cook Islands Government departments to distribute and share data collected throughout the exploration campaigns. CIC understands how critical these data are for better scientific understanding of the Cook Islands' marine environment and that they will play a large role in assisting legislation such as the Marae Moana Act to designate areas for certain marine activities throughout the Cook Islands' EEZ.
6. **The Principle of Integrated Management**	From the onset of lodging CIC's Application, various government, non-government, and external partners will be involved with its review and scoring. If an Exploration Licence is granted to CIC, engagement with all these groups will be continued throughout the Exploration Licence term as variations to the proposed Work Programme are contemplated and project design continues to develop.
7. Principle of Investigation and Research	The methodology proposed for the exploration Work Programme being presented by CIC is essentially standard marine scientific research with the exception of a few geotechnical techniques that will give additional clarity and confidence in the resource as well as provide data for the engineering of a harvesting system that minimises environmental impact. The data collected throughout the Exploration Licence term will help the Cook Islands introduce the needed regulations and policies prior to any commercial harvesting of nodules.
8. Principle of Ecosystem-Based Management	A critical part of the Exploration Work Programme will be identifying the biodiversity, physical properties and chemistry of the deep-ocean environment to contribute knowledge to this relatively new ecosystem and implement measures and effective preservation zones that minimise the impact on these ecosystems prior to commercial harvesting of nodules.

9. Principle of Sustainable Financing	CIC is a privately owned, Cook Islands' company that has the financial and technical support needed to help the Cook Islands develop an economically feasible and environmentally responsible Seabed Mineral Exploration Programme. Each investor, partner, advisor and manager has been thoroughly vetted and approved by the Cook Islands Business Trade Investment Board (BTIB) to ensure that CIC is bringing the highest quality of expertise and financing to assist the Cook Islands in developing their seabed minerals sector.

4.10 Marine Life

When planning all exploration activities, CIC will give special consideration to ensure that marine life is not exposed to serious negative impacts during the operational stages.

CIC recognises that the entire Cook Islands' EEZ is a designated whale sanctuary and plans to pay special attention to the whale migration route through the Cook Islands. A variety of different species of whales including humpback, sperm, and beaked whales have annually been observed migrating north up to Rarotonga and Aitutaki during early July, then departing via a route west/northwest by late October toward Samoa, Tonga, and Fiji.

While some of the proposed licenced areas may overlap with known whale migration routes, the research that will be done in these areas during the Exploration Licence term will primarily be standard marine scientific studies for which impact to whales is already known to be minimal.

No activities are planned that will cause significant emissions of acoustic energy within the Deep Sound Channel (~700 – 1,500m water depths). A detailed description of each exploration campaign will be provided to the NES, NEC, and technical experts for review prior to the commencement of any exploration activities.

The multibeam echosounder equipment used to map the seabed poses no harmful impact to whales and is operated at both a frequency and intensity considered safe for marine mammals.

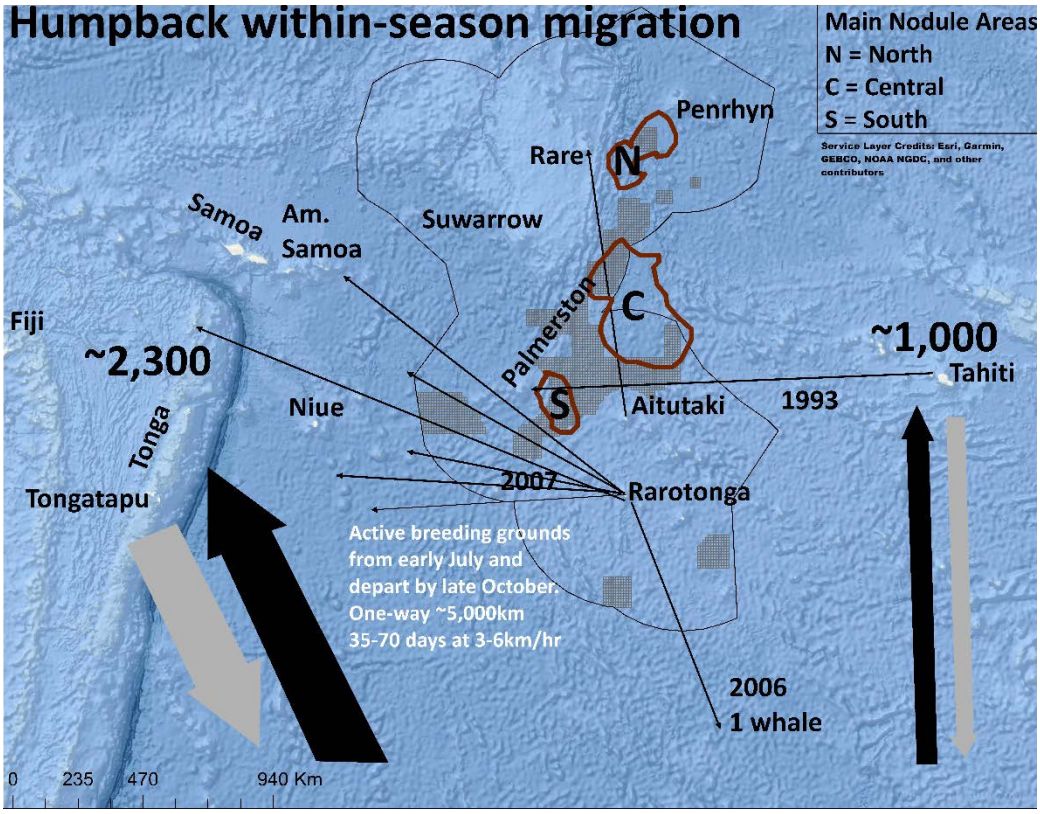


Figure 7. Map of Cook Islands' EEZ showing the approximate whale migratory patterns (thin arrows) in relation to CBGs (hash marks). Image adapted from Cook Islands Seabed Minerals: A Precautionary Approach to Mining by Gerald McCormack 2016.

Marine biota observations will be an important component of all offshore exploration activities. In addition to opportunistic sightings, CIC is in the process of evaluating several methodologies for marine surface survey that will produce valuable data such as species identification, individual identification, abundance, density, behaviour, and direction of travel. High-definition photography and video from both shipboard electronics as well as drones are anticipated to be incorporated into the data collection program.

CIC recognises that having personnel capable of recording data accurately is as crucial as the data being collected and therefore, where appropriate, will be contracting qualified observers with field experience as well as providing opportunities for Cook Islanders to become qualified observers.

Environmental data collection will include the use of hydrophones in both the sound channel and near the seabed to establish a baseline of ambient acoustic levels. All activities will be designed to avoid generating any significant noise within the deep sound channel (~700 m – 1,500 m water depths) to minimise any potential impacts to cetacean communication.

Sea turtles have also been known to inhabit the open seas and lagoons as well as nest throughout the Cook Islands. The most commonly observed sea turtles in the Cook Islands' EEZ are Hawksbill (endangered) and Green Turtles (threatened).

Both species are known to nest on Manihiki, Pukapuka, Penrhyn, Nassau, Suwarrow (December to February), and Palmerston (May to August). In Rakahanga only Green Turtles are known to nest.

Most of these are part of the Northern Group of islands (with the exception of Palmerston) giving sea turtles ample distance from the concentration of exploration activities that will take place. The most commonly frequented islands for turtle nesting are the Palmerston and Penrhyn atolls. Palmerston is approximately 50 nautical miles and Penrhyn is approximately 64 nautical miles from the closest licenced areas.

Currently there is not enough available data to determine precisely how many sea turtles regularly inhabit the Cook Islands' EEZ for nesting, feeding, and resting. The most recent data and observations however suggest that turtle populations are declining on most of the islands. CIC is confident that exploration operations, which will occur outside of the Marae Moana 50 nautical mile exclusion zones, will result in no significant environmental impact on sea turtles. The company looks forward to engaging with the Cook Islands' Government and relevant stakeholders to assist wherever possible with turtle protection measures and programs.

Offshore exploration activities are not expected to interfere with seabird migratory routes or feeding grounds as the vessel is generally well offshore and in motion during operations. Observations of seabirds will be logged as part of standard operating procedures during exploration.

In addition to the precautions geared towards avoiding interference with whales, sea turtles and seabirds, CIC will collaborate with Cook Islanders, scientists and other technical experts to avoid interference with seasonal migratory patterns of any other marine species that may not have been mentioned in this section.

4.11 Ports

Prior to initiation of exploration cruises, communication will be established between Odyssey and the Cook Islands' Ports Authority to ensure there is a clear understanding of the scheduling and location of where exploration activities will occur and what those activities will entail.

For exploration operations, CIC plans to take a collaborative approach with regard to interfacing with Cook Islands' offshore support businesses. Where commercially reasonable and in line with both the Cook Islands' and the community's interests, every effort will be made to support and utilise the services of Cook Islands' businesses.

While Pago Pago (American Samoa) has the closest suitable infrastructure to provide Odyssey's exploration work with a location for port calls of large vessels, mobilisation, crew changes, provision/fuel, and de-mobilisation, CIC intends to incorporate Cook Islands' landside support to whatever extent Cook Islanders deem it appropriate, logistically possible, and acceptable.
While undertaking operations with the large multibeam vessel, Avatiu Harbour (Rarotonga) and Arutanga Harbour (Aitutaki) may only be utilised in the case of transporting specialised technical scientists, priority parts needed for operations, and medical emergencies unless it can be determined that the large vessel can safely utilise the services of Avatiu Harbour.

CIC intends to collaborate with communities and representatives of the Cook Islands to better understand the level of involvement Rarotonga and Aitutaki communities desire in terms of interface with the vessel during exploration activities. All landside port support will seek to pay close attention to sensitive cultural issues and concerns between ship operators and the port communities. In Phase Two of research expeditions, CIC is planning on the constant presence of a smaller research vessel (30-50 metres) that will mostly operate out of Avatiu Harbour, availing itself of the port facilities there. This smaller vessel will be undertaking year-round research expeditions of an average of 5 to 15 days per month, which enables it to accommodate shorter expeditions and to provide a research platform for guest scientists from around the world. It may also call on different islands in the Pa Enua for educational purposes, for public outreach, and to transport people and supplies as may be required or requested by the government.

4.12 Proposed Mitigation for Exploration

CIC will use available data and suggestions or proposals from Cook Islands' stakeholders/communities to help design an exploration plan that avoids conflicts with commercial/cultural fisheries, submarine cable projects, marine scientific research, navigation, and other sea users.

The following approaches will be incorporated into all exploration cruise plans to attempt to avoid any conflict with other sea users within the Cook Islands' EEZ and to provide valuable information to assist in their growth and management:

1. Focus exploration in CBGs to avoid any activities that interfere with the most productive commercial fishing zones (both longline and purse seine), as well as any whale migration routes.
2. Collaborate with the Ministry of Marine Resources (MMR) as well as local communities while formulating exploration cruises to minimise potential interference from CBGs that are overlapping with known and expected fishing zones.
3. Stay outside 50 nautical miles exclusion zones to ensure that the islands, fisheries, tourism, shipping traffic, and marine life surrounding them will not be affected by exploration work.
4. Share and facilitate communication of biological, geological, and physical oceanographic data that will contribute toward a better understanding of the ocean environment within Cook Islands' EEZ.
5. Cooperate with authorities to monitor and report international fishing vessels that may be conducting unauthorised and unlicenced activities within the Cook Islands' EEZ, if requested by the Cook Islands' authorities.
6. Engage in open and proactive communications with the Cook Islands' Government and submarine cable contractors to ensure exploration work does not interfere with the submarine cable maintenance and upkeep, and potentially provide access to CIC's ships and equipment, if necessary, for cable maintenance and monitoring.
7. Engage in open and proactive communication with any academic institutions that wish to conduct marine scientific research to ensure exploration work proposed does not interfere with, and where possible complements and extends scientific research.
8. Engage in open and proactive communication with the Cook Islands' Ports Authority and Ministry of Transport to ensure exploration work and shoreside logistics do not interfere with existing or future shipping schedules, and potentially offer access to CIC's research vessels for transportation of supplies and people to the Pa Enua (Outer Islands).

5. Risk Assessment

CIC presents general statements related to risks and benefits of the EWP to the Cook Islands. Areas considered include social/cultural, environmental, and economic/financial. The following table is by no means exhaustive and will be expanded collaboratively with the SBMA and with interested parties, including sea users, during early-stage outreach programmes.

Table 5. Risks, Mitigation and Benefits Overview

Risk Area	Risks	Mitigation	Benefit
Social / Cultural	• Community concerns about subsea mineral exploration.	• Investment in community and sea user outreach and collaboration programmes. • Prioritisation of transparent and meaningful, effective communication with the public and stakeholders about the Exploration Programme.	• Early, frequent and on-going engagement with Cook Islanders intended to create an environment where the community is engaged in the Exploration activities undertaken by the contractor, the data it is generating and ways to use that data to better understand the marine environment.
Environmental	• Concerns that Ecosystem health and function may be adversely impacted.	• Employ only proven methodologies for Exploration Programmes and minimally invasive interaction with the seabed. • Partner with the scientific community, including objective deep-sea ecology experts, to conduct studies and design environmental programmes. • Open sharing of environmental data.	• Significantly increase the Cook Islands' data and knowledge regarding their EEZ environment.

Economic / Financial	• Concerns that the programme may negatively affect core economic drivers including tourism and fisheries. • Concerns that investment in the Cook Islands (businesses and employment of people) may not meet expectations.	• Nothing from the proposed Exploration Work Programme will have any measurable impact on tourism or fisheries. All work being proposed will take place at least 50 nautical miles away from any island. • CIC is committed to finding a variety of ways to employ, train and provide valuable data to Cook Islanders throughout the entire Exploration period.	• In addition to the value-based commitment of CIC to engage businesses, there is a budget commitment to this endeavour as well as a Trust that has already been established to invest in local traditional, cultural and educational programmes.

The Exploration Work Programme uses standard and proven methodologies for mineral exploration and environmental baseline data collection and assessment with limited risks and defined mitigation programmes. Even so, a detailed risk assessment will precede each offshore campaign to ensure appropriate risk management occurs and that risks are minimised as reasonably practicable at every stage of project development. This approach to risk management, along with the work done to understand the baseline environment and expected impacts, accrues to the application of the precautionary approach for extraction programme development.

CIC proposes that an annual risk review process be established, in line with the Seabed Minerals Authority's Annual Reporting requirement, to assess overall risks of the project at regularly scheduled intervals. These reviews will consider both the work that has been done on the project and the upcoming Work Programme. The reviews will seek to incorporate new ways to mitigate risks in all aspects of the project.

6. Public Outreach, Awareness, and Education Plan

6.1 Employment, Training and Capacity Building of the Cook Islands' Community

As stated in CIC's Annex 6 Local Engagement, Training, and Business Development Plan (LDP) (CIC078), CIC's Exploration Work Programme will lead to a variety of employment, training, and capacity-building opportunities for Cook Islanders. This will assist in developing the Cook Islands' seabed mineral exploration sector by establishing new technical, administrative, and support services that will be able to cater to future maritime and research operations. If exploration and research activities determine that nodule harvesting will not create serious harm to the environment, creation of these services will be important in the development of one of the world's first deep-sea mineral harvesting programmes and create opportunities for future generations of Cook Islanders to pursue new technical career paths related to ocean exploration and scientific studies.

There will also be considerable direct benefits to the Cook Islands' local business economy. While it is recognised that a significant part of the economic activity conducted from the larger ship during exploration will focus on port stops in Pago Pago (American Samoa) or other ports with the required facilities, CIC will give priority to staffing the research team with Cook Islanders who either have appropriate previous experience or would qualify as trainees. CIC will also utilise local port and support facilities whenever possible.

It is expected that early-stage exploration and evaluation through to full-scale harvesting (if approved) will require progressively greater levels of ship-to-shore support, utilisation of local expertise and modern communications techniques and technologies, while being sensitive to local and community concerns. Examples of potential local support in the exploration phase include provisioning of the ship's operations with fuel, food and supplies from local businesses, emergency and standby support vessels and calling on islands in the event of an emergency. Local chartering services could also benefit, as will port facilities and operators.

When the smaller research vessel arrives for its intended multi-year mission, it will initially be staffed primarily from outside the Cook Islands by experienced DP/research vessel crew, but it will need to be supported by facilities, suppliers and other resources from the Cook Islands. As the project progresses and Cook Islands' trainees have gone through training programmes and are able to assume more responsibilities for running this vessel, it is anticipated that the crew will eventually be made up primarily of qualified local Cook Islands' seamen and officers whom CIC will assist in obtaining appropriate licencing and certification for running the vessel.

It is also expected that many of the planned environmental monitoring and support programmes will ideally include local hiring of Cook Islanders who have exceptional local knowledge relating to the waters and sea life around the Cook Islands. There will likely be a need for the development of onshore testing and laboratory facilities for biological, geological, and other sampling analysis and a programme established to train locals for a variety of technical positions which will be needed for onshore logistics and/or testing facilities.

The combination of these requirements will create both professional and non-professional job opportunities.

These expected direct benefits will be widely distributed throughout the Cook Islands, with the intent to create new direct employment and business opportunities for a wide range of activities. This will be matched with extensive community outreach efforts, both on the more populous islands (Rarotonga and Aitutaki), as well as on the Pa Enua (Outer Islands), where a combination of meetings, technical workshops, town halls, web-based communications, ship visits and seminars can ensure that everyone has the necessary information and understanding of the project to make their own informed opinions.

Over time, if harvesting is licenced and Cook Islanders desire to be involved in more of the nodule harvesting support activities, there will be opportunities for local sourcing of many different types of resources. Nevertheless, it is recognised that it will be important to avoid placing too much pressure on the country's current facilities, taking into account the opinions of the public and government as to how activities could cause detrimental effects to the Cook Islands' cultural or natural resources.

Even in the early evaluation days where on-shore activities will be relatively modest, CIC intends to create on-shore and at-sea development, apprenticeship and educational opportunities to build local competencies so Cook Islanders can learn the skills for the future roles in the seabed minerals sector.

As deep-ocean harvesting technology gains prominence and global interest, it will raise awareness of the implications of future seabed mineral harvesting technology as well as the potential for a new critical metals supply needed for developing electric vehicles and batteries for renewable energy sources. This may also create new career opportunities for Cook Islanders both at home and abroad.

It is expected that the final feasibility studies for the decision to proceed to harvest will review these direct and indirect benefits in more detail. Final feasibility studies will include projections for new employment in addition to mapping of second and third order economic benefits. There will be close engagement with the Cook Islands' Government and local stakeholders so that final planning incorporates and meets local expectations.

CIC recognises the importance of the Cook Islands' National Sustainable Development Plan (NSDP) 2016-2020 and intends to assist the Cook Islands in achieving as many of their goals outlined in this plan as possible by developing the seabed mineral sector.

Table 6 shows some of the ways CIC sees its assistance in the expansion of the Cook Islands' seabed minerals sector potentially contributing toward various goals presented in the Cook Islands' NSDP.

Table 6: CIC Contributions toward the Cook Islands NSDP 2016-2020

Strategic Goal	How CIC can contribute
1. Improve welfare, reduce inequality and economic hardship.	If exploration successfully leads to the discovery of an economically and environmentally viable deposit and is brought to production, the Cook Islands will be able to diversify its economic portfolio, which has the potential to significantly raise the Cook Islands' economic resilience and bring about a new source of revenue.
2. Expand economic opportunities, improve economic resilience and productive employment to ensure decent work for all.	Throughout both exploration and harvesting phases, CIC will make a variety of new technical work opportunities and training available to Cook Islanders. The skills garnered from these technical positions will be applicable to a variety of jobs within and outside of the seabed minerals sector.
3. Promote sustainable practises and effectively manage solid and hazardous waste.	CIC is committed to environmentally and socially responsible practises and will ensure it will follow all applicable waste standards and regulations. This includes, but is not limited to, international standards and regulations such as The International Convention for the Prevention of Pollution from Ships (MARPOL).
4. Sustainable management of water and sanitation.	Neither exploration nor harvesting would impact freshwater supplies or sanitation for the Cook Islands. After exploration, should the project proceed to harvesting, revenues from harvesting could be directed to develop and/or augment infrastructure relating to water supply and sanitation.
5. Build resilient infrastructure.	Neither exploration nor harvesting would impact current infrastructure in the Cook Islands. After exploration, should the project proceed to harvesting, revenues from harvesting could be directed to develop and/or reinforce infrastructure to be more resilient.
6. Improve access to affordable, reliable, sustainable, clean energy and transport.	CIC, together with the Cook Islands, can help deliver to the world the metals it needs to realise a clean energy future if nodule harvesting is found to create no serious harm to the environment. The battery metals found in the Cook Islands' polymetallic nodules are critical for the development and growth of the battery industry and could contribute to the development of renewable energy sources in the Cook Islands such as wind and solar.
7. Improve Health and Promote Healthy Lifestyles	CIC intends to engage with the Ministry of Health, INTAFF (Internal Affairs) and CISNOC (Cook Islands National Olympic Committee) with an interest towards achieving the NSDP goal of Improving health and promoting healthy lifestyles.

8. Ensure inclusive and equitable quality education and promote life-long learning opportunities.	Scholarships and bursaries from revenue will be generated by a successful seabed mineral harvesting programme. Apprenticeships and capacity building related to both technical and non-technical work during exploration and harvesting phases that will carry over into many other career opportunities.
9. Accelerate gender equality, empower all women and girls, and advance the rights of youth, the elderly and disabled.	CIC encourages equal opportunity in both education and employment. The company recognises that equality exists between all genders, not only in the workforce of the Cook Islands but also at all community levels. CIC's programme will endeavor to provide opportunities that empower females, educate youth and include the elderly and disabled.
10. Achieve food security.	Increased revenue from a successful harvesting programme can be distributed to achieve this goal.
11. Promote sustainable land-use, management of terrestrial ecosystems and protect biodiversity.	Exploration will expand the Cook Islands' database of deep-sea biodiversity and assist in establishing the necessary precautions to preserve it. Additionally, CIC intends to support the development of land-use and terrestrial ecosystem management programmes.
12. Sustainable management of oceans, lagoons, and marine resources.	Development of a better understanding of the Cook Islands' marine environment is essential in establishing the necessary set-asides to preserve the ocean, its biodiversity and resources for future generations of Cook Islanders to come. The oceanographic and environmental data acquired throughout exploration and harvesting is property of the Cook Islands and can be used to establish sustainable management programmes to ensure that the newly established Marae Moana marine park is properly maintained and monitored.

13. Strengthen resilience to combat the impacts of climate change and natural disasters.	Benefits from the development of the seabed mineral sector will contribute to the nation's funding options to find the ideal practises for facilitating its climate change activities and achieving its development aspirations. CIC recognises and will aim to assist in the realisation of the following Cook Islands goals: • Achieving 100% renewable energy generation in all islands by 2025 • Achieving 100% energy efficiency across the country by 2025 • Confirm a zero emissions target for the Cook Islands by 2040 Additionally, if the Cook Islands goes forward with a nodule harvesting program, the nation can contribute to a de-carbonised society by supplying the critical metals needed for clean energy solutions.
14. Ensure a sustainable population, engaged in development for Cook Islanders by Cook Islanders.	Throughout both exploration and harvesting phases, if harvesting is determined to be viable, a variety of new technical work opportunities and training will be made available to Cook Islanders. The skills garnered from these technical positions will be applicable to a variety of jobs within and outside of the seabed minerals sector. For example, reapplying the skills gained from mineral/sediment assaying can be used for terrestrial soil and hydrologic analyses.
15. Promote a peaceful and just society and practise good governance with transparency and accountability.	CIC aligns with this goal and intends to work with the Cook Islands' Government through every stage of development to ensure transparency and accountability of an environmentally responsible and economically viable seabed mineral resource management programme, taking into account a deep concern and respect for Cook Islands' culture.
16. Preserve our heritage and history, protect our traditional knowledge, and develop our language, creative and cultural endeavours.	CIC has set up and funded The Cook Islands Traditional Arts Trust (Te Rito O Taku Peu Tupuna) and has already begun contributing to the preservation of Cook Islands' heritage, history, art and language through multiple programs and initiatives.

6.2 Public Engagement, Collaboration and Information

CIC welcomes advice and ideas with respect to public outreach and looks forward to establishing a formalised engagement plan in consultation with the Cook Islands' Government to ensure effective public engagement and education that is culturally appropriate.

CIC intends to utilise local expertise and communication techniques to effectively engage the public of the Cook Islands. With the help of trusted local experts and public input, CIC plans to provide Cook Islanders with the data and information needed to develop an informed view of impacts, consequences and merits of seabed exploration activities and harvesting. A proactive approach will be implemented that ensures consultation with all levels of the community regarding concerns related to seabed mineral exploration and harvesting. This would include, but is not limited to, meetings with traditional leaders, environmental organisations, Pa Enua leaders/communities, schools, churches, parliament, the various Ministries and all political parties.

Additionally, CIC intends to foster cooperation between academic experts from the University of South Florida College of Marine Science (USA), University of North Carolina at Chapel Hill (USA), The University of the South Pacific (Rarotonga), Eckerd College (USA), The University of Hawai'i (Manoa), Kochi University (Japan), The International Marine Minerals Society (IMMS), The United States Geological Survey (USGS), The Natural History Museum of London (UK), and The National Oceanography Centre at the University of Southampton (UK) as well as other institutions. Students and faculty will have an opportunity to co-author scientific articles and participate in scientific investigations related to the project.

The team is committed to engaging with Cook Islands' citizens and stakeholders for scientific collaboration, education, grant acquisition and employment opportunities pertaining to marine science and engineering.

Dr. Martens of the University of North Carolina at Chapel Hill, a co-leader of CIC's physical oceanographic data collection and current modelling plan, has experience with similar interagency and international team building. A specific programme he participated in organising focused on scientific investigation of Brazil's Amazon region through a long-term effort funded as part of NASA's Large-scale-Biosphere-Atmosphere Ecosystem Program (National Aeronautics and Space Administration). The programme resulted in training, employment and education through the doctoral level for many citizens and scientists including members of the regional community wherein the study was undertaken. Dr. Martens, as a member of the CIC team, can assist in implementing a similar successful programme within the Cook Islands.

CIC foresees the following steps in developing its engagement plans and conducting meaningful engagement:

- Stakeholder Identification and Collaboration. These stakeholders include, but are not limited to:
    - Parliament
    - Government Ministries and Crown Agencies
    - The Koutu Nui House of Ariki
    - Religious Advisory Council (RAC)
    - Local Non-governmental organisations – Te Ipukarea Society (TIS) and Korero O Te 'Orau

- General Public – Village meetings in each of the three Rarotonga Vakas: Takitumu, Te Au Tonga and Puaikura as well as throughout the Pa Enua
- Schools

This list will be updated on a regular basis.

- Develop a list of expertise and services required for the project.
  - Advertising locally and looking in country for initial hires.
- Review of relevant local expertise and techniques, including marine scientists, fisheries experts, laboratory analysis capability, etc., in consultation with the Cook Islands' Government.
  - CIC to work in collaboration with the Cook Islands' Government to create a local database of qualified Cook Islanders in various skilled fields to draw from when required.
- Review of local businesses and the capability of the local community to offer supplies for the exploration vessel.
  - CIC to meet with local suppliers to discuss how they can meet the needs of the exploration vessels – giving local businesses first opportunity.
- Review of local communication techniques and technologies – e.g., newspaper, radio, TV, workshop and conferencing facilities.
- Establish an in-country CIC presence to ensure a local go-to person and response team for local interaction with the project.
- Conduct awareness campaigns, including visits to outer islands as advised by the Cook Islands' Government.
  - Awareness campaigns will be conducted in both English and Maori.
  - Ideally, these would be joint campaigns between CIC, the national government, and any relevant experts to collaboratively inform the public about the activities being undertaken, the regulatory regime related to these activities, the impact of the activities, and to answer any questions the community may have about the planned activities.
  - Campaign schedule to be decided in consultation with the Cook Islands' Government.
- Collaboration with the Ministry of Education to include seabed minerals and ocean exploration as part of its current curriculum.
- Open, inclusive, transparent workshops to discuss exploration plans and results in both Rarotonga and the outer islands.
- Development of information materials for dissemination (co-developed with Cook Islands' Government and translated into Cook Islands' Maori).
- Berths made available on CIC exploration ships to trained Cook Islands' Government representatives as well as local interested parties and researchers.
- Operation of a full-time, smaller research vessel is envisioned to be based in either Rarotonga or Aitutaki beginning in year one of the Exploration Programme. This will create opportunities for qualified Cook Islanders to regularly participate in exploration activities, support the local economy, and provide an enhanced research platform for other interested sea users and institutions.

6.3 Development and Investment in Local Business, Arts and Cultural Projects

Over the past 20 months, CIC has been engaged in various projects in the Cook Islands including:

- Sourcing, transporting and donating medical equipment for COVID-19 preparation in cooperation with *Te Marae Ora*, the Ministry of Health.
- Creating a dialogue with the Arts Department of the Ministry of Education to encourage the Arts curriculum within the schools. Working on this initiative with the Advisor for the Ministry of Education and coordinating these activities with The Cook Islands Traditional Arts Trust.
- Supporting Autism Cook Islands and contributing to its fundraising efforts for the Kara Run 2020.
- Securing sponsorship funds with the local BSP bank to construct bathroom facilities and to open a teaching cafe to support the Tavioni Arts program & Vananga.
- Support for classes in traditional arts skills and assisting author Michael Tavioni to distribute his educational motif book to several schools in Rarotonga and Aitutaki.
- Participating in World Clean-Up Day on the beaches and roadways.
- Providing a mental wellness workshop for the community.
- Contributing support and funds to the Cook Islands' 2020 Olympic kayak team.

Cook Islands Traditional Arts Trust

In the traditional terrestrial mineral extraction industry, Foundations are often created for the purpose of community development funds over the life of the mine; however, investment in local traditional, cultural and educational programmes is not done directly or initiated by companies until after a mining licence is acquired, extraction has started, and cash flow is being generated from the processed metals.

To demonstrate CIC's commitment to contribute to various local non-profit cultural and educational projects, The Cook Islands Traditional Arts Trust has been established and has already developed plans and has begun making contributions in a variety of local traditional, cultural and educational programmes.

Objectives

The Trust is established as a charitable organisation for the purpose of providing financial assistance to such individuals, entities or projects as are approved by the Trustees for educational initiatives which advance and develop the cultural and traditional arts of the Cook Islands and will benefit the public of the Cook Islands.

PROJECT 1: THE TAVIONI ARTS SCHOOL/TAURA VANANGA TRUST

Construction work has already begun on the existing facility to help provide an operational footprint that will allow the Arts Centre to offer more courses, workshops and events in traditional arts and life skills. The physical working space requires these zones to be better structured and organised to ensure that the teaching areas are fit for purpose, safe and hygienic.

These new improvements are already providing a more structured teaching campus for the traditional teachings of Master Carver Mike Tavioni and other Cultural Arts programmes – with many classes and events being regularly planned and conducted for students of all ages.

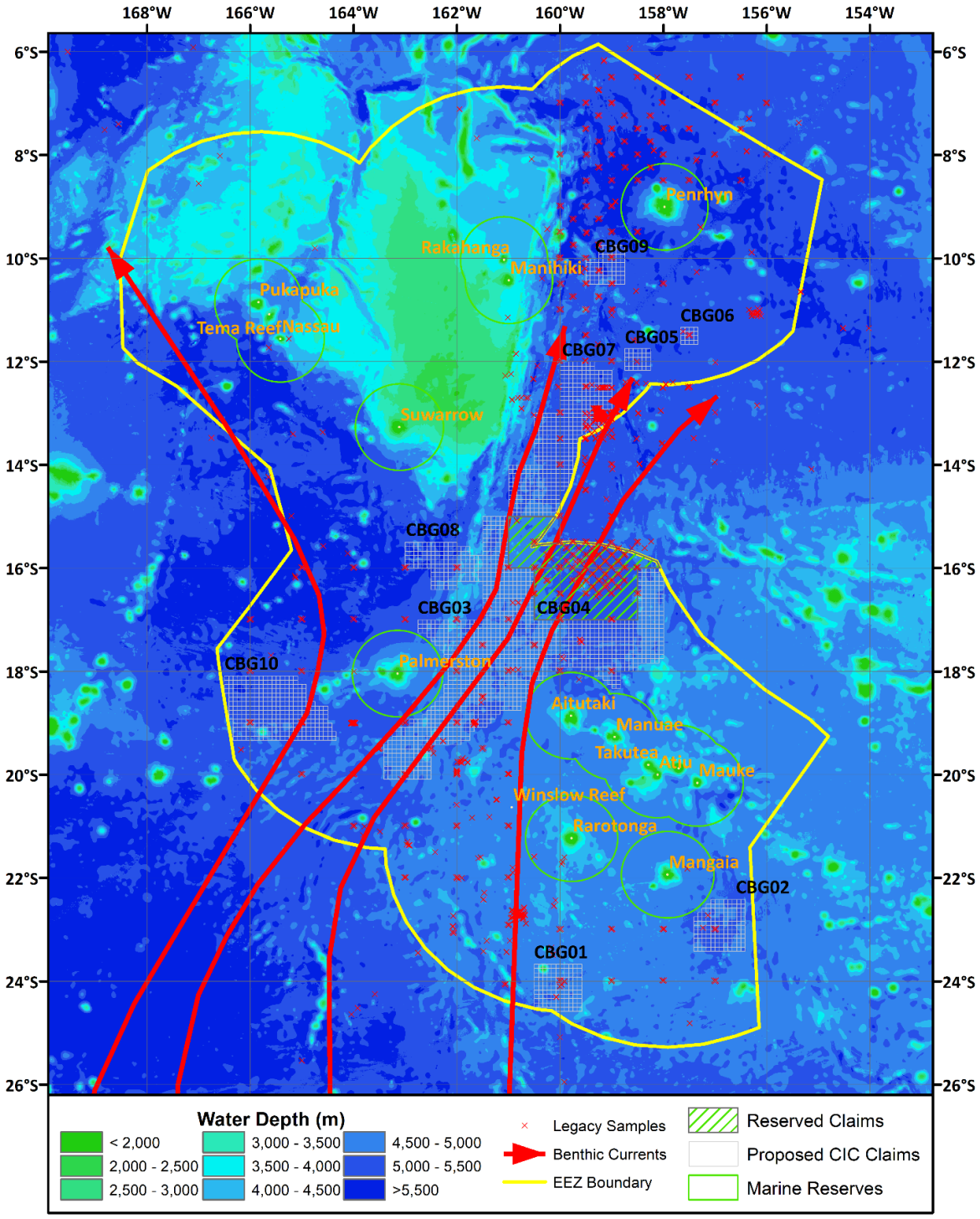
Conclusion

CIC looks forward to working with the Cook Islands' Government, the NES, the NEC, local communities, businesses and organisations to further refine this Environmental Management Plan (EMP). The CIC Exploration Work Programme will align with the Cook Islands' desire for a world class-exploration programme to responsibly and effectively learn more about the potential mineral resources and the marine environment in the Cook Islands' EEZ.

List of Attachments

- 2a. CBGs and Currents Map (CIC067)
- 3a. List of Environmental Baseline Studies and Approaches (CIC068)
- 3b. Key Environmental Impact Assessment Work for Nodule Provinces in the Deep Sea (CIC069)

Attachment: 2a. CBGs and Currents Map



Attachment: 3b. Key Environmental Impact Assessment Work for Nodule Provinces in the Deep Sea

Study Name (location, year)	Entity	Key Focus Areas	Objectives/Findings
DOMES (CCZ, 1970s)	USA	Baseline studies, impact prediction	DOMES identified three key future EIA study areas: i) benthic community impacts due to nodule removal, ii) near-surface biota impacts due to plumes from discharge water (assumes surface discharge), and iii) benthic community impacts due to deposition of suspended sediments. The study suggested test harvesting was needed to confirm predictions made.
ECHO-1 (CCZ, 1983)	USA	Revisited DOMES Site C post-test mining in 1978	Objective was to examine benthic recolonisation using box core samples following small-scale test mining by OMA some five years earlier. No significant differences were found between macrofauna and meiofauna from mining tracks and a nearby control area. Dick and Foell (1985) [cited in Morgan et al. 1999] determined that the tests were inconclusive due in part to the techniques used, which had low positional accuracy.
Acute Mortality Experiment (CCZ, ca. late 1980s)	USA	Studied impacts of sedimentation on fauna	Known amounts of sediment were added to corers positioned on the seabed with the expectation to learn the amount of sedimentation required to smother or entomb benthic biota. This project experienced technical difficulties with core recovery from the sea floor. General conclusions were that there was little evidence of serious disturbance to macrofauna when subjected to burial <1 cm of sediment, while burial under 4 cm of sediment appeared to cause entombment of 25% to 50% of the macrofauna in six days.
Quagmire II Expedition (CCZ, 1990)	USA	Revisited DOMES Site C post-test mining in 1978	Examined benthic recolonisation using precision sampling techniques (RUM-III vehicle) following small-scale test mining by OMA in 1978. Carried out a critical-dose experiment to determine the sensitivity of benthic fauna to sedimentation levels. The major cruise objectives were not achieved.

DISCOL (Peru Basin, 1989 to 2015)	Germany	Large-scale disturbance-recolonisation experiment (Peru Basin)	The work involved baseline data gathering, plowing ~11 km^2 of the sea floor using a "plow-harrow" down to 10 to 15 cm depth. ~20% of the area was affected by the plow harrow, ~70% was covered by various thicknesses of sediment, and ~10% remained unaffected. Following the disturbance, studies were conducted immediately after the impact, after six months, then at three and seven years to determine the rate of recolonisation of the impacted areas. Due to the impact, the abundances of all fauna decreased significantly, then three years after the impact, densities of major faunal groups significantly exceeded what had been found during baseline studies, although diversity was lower. After seven years, the tracks remained clearly visible. The undisturbed areas remained more or less constant. For the megafauna, biota that depend on hard substrates (nodules) remained absent while more mobile biota dominated. A further offshore study at the DISCOL site was conducted in 2015, some 26 years post disturbance (as part of MIDAS and JPIO; jpio-miningimpact.geomar.de). The researchers noted that while the faunal densities of most taxa recovered rather quickly, and were almost back to pre-disturbance conditions after seven years, the diversity and community composition had not recovered 26 years after the impact. The study highlighted that to minimise large-scale impacts, there is a need for marine spatial planning, including the establishment of set-aside areas. It should be noted that no impact minimisation, mitigation, or restoration activities were trialled as part of the original disturbance experiment.
Benthic Impact Experiment; BIE (CCZ, 1993)	Collaboration between Russia, USA, and Japan	Studied the effects of sediment re-deposition on benthic fauna	Work included baseline studies (including current meters, box cores and sediment traps), then blanketing an area with sediment by towing through an area 150 × 3,000 m in a NE–SW direction, resulting in the suspension of ~4,000 m^3 of sediment. Bulk of sediment travelled north and settled quickly as a sediment-laden fluid flow. Of the 71 macrofaunal families analysed, only two appeared to be impacted by sediment re-deposition. Overall species diversity remained unaffected by sediment re-deposition. However, the resultant sediment thickness was not attainable due to wide dispersion causing no measurable significant accumulation outside the disturbance area. Therefore, no relationship between faunal succession and sediment was accomplished.

Japan Deep-Sea Impact Experiment; JET (CCZ, 1993)	Japan	Studied the effects of sediment re-deposition on benthic fauna	Used the same device as BIE in a western CCZ location. Samples before and after disturbance were collected and then collected again after 1 year. Abundances and vertical distributions of meio- and microfauna were studied. Again, there was no quantification of the re-sedimentation thickness. The extended effects of disturbance on the abundances of each faunal component were different. Changes in abundance in total fauna were greatest in the upper layers of sediment.
Interocean-metal Joint Organization Benthic Impact Experiment; IOM-BIE (CCZ,1995, 1997, 2000)	IOM, COMRA (China)	Studied the effects of sediment redeposition on benthic fauna	IOM-BIE monitored ecosystem changes following a sediment disturbance. Immediately following the disturbance, intense feeding activity by megabenthos was observed, presumably due to additional availability of food sources. Meiobenthos abundance decreased and their vertical distribution was altered. During the 2000 campaign, the results collected indicated the abyssal meiobenthos in the control area had been affected by (assumed) natural processes. By 2000, abundances at the 10M site had reverted to control area levels.
Indian Deepsea Experiment; INDEX (CIOB, 1997 to 2007)	India	Studied the effects of sediment re-deposition on benthic fauna (Central Indian Ocean Basin; CIOB)	INDEX utilised the Deep-Sea Sediment Resuspension System (Brockett and Richards 1994) to resuspend >6,000 m^3 of sediment over a nine-day period. Monitoring over a decade showed that the CIOB has highly heterogeneous environmental conditions in terms of spatial variation. India reported at an ISA workshop held in 2010 that the monitoring of environmental conditions after the benthic disturbance experiment indicated the benthic conditions were steadily moving towards restoration and the effects of disturbance are waning with time.

Kaplan Study (CCZ, 2002 to 2007)	International; USA, UK, Japan, France (JM Kaplan Fund and ISA funded)	Baseline Studies (biological)	The Kaplan study was designed to study biodiversity, species ranges, and gene flow in the abyssal Pacific nodule province, with specific reference to predicting and managing the impacts of deep seabed mining. The Kaplan study aimed to i) estimate, using molecular methods and rigorous statistical techniques, the number of polychaete, nematode and foraminiferal species at three stations spaced at 1,500 km intervals across the Pacific nodule province; ii) evaluate species overlap and rates of gene flow; iii) communicate findings and make specific recommendations on minimizing the risks to biodiversity resulting from mining. Based on the data collection and analysis, the researchers recommended that the ISA establish a network of MPAs across the CCZ to safeguard biodiversity that could be affected by mining activities. This eventually led to the establishment of APEIs within the CCZ.
EqPac (JGOFS EqPac) (CCZ, 1992)	USA	Equatorial Pacific Process Study; Baseline studies	The EqPac process study was conducted along 140°W. Four process cruises took place, with a fifth benthic cruise and sediment trap legs adding to the overall study. The scientific objectives of this study were to determine the fluxes of carbon and related elements, and the processes controlling these fluxes between the Equatorial Pacific euphotic zone and the atmosphere and deep ocean.
NIXO/NIXO 47 (CCZ, 2004)	France	Studied long-term effects of physical disturbance made by a dredge (OMCO) in 1978	This study compared surface sediments in and outside a dredge track. 26 years after the dredging event, the track was still visible. The physical and chemical properties of the disturbed sediment sampled in the track had not changed significantly over time and had not shown any recovery since the disturbance. On the other hand, the biological activity measured in the track with a respirometer did not differ from the unperturbed site, which suggests that the benthic fauna have completely recovered, as have nutrient fluxes at the water–sediment interface (Khripounoff et al. 2006).
NaVaBa Program (CCZ, 1996 to present)	China	Natural variability baseline studies	10 cruises were conducted from 1998 to 2010, focusing on environmental baseline work for the COMRA contract area. Initial studies examined spatial variability/heterogeneity and functional relationships between fauna.
Deep CCZ Biodiversity Synthesis	International	Summary of Friday Harbor Biodiversity Workshop	Comprehensive update of CCZ biodiversity research, sponsored by the ISA and the Pew Charitable Trusts

Workshop Report **October 2019**			
Deep-Sea Mining Plume Mitigation: Sequestration and Treatment (2020 to present)	USA	Mitigation of miner plume impacts	Laboratory studies of natural sediments to investigate potential for using electrocoagulation to mitigate plume dispersion (Steven Rizea, Underwater Mining Conference 2020)

CCZ = Clarion-Clipperton Zone; DOMES = Deep Ocean Mining Environmental Study; EIA = Environmental Impact Assessment; OMA = Ocean Mining Associates ; BIE = Benthic Impact Experiment; IOM = Interoceanmetal Joint Organization; MPA = Marine Protected Area; COMRA = China Ocean Mineral Resources Research and Development Association; CIOB = Central Indian Ocean Basin; OMCO = Ocean Minerals Company.

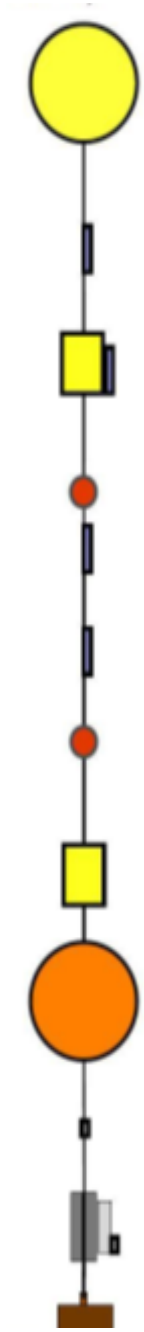
References

Brockett T, Richards CZ. 1994. Deep sea mining simulator for environmental impact studies. *Sea Technology* 35(8):77–82.

Khripounoff A, Caprais J-C, Crassous P, l'Etoubleu J. 2006. Geochemical and biological recovery of the disturbed seafloor in polymetallic nodule fields of the Clipperton-Clarion Fracture Zone (CCFZ) at 5,000-m depth. *Limnology and Oceanography* 51(5):2033–2041.

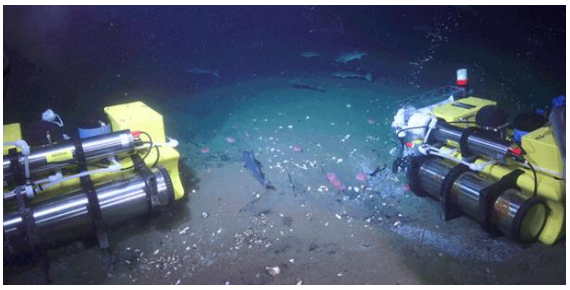
Morgan CL, Odunton NI, Jones AT. 1999. Synthesis of environmental impacts of deep seabed mining. *Marine Georesources and Geotechnology* 17:307–356.

Attachment: 3a. List of Environmental Baseline Studies and Approaches

Study Area: Physical Oceanography (Long-term Studies)		
 (example only, not to scale)	**Platform**	**Multiple moorings installed on the seafloor**
	Study Objective	To understand the currents around the extraction site and to estimate the natural levels of sedimentation over a 12 to 36-month period (depending on the mooring). Study enables modelling the extent and duration of plumes that may be formed during full-scale operations.
	Technique Description	Moorings will be anchored to the seafloor and will include instrumentation such as single point current meters, acoustic doppler current profilers (ADCPs), sediment traps, CTDs, transmissometers, and other instruments, along with buoyancy devices. Moorings will be of multiple lengths and most will focus on bottom-water currents, with at least one envisaged to cover almost the entire water column (example shown). Moorings will be retrieved on a ~6 to 12-month basis for data download, equipment maintenance and mooring reinstallation. Following data acquisition, hydrodynamic modelling of plume extent and duration will be performed.
	Project Stage	EIA – Environmental Impact Assessment
	General Comments	Moorings are usually anchored using scrap metal or cement blocks. The moorings will be affixed to the anchor with dual acoustic releases, which are triggered from the ship using a "Deck Box" when equipment retrieval is necessary.
	Area Disturbed	Small, corresponds to size of the anchor which is typically less than 2 m x 2 m.
	Environmental impact[1]	Very low. Note that the depth of the shallowest instrument will need to be determined in consultation with the Cook Islands government and local fisheries to ensure there is no chance of entanglement with fishing nets or lines.
	Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups and environmental agencies.

Photos and specifications for moorings and equipment are courtesy of RDSea International.

[1] Environmental impact beyond standard vessel operations.

Study Area: Physical Oceanography (Near-term and Long-term Studies)	
 	
Platform	**Benthic Basic Mini Landers**
Study Objective	To understand the currents around the extraction site and to estimate the natural levels of turbidity, as well as near-seabed dissolved oxygen, water temperature, and conductivity (as a proxy for salinity). Study enables modelling the extent and duration of plumes that may be formed during full-scale operations.
Technique Description	Landers are unmanned and deployed from a research vessel. They collect data for a defined period of time and then shed their ~90kg ballast after which they float to the surface. The units are retrieved aboard the research vessel and collected data is obtained from the Lander's sensors.
Project Stage	EIA – Environmental Impact Assessment
General Comments	These offer an expeditious means to acquire valuable data on currents and other parameters near the seabed. They complement data collected from moorings and their deployment/retrieval requires fewer logistical considerations than moorings.
Area Disturbed	Small, corresponds to size of the unit which is a footprint of about 90 x 90 cm.
Environmental impact	Very low
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups and environmental agencies.

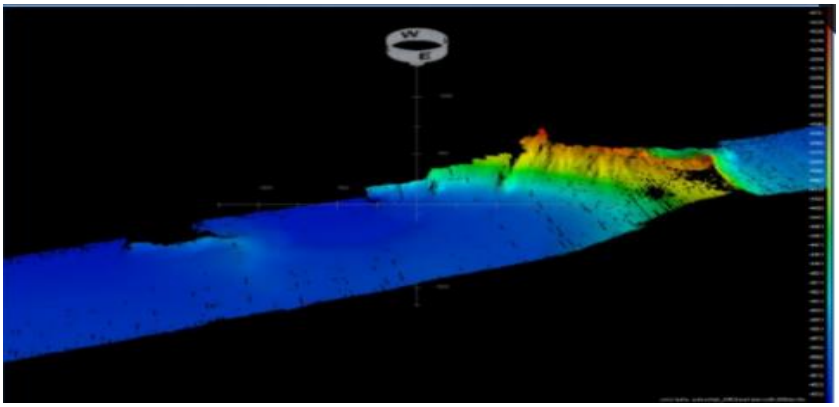
Photos and specifications for Mini-Landers are courtesy of UNC-CH.

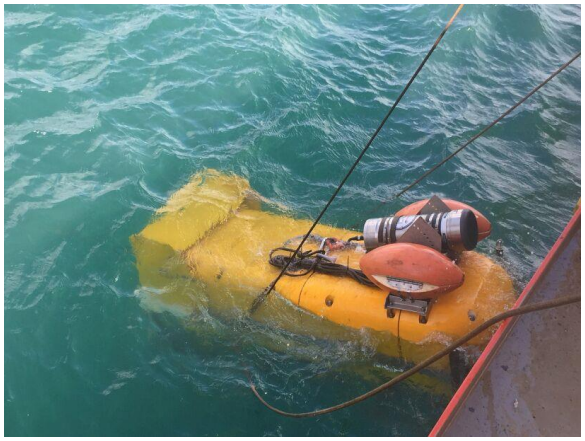
Study Area: Physical Oceanography (Opportunistic Current Profiles)	
 	
Platform	**L-ADCP (Lowered Acoustic Doppler Current Profiler)**
Study Objective	To understand the currents above and around the extraction site at a single point in time – will help to 'calibrate' the long-term moorings over a larger area of study. Study enables an estimate of the extent and duration of plumes that may be formed during full-scale operations.
Technique Description	A Lowered-Acoustic Doppler Current Profiler (ADCP) is tethered to the ship by a long cable and is used to obtain water column current (speed and direction) profiles in a simple vertical down and up cast.
Project Stage	EIA – Environmental Impact Assessment
General Comments	Data needs to be carefully processed following collection to remove interferences from ship movements and deployment method (i.e. the movement associated with the instrumentation traveling through the water column).
Area Disturbed	Nil. No physical contact made with the seafloor.
Environmental impact[2]	None. No physical contact made with the seafloor.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

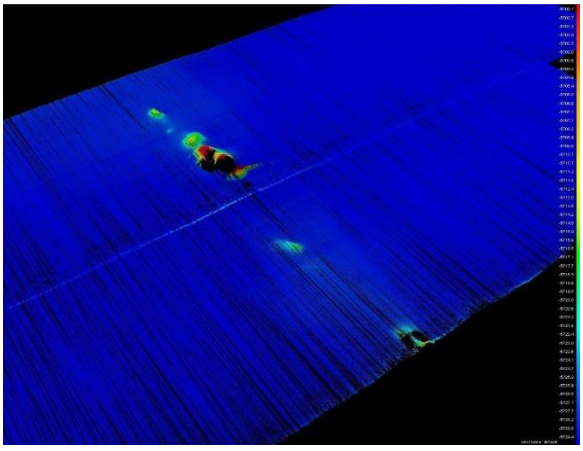
Photo #1 Courtesy of Teledyne Marine
Photo #2 Courtesy of Census of Marine Life

[2] Environmental impact beyond standard vessel operations.

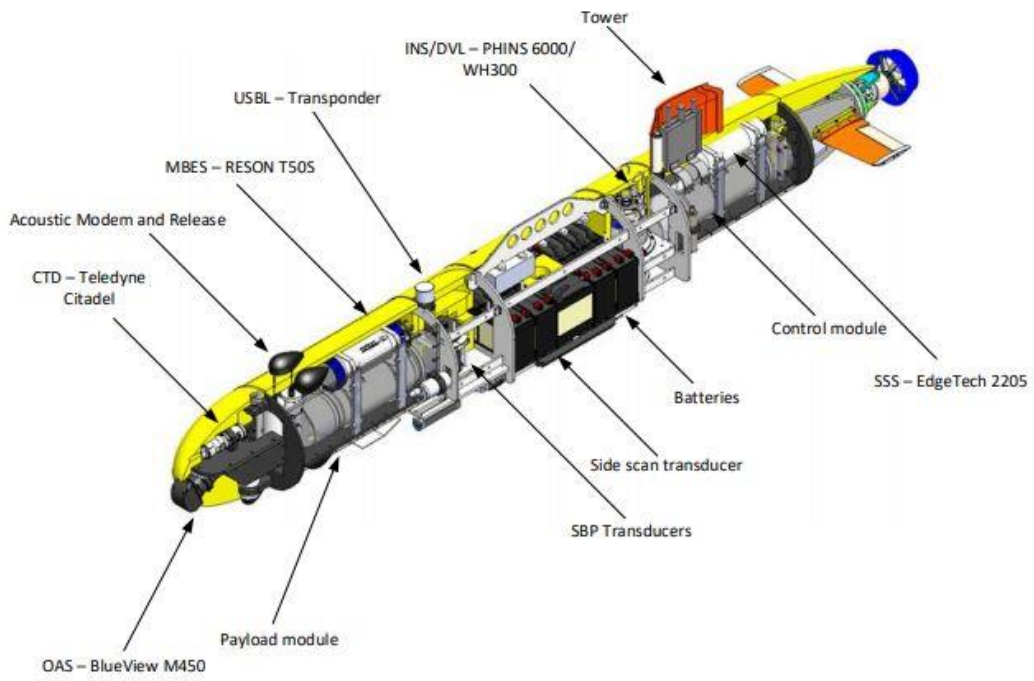
Study Area: Geology (High Resolution Bathymetry)

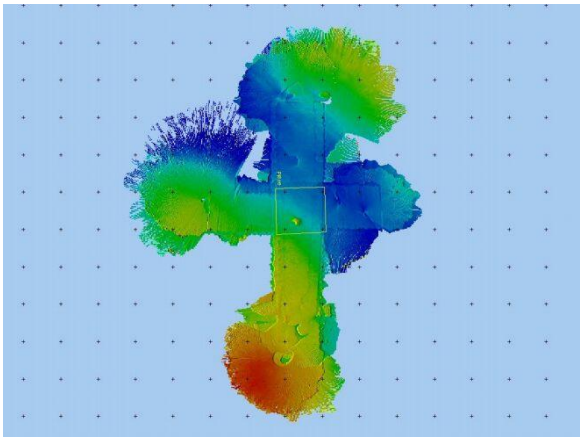


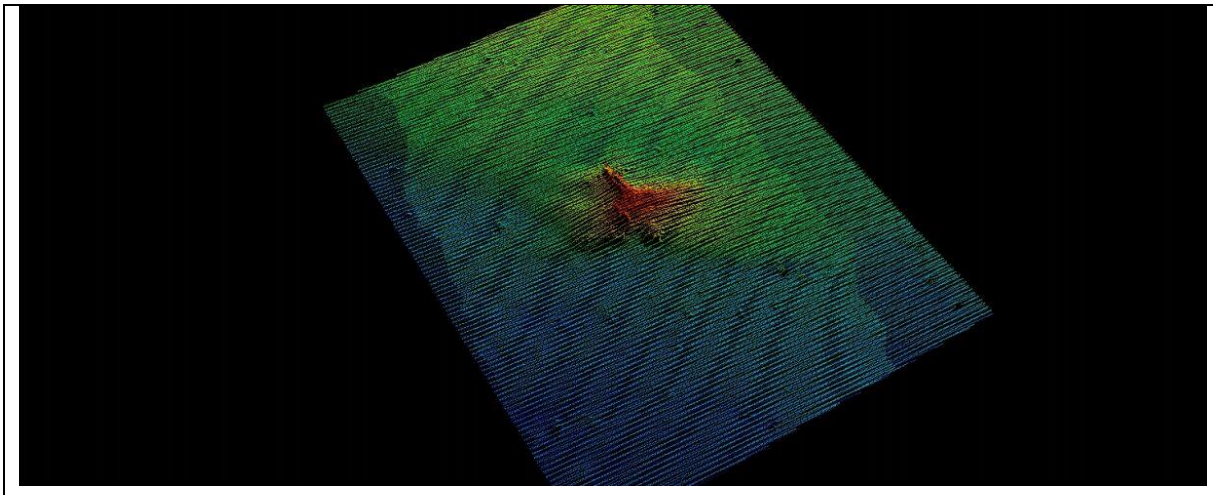




DeepTow images and 200kHz multibeam data images collected courtesy of Odyssey Marine


Tower
INS/DVL – PHINS 6000/
WH300
USBL – Transponder
MBES – RESON T50S
Acoustic Modem and Release
CTD – Teledyne
Citadel
Control module
SSS – EdgeTech 2205
Batteries
Side scan transducer
SBP Transducers
Payload module
OAS – BlueView M450





SeaRaptor AUV images and 400kHz multibeam data images collected courtesy of Teledyne Gavia ehf

Platform	**Deep Tow / AUV**
Study Objective	To produce Geographic Information System regional maps with high resolution bathymetry showing major geological and geomorphological features to assess the heterogeneity of the environment. These maps will be produced at a scale appropriate to habitat variability. This information will also assist with the placement of study locations and mooring installations.
Technique Description	The Deep Tow method employs an underwater sled that is tethered to the ship by a long (fibre-optic) cable. The sled is towed several meters above the seafloor and can be up to 5700 m behind the vessel. A typical deep-tow method uses two side-mounted sonars to map the seafloor on each side of the instrument. The sonars emit low power[3] sound waves, which are reflected off the seafloor and recorded by receivers on the sidescan instrument.
Project Stage	Early Exploration
General Comments	Deep Tow: sled can remain in the water for up to 2 days at a time. A typical survey area may take several weeks to complete.
Area Disturbed	Nil. No physical contact made with the seafloor.
Environmental impact[4]	Negligible. No physical contact made with the seafloor. Sound levels not high enough to cause physical damage to marine biota.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

[3] Power and frequency levels dependent on specific technique used.
[4] Environmental impact beyond standard vessel operations.

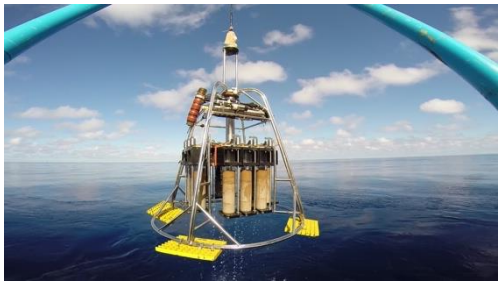
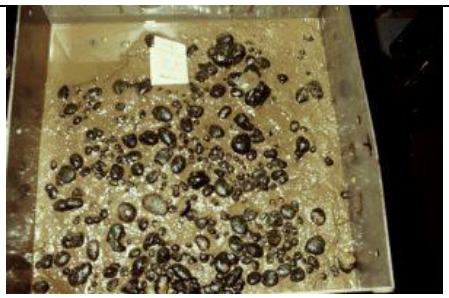
Study Area: Geology (Heavy Metals and Trace Elements)	
  	
Platform	**Multiple-Corers (Multi-Corers) or Mega-Corers**
Study Objective	To collect information on the potential for heavy metal and trace element release during full-scale mineral extraction operations, and their concentrations.
Technique Description	A multi-corer is a bottom sampling tool used for sampling in chemical, geochemical and biological applications. The coring head is hydraulically damped to ensure undisturbed samples. It is deployed from a research vessel with a deep-sea wire. The design of the system allows for multiple cores to be retrieved from a single deployment/retrieval cycle, increasing the chances of successful core retrieval in areas of difficult seabed terrain (i.e. hard bottom, seamounts, and undulating bathymetry). Cores are brought up to surface, sectioned and preserved following best practise technique.
Project Stage	EIA – Environmental Impact Assessment
General Comments	Multi-corers generally have between four and twelve individual corers that will separately penetrate the seafloor once contact is made. Multi-corers can be outfitted with additional instrumentation such as altimeters, CTDs, and penetrometers. Casts are usually completed within several hours.
Area Disturbed	Varies depending on how many corers, but the diameter of the base of a mega-corer (twelve core tubes) is ~ 2.8 m.
Environmental impact[5]	Very small, restricted to area where sample is taken.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photo #1 courtesy of Natural Resources Defence Council

[5] Environmental impact beyond standard vessel operations.

Study Area: Geology (Heavy Metals and Trace Elements)	
  	
Platform	**Box Corers**
Study Objective	To collect information on the potential for heavy metal and trace element release during full-scale mineral extraction operations, and their concentrations.
Technique Description	Bottom sampling tool designed for minimum disturbance of sediment and overlying features. It is deployed from a research vessel with a deep-sea wire. Upon contact with seafloor, the outer shovel is released, and the sample taken.
Project Stage	Early Exploration, EIA – Environmental Impact Assessment
General Comments	Box cores typically have an area of approximately 2500 - 5625 cm^2. Retrieval and deployment time depends on winch capabilities and water depth; however, total time generally does not take more than several hours at depths of ~5000 m. Box corers can be outfitted with additional instrumentation such as altimeters, CTDs, and penetrometers.
Area Disturbed	Maximum area of 0.75 m x 0.75 m with 0.65 m depth penetration per sample if largest known box corer is utilised.
Environmental impact[6]	Very Low.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photos #1 and #3 and specifications for Box Corer courtesy of Ocean Instruments.
Photo #2 courtesy of NOAA

[6] Environmental impact beyond standard vessel operations.

Study Area: Chemical Oceanography (Water Column Chemistry)	
  	
Platform	**Water Sampling Carousel / Rosette, CTD**
Study Objective	To understand baseline water quality conditions in the water column overlying the site targeted for nodule extraction, capturing at least two summer/winter seasons (seasonal studies).
Technique Description	Water sampling bottles (or "Niskin" bottles) are arranged in a rosette formation around sensors (e.g. CTD). The instrument package is tethered to the ship by a long cable and is used to obtain water column samples and profiles in a simple vertical down and up cast. Each bottle can be triggered individually to enable sampling from various locations. A CTD, which is commonly attached to the water sampling carousel, provides profiles of chemical and physical parameters through the entire water column by detecting its conductivity and temperature (which in turn relates to concentration of salt and other inorganic compounds in seawater). By analysing these parameters, scientists can make inferences about the occurrence of certain biological processes.
Project Stage	EIA – Environmental Impact Assessment
General Comments	Casts are usually completed within several hours.
Area Disturbed	None. No physical contact made with the seafloor.
Environmental impact[7]	Negligible. No physical contact made with the seafloor.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups to characterise water chemistry of the deep sea.

Photo #1 courtesy of Sea Catalog
Photo #3 courtesy of Heraeus Group

[7] Environmental impact beyond standard vessel operations.

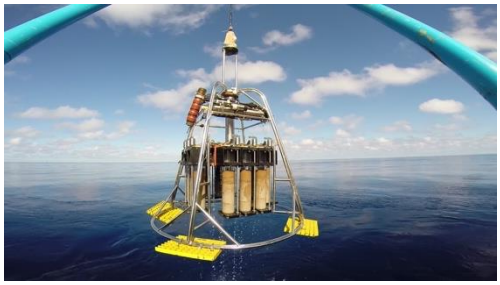
Study Area: Chemical Oceanography (Sediment Pore Water)	
  	
Platform	**Multiple-Corers or Mega-Corers**
Study Objective	To understand baseline water chemistry conditions in sediment pore waters. To collect information on metal and other elements that may be released during the nodule extraction process.
Technique Description	A multi-corer is a bottom sampling tool used for sampling in chemical, geo-chemical and biological applications. The coring head is hydraulically damped to ensure undisturbed samples. It is deployed from a research vessel with a deep-sea wire. The design of the system allows for multiple cores to be retrieved from a single deployment/retrieval cycle, increasing the chances of successful core retrieval in areas of difficult seabed terrain (i.e. hard bottom, seamounts, and undulating bathymetry). Cores are brought up to surface, sectioned and preserved following best practice technique.
Project Stage	EIA – Environmental Impact Assessment
General Comments	Multi-corers generally have between four and twelve individual corers that will separately penetrate the seafloor once contact is made. Multi-corers can be outfitted with additional instrumentation such as altimeters, CTDs, and penetrometers. Casts are usually completed within several hours.
Area Disturbed	Varies depending on how many corers, but the diameter of the base of a mega-corer (twelve core tubes) is ~ 2.8 m.
Environmental impact[8]	Very small, restricted to area where sample is taken.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photo #1 courtesy of Natural Resources Defence Council

[8] Environmental impact beyond standard vessel operations.

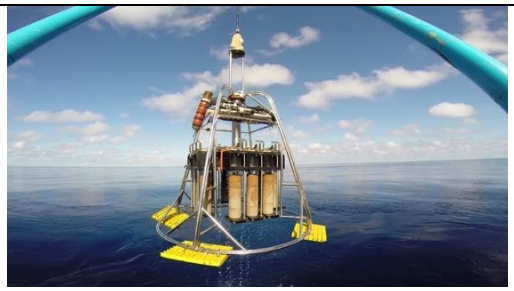
Study Area: Sediment Properties	
  	
Platform	**Box Corers, Multiple-Corers**
Study Objective	To study baseline sediment conditions and predict the behaviour of mineral extraction on sediment composition. To determine the basic properties of the sediment, including measurements of soil geotechnical properties and composition to adequately characterise the surficial sediment deposits which are the potential source of deep-water plume.
Technique Description	See *Heavy Metals and Trace Elements* study for Box coring techniques. See *Heavy Metals and Trace Elements* and *Sediment Pore Water* studies for multi-corer techniques. Sediment to be sampled taking into account the variability of the seabed.
Project Stage	EIA – Environmental Impact Assessment
General Comments	See Box corer methods. See Multi-corer methods.
Area Disturbed	Small, area equivalent to the size of the box corer (typically 0.25 to 0.56 m^2 per deployment) or multi-corer (base diameter ~2.8m).
Environmental impact[9]	Very small, restricted to area where sample is taken.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photo #1 courtesy of Natural Resources Defence Council

[9] Environmental impact beyond standard vessel operations.

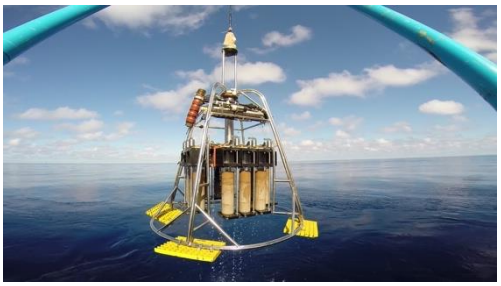
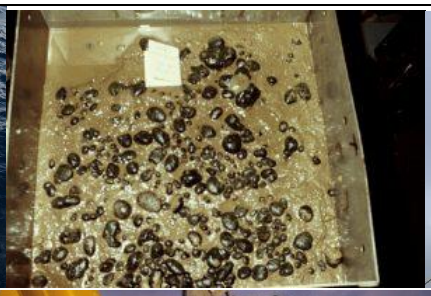
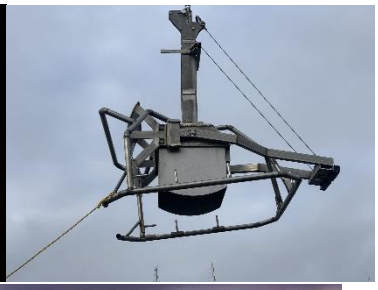
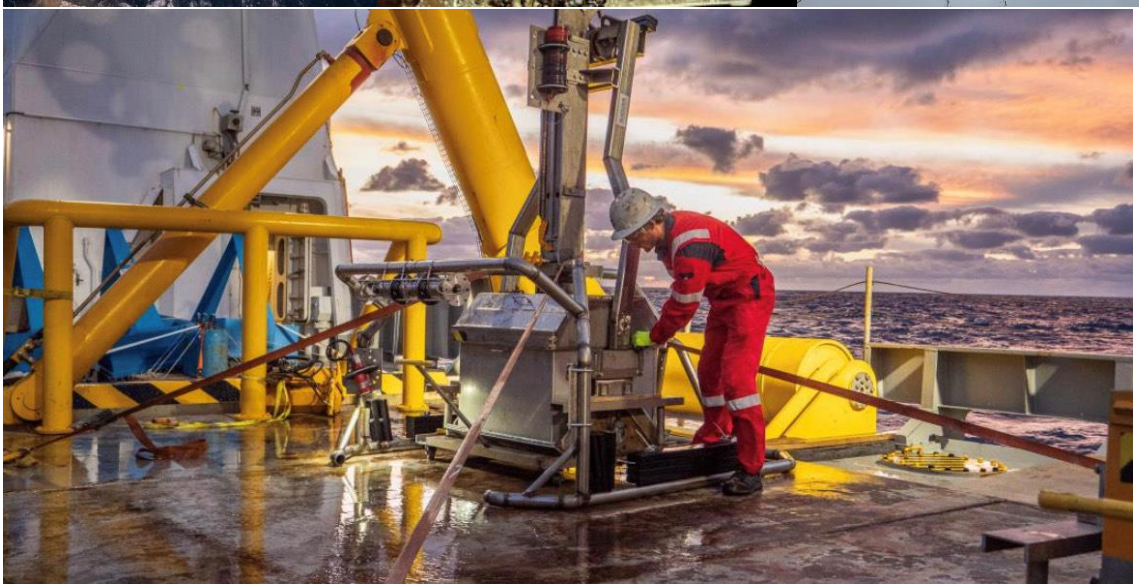
Study Area: Biological Communities - Meiofauna [32-250 micron], Microfauna [<32 micron]	
  	
Platform	**Multiple-Corer**
Study Objective	To understand baseline biological conditions within the seafloor sediments and predict the impact of mineral extraction on biological communities. Samples of fauna to be representative of variability of habitats, bottom topography, depth, seabed and sediment characteristics, abundance and mineral resource being targeted.
Technique Description	See *Sediment Pore Water* study for a description of the sampling technique. Meiofauna: One complete core to be dedicated to metazoan meiofauna (sieved through a 32-micron mesh), a second core for molecular meiofauna analysis with the top 0-5 cm processed. A separate core should be provided for foraminiferal meiofauna, sliced into 1-cm thick layers down to 5 cm depth. Microfauna: Microbial metabolic activity should be determined using adenosine triphosphate or other standard assay. In soft sediment, vertical profiles should be obtained with suggested intervals for sampling as follows: 0-0.5, 0.5-1.0, 1-2, 2-3, 3-4, 4-5 cm. Samples should then be preserved as appropriate.
Project Stage	EIA – Environmental Impact Assessment
General Comments	Multi-corers generally have between four and twelve individual corers that will separately penetrate the seafloor once contact is made. Multi-corers can be outfitted with additional instrumentation such as altimeters, CTDs, and penetrometers. Casts are usually completed within several hours.
Area Disturbed	Varies depending on how many corers, but the diameter of the base of a mega corer (twelve core tubes) is ~ 2.8 m
Environmental impact[10]	Very small, restricted to area where sample is taken.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photo #1 courtesy of Natural Resources Defence Council

[10] Environmental impact beyond standard vessel operations.

Study Area: Biological Communities - Macrofauna [250 micron], Nodule-associated Fauna

Platform	Box Corer
Study Objective	To understand baseline biological conditions within the seafloor sediments an on hard substrates and predict the impact of mineral extraction on biological communities. Samples of fauna to be representative of variability of habitats, bottom topography, depth, seabed and sediment characteristics, abundance and mineral resource being targeted.
Technique Description	See *Heavy Metals and Trace Elements* study for a description of the sampling technique. Macrofauna: information obtained on abundance, species structure, biomass and diversity. Vertical profiles with a suitable depth distribution (i.e. 0-1, 1-5, 5-10 cm) should be obtained. Where possible, whole box core samples should be used and should not be sub-cored or divided. Nodule Fauna: information obtained on abundance, biomass and species structure should be determined from nodules taken from the top of the box corers.
Project Stage	EIA – Environmental Impact Assessment
General Comments	Box cores typically have an area of approximately 0.25 m^2 – 0.56m^2. Retrieval and deployment times depend on winch capabilities and water depth; however, total time generally does not take more than several hours at depths of ~5000 m. Box corers can be outfitted with additional instrumentation such as video cameras, altimeters, CTDs, and penetrometers.
Area Disturbed	Maximum area of 0.75 m x 0.75 m with 0.65 m depth penetration per sample if large box corer is utilised.
Environmental impact[11]	Very Low.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photos #1, #3 and #4 as well as specifications for Box Corer courtesy of Ocean Instruments.
Photo #2 courtesy of NOAA

[11] Environmental impact beyond standard vessel operations.

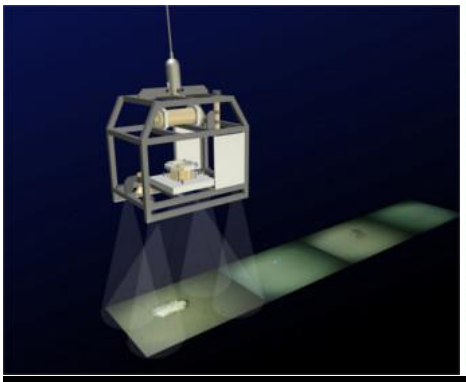
Study Area: Biological Communities – Fauna Sampling by ROV (Megafauna [>2 cm]

Platform	ROV
Study Objective	To understand baseline biological conditions of visible fauna (megafauna - 2 cm and bigger) at the seafloor and predict the impact of mineral extraction on biological communities. Samples of fauna to be representative of variability of habitats, bottom topography, depth, seabed and sediment characteristics, abundance and mineral resource being targeted.
Technique Description	Select target species, combined taxonomy and genetic studies (study to be confirmed – possibly not practical due to low numbers of biota expected in nodule provinces).
Project Stage	EIA – Environmental Impact Assessment
General Comments	The ROV is lowered to the seafloor and surveys are completed and discrete samples can be taken. The ROV is powered by electricity and is hydraulically controlled from the support ship using an umbilical. ROV is typically underwater for 6 to 12 hours at a time, depending on whether or not samples need to be recovered to surface.
Area Disturbed	None – very little contact with seafloor, if any
Environmental impact[12]	Very low, confined to limited removal of individual biota.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

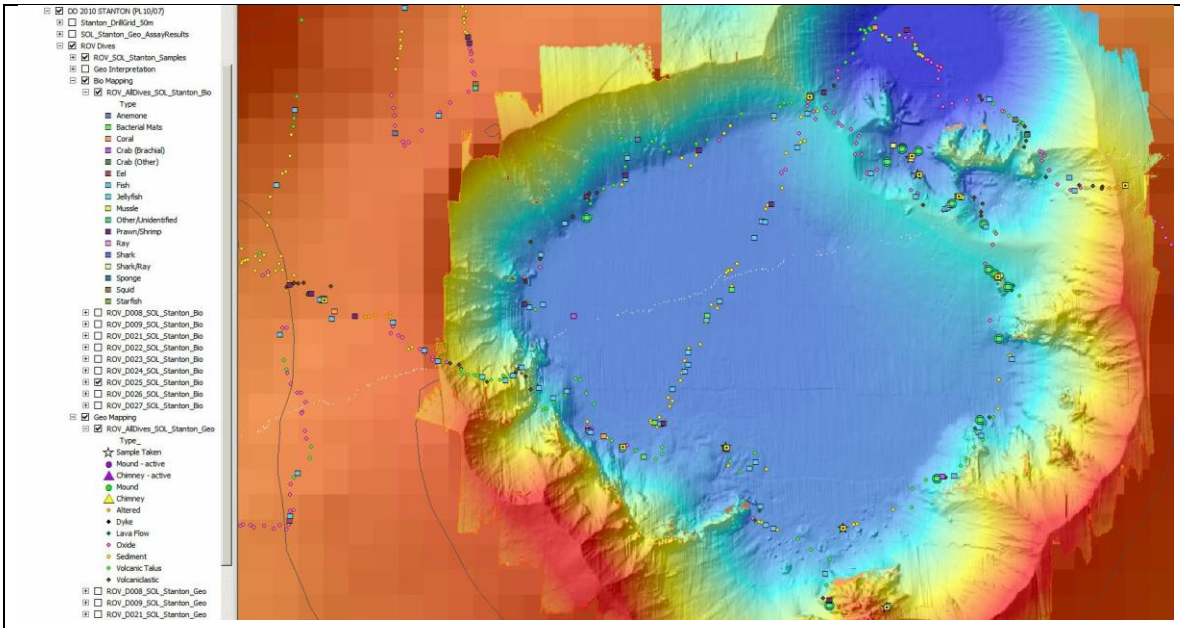
Photos courtesy of Odyssey Marine Exploration, Inc.

[12] Environmental impact beyond standard vessel operations.

Study Area: Biological Communities – Photo/video Transects (Seafloor and Near-Bottom Megafauna)



Images courtesy of Fugro



Example of biota mapping completed with ROV (courtesy of Odyssey Marine)

Platform	**ROV/AUV/Towed Camera System (TBC)**
Study Objective	To understand baseline biological conditions at and immediately above the seafloor and predict the impact of mineral extraction on biological communities.
Technique Description	Follow pre-established transect lines and record observed biota. Assess density and biodiversity of megafauna (biota >2 cm).
Project Stage	EIA – Environmental Impact Assessment
General Comments	See ROV, AUV, and Towed methods
Area Disturbed	None – no contact with seafloor
Environmental impact[13]	None – no contact with seafloor (see ROV)
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

[13] Environmental impact beyond standard vessel operations.

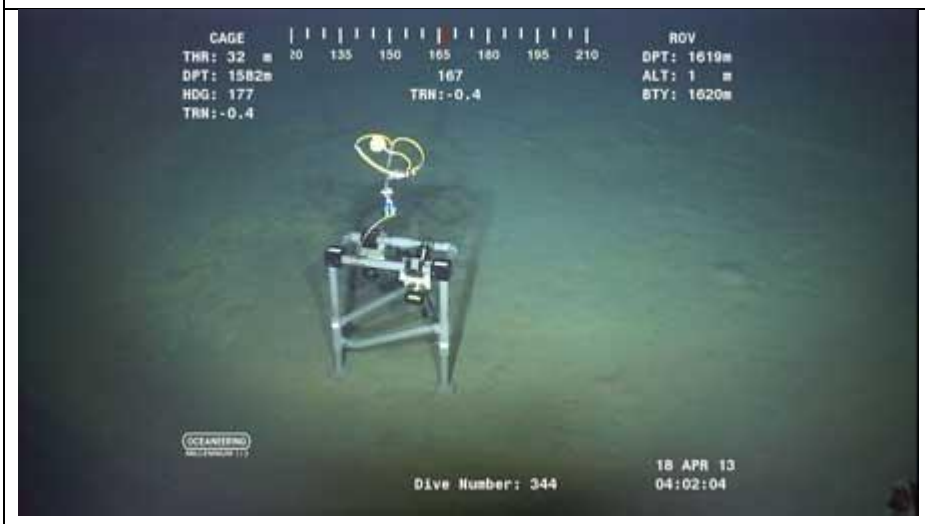
Study Area: Biological Communities (Demersal Scavengers)	
	
Platform	**Moored Time Lapse Camera(s), Baited Time Lapse Cameras**
Study Objective	To understand baseline biological conditions at and immediately above the seafloor and predict the impact of mineral extraction on biological communities.
Technique Description	Recording device is set up within suitable distance of time lapse camera (TLC) anchored bait to observe behaviour of demersal scavengers.
Project Stage	EIA – Environmental Impact Assessment
General Comments	Likely to be deployed during ROV operations
Area Disturbed	Minimal, confined to area where TLC anchor has contact with seafloor, estimated to be less than 2 m x 2 m.
Environmental impact[14]	Negligible.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Image courtesy of Oceaneering International, Inc.

[14] Environmental impact beyond standard vessel operations.

Study Area: Biological Communities (Pelagic Communities)	
  	
Platform	**Plankton nets, fishing gear, etc.**
Study Objective	To assess the pelagic communities in the water column and near-bottom (in the benthic boundary layer) that may be impacted by operations (e.g. the operational and discharge plumes) and to assess their baseline metal concentrations.
Technique Description	Pelagic monitoring moorings will comprise of a buoyed camera unit to monitor a separate baited/weighted line suspended in the water column
Project Stage	EIA – Environmental Impact Assessment
General Comments	Pelagic monitoring rigs will be deployed opportunistically See Plankton net methods
Area Disturbed	Nil if suspended in water column.
Environmental impact[15]	Negligible.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photo #1 courtesy of Deep-Sea News
Photo #2 courtesy of Microcosmos

[15] Environmental impact beyond standard vessel operations.

Study Area: Biological Communities – Marine Biota Observations	
	
Platform	Ship
Study Objective	To record sightings of marine mammals, other near-surface large biota (such as turtles and fish schools) and bird aggregations, identifying the relevant species and behaviours where possible. Details to be recorded in transit to and from areas of exploration and on passage between stations. Temporal variability should be assessed.
Technique Description	Opportunistic sightings. Use binoculars where possible. Marine Biota Observation Log filled out on the bridge of the ship. Pelagos system currently under development by OML will be considered to encourage uniformity of the observations made
Project Stage	EIA – Environmental Impact Assessment
General Comments	All crew of research vessel will be instructed to notify onboard environmental contractor of all sightings of marine biota while at sea. Sightings will properly be recorded by qualified personnel.
Area Disturbed	None.
Environmental impact[16]	None.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

[16] Environmental impact beyond standard vessel operations.

Study Area: Biological Communities (Connectivity)	
  	
Platform	Ship
Study Objective	To assess the regional distribution of species and genetic connectivity of key species.
Technique Description	Samples taken as per methods described above (e.g. ROV, box corer, multiple-corer) and specimens are processed, preserved and analysed appropriately.
Project Stage	EIA – Environmental Impact Assessment
General Comments	See above for the relevant technique.
Area Disturbed	See above for the relevant technique.
Environmental impact[17]	See above for the relevant technique.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photo #2 courtesy of KC Denmark
Photo #3 courtesy of NOAA

[17] Environmental impact beyond standard vessel operations.

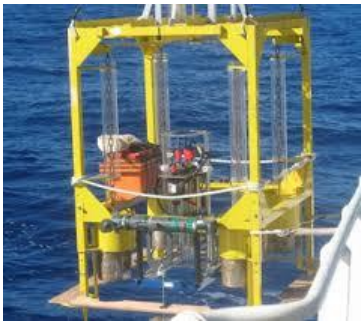
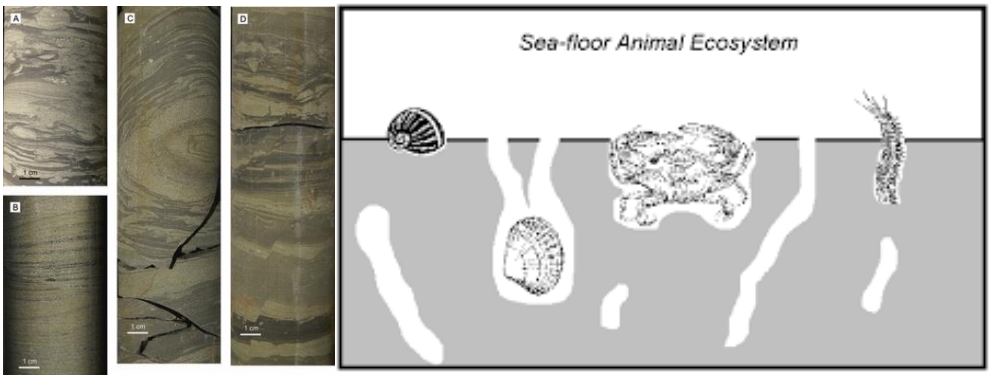
Study Area: Biological Communities (Oxygen Consumption Experiments)	
 	
Platform	**Lander**
Study Objective	To understand baseline biological activity within the seafloor sediments and predict the impact of mineral extraction on biological communities.
Technique Description	Landers are used to measure the sediment-water exchange of nutrients by placing a chamber over the sediment and taking water samples with syringes from the chambers at fixed moments in time. The oxygen concentrations in the chambers are also measured. This gives us an idea of the uptake of oxygen by the sediment. We can compare this measured oxygen uptake to that calculated from profiles of oxygen measured in sediment cores.
Project Stage	EIA – Environmental Impact Assessment
General Comments	N/A
Area Disturbed	Small – equivalent to size of lander (~2 m x 2 m)
Environmental impact[18]	Negligible.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photo #1 courtesy of NOAA
Photo #3 courtesy of http://sea.wreia.us/

[18] Environmental impact beyond standard vessel operations.

Study Area: Bioturbation	
	
Platform	**Multiple-Corer**
Study Objective	To gather data on the mixing of sediments by organisms and to predict the impact of extractive activities on biological communities.
Technique Description	See multiple-corer methods. Rates of bioturbation (i.e. the mixing of sediments by organisms) must be measured to analyse the importance of biological activity prior to a mining disturbance and can be evaluated from profiles of excess ^{210}Pb activity in the cores. Excess ^{210}Pb activity should be evaluated on at least five levels per core (suggested depths are 0-0.5, 0.5-1.0, 1-1.5, 1.5-2.5 and 2.5-5 cm).
Project Stage	EIA – Environmental Impact Assessment
General Comments	
Area Disturbed	None – no contact with seafloor.
Environmental impact[19]	Negligible.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

[19] Environmental impact beyond standard vessel operations.

Study Area: Fluxes to the Sediment (Sedimentation)	
  	
Platform	**Moored Time Lapse Sediment Traps**
Study Objective	To gather time series data on the flux and composition of materials from the upper water column to the deep sea. To understand baseline sedimentation rates and to evaluate the effects of mineral extraction activities (especially plumes) on these rates.
Technique Description	It is currently envisaged that time lapse sediment traps will be incorporated into the moorings used for physical oceanography studies (see above), or as stand-alone moorings. Measurements will be focused near the seafloor. Traps will be in place for a minimum of 6 months to obtain seasonal data. Besides weight/volume, the material collected in the traps will also be analysed to determine nutrient and trace element transport to deep sea environments.
Project Stage	EIA – Environmental Impact Assessment
General Comments	In addition to providing sedimentation data, analysation of trace elements can help with understanding local upwelling phenomena.
Area Disturbed	None – no contact with seafloor.
Environmental impact[20]	Negligible.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR groups.

Photos #1 and #2 and specifications for sediment traps are courtesy of RDSea International.
Photo #3 courtesy of KC Denmark

[20] Environmental impact beyond standard vessel operations.

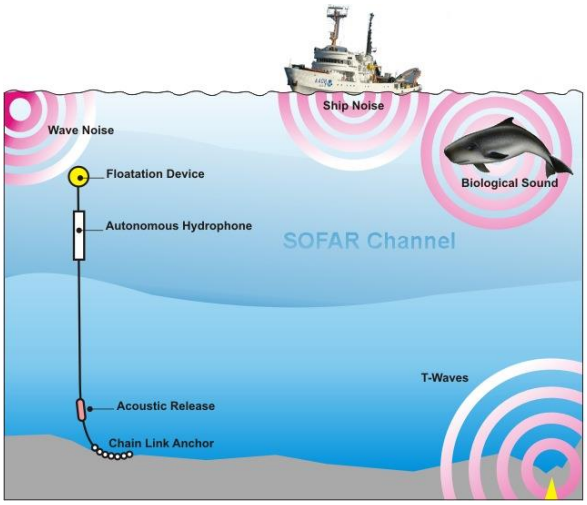
Study Area: Noise	
	
Platform	**Moored Hydrophones**
Study Objective	To determine the baseline noise levels, for example from marine mammals and shipping, and estimate impact of mineral extraction activities.
Technique Description	It is currently envisaged that hydrophones will be incorporated into the moorings used for physical oceanography studies (see above), or as stand-alone moorings.
Project Stage	EIA – Environmental Impact Assessment
General Comments	Hydrophones for this application are not off the shelf. Some design development will likely be needed and may represent a collaboration opportunity.
Area Disturbed	Very little. Possibly the area of an anchor to keep it in place on seafloor (0.5-1 m^2)
Environmental impact[21]	Negligible.
Technique used in Marine Scientific Research (MSR)	Yes. These are standard techniques used by MSR and environmental agencies in shallower waters.

Photo courtesy of Kompasiana

[21] Environmental impact beyond standard vessel operations.

References

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Khripounoff A, Caprais J-C, Crassous P, l'Etoubleu J. 2006. Geochemical and biological recovery of the disturbed seafloor in polymetallic nodule fields of the Clipperton-Clarion Fracture Zone (CCFZ) at 5,000-m depth. *Limnology and Oceanography* 51(5):2033–2041.

Morgan CL, Odunton NI, Jones AT. 1999. Synthesis of environmental impacts of deep seabed mining. *Marine Georesources and Geotechnology* 17:307–356.

Cook Islands Exploration Licence EL1

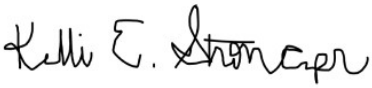
Incident Response Management Plan (CIC071)

As of January 5, 2022

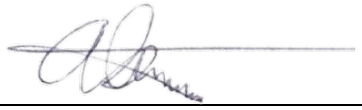
APPROVAL(S)

Name & Title	Signature	Date
Gregory P Stemm Managing Director CIC Ltd		January 5, 2022

AUTHOR(S)

Name & Title	Signature	Date
Kelli Shultz Marine Operations Manager Odyssey Marine Exploration		January 5, 2022
Ernie Tapanes Senior Project Manager Odyssey Marine Exploration		January 5, 2022

REVIEWER(S)

Name & Title	Signature	Date
Adam Stemm COO CIC Ltd		January 3, 2022

CHANGE HISTORY

Date	Change Req No.	Revision	Description of Change
January 5, 2022	N/A	0	Issued

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This document details the standard requirements for the Incident Response and Management Plan (IRMP) (CIC071) for CIC's operations in Cook Islands' Exclusive Economic Zone (EEZ).

CIC LTD (CIC) is the license holder and CIC LLC is its affiliate. Odyssey Marine Exploration, Inc. (Odyssey) is a CIC Consortium member and the exclusive marine operating partner for the CIC Exploration Work Plan (EWP) (CIC065). For purposes of this document when CIC is referenced it could imply CIC LTD or its Consortium or both. For practical purposes, all funding, management, and operational activities are performed by CIC personnel under intercompany agreements. Parties to contracts with contractors and consultants will be at subsidiary level whenever practical and as such meet the requirements for local content and spending.

CIC will conduct an EWP using chartered third-party vessels and this standard will be used to review and finalize campaign and vessel specific operational IRMP together with the relevant Crown Agencies and other bodies with jurisdictional competence. Each plan will be subject to finalization and approval under section 20(4) of the Seabed Minerals Act 2019.

This document identifies the major incidents that could occur, a preliminary risk assessment (to be finalized with the signing of the Charter Agreement), and the standards required for incident response, crew competencies and reporting.

CIC and any appointed operators shall ensure that the EWP activities are carried out with due diligence and efficiency and according to good industry practice. As such, CIC will safeguard the health, safety and welfare of persons engaged in the activities, observe Cook Islands' labor standards; and avoid, mitigate, or remedy adverse effects on the marine environment.

2. DEFINITIONS, ABBREVIATIONS AND ACRONYMS

Field	Description or Definition
AABW	Antarctic Bottom Water
ACT	Maritime Transport Act (2008) as amended
BA	Breathing Apparatus
CI	Cook Islands
CIC	CIC Limited, CIC LTD, or CIC Consortium
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EWP	Exploration Work Program
GMDSS	Global Maritime Distress and Safety System
GRT	Gross Register Tonnage
IRMP	Incident Response Management Plan
LAT	Average Low water mark
NES	Cook Islands National Environment Service
NM	Nautical Mile
OEL	Occupational Exposure Limit
Odyssey	Odyssey Marine Exploration, Inc.
OSH	Occupational Safety and Health
PUE	Priority Unwanted Event
SBMA	Cook Islands Seabed Minerals Authority
MOSS	Marine Operator Safety System
SOLAS	Safety of Life at Sea Convention
SOPEP	Shipboard Oil Pollution Emergency Plan
STCW	Standards of Training, Certification and Watchkeeping
Subsidiary	Any company in which CIC has a controlling interest
TARP	Trigger Action Response Plans
WHS	Work Health and Safety

3. OBJECTIVES

Critical to the success of the EWP undertaken by CIC is the state of readiness of any chartered vessel and crew, and their ability to respond effectively to all reasonably foreseeable emergency situations and other incidents. This document acts as a guideline defining a minimum standard to be met before commencing any exploration work in order to ensure that the arrangements for managing the risk of incidents are clearly understood by all stakeholders.

Where necessary CIC will provide guidance to the vessel operators and managers to achieve optimal outcomes from any given unwanted event.

On the basis that prevention is better than the cure, the focus of any charter shall be to ensure that proactive practices are in place to prevent any injuries or harm to people and damage to property. CIC will follow the approach of the four-element emergency management model "Prevent, Prepare, Respond, Recover" through the review of the vessel and operator's policies, procedures, and resources. This process will establish their current capacity to contain and where necessary respond to an emergency and to deal with shipboard incidents to ensure that sound maritime operations are practiced and that the conditions of any approved Consent or Permit are met.

This document applies to any incidents of accident or harm, as defined by the Cook Islands Maritime Transport Act. As such, any vessel used by CIC will be required to comply with this Act.

4. CODES AND DOCUMENTATION

The policies and plans below are covered by the Incident Response Management Plan (IRMP):

- CIC's Environmental, Community, Occupational Health and Safety Policy
- Odyssey Marine Exploration's (Odyssey) Risk Management Plan
- CIC and Odyssey Integrated Safety, Health and Environmental Management Plan

The following key legislation and guidelines are applicable to the implementation of the IRMP:

Instrument	Description	Responsibility Department/Agency
Seabed Minerals Act (2019), Seabed Minerals Amendment Act (2020), Seabed Minerals Amendment Act (2021), Seabed Minerals (Exploration) Regulations (2020)	Sets out the governance requirements of the licensing of exploration and exploitation activities. Upholds the requirements of the Environment Act (2003) and establishes compliance requirements.	Seabed Minerals Authority, Seabed Minerals Commissioner, Seabed Minerals Advisory Board
Cook Islands Environmental Act (2003)	Core Legislation that controls the permitting of activities that have potential to cause significant environmental harm	The Cook Islands National Environment Service
Prevention of Marine Pollution Act (1998)	An act to provide for the prevention of marine pollution, the dumping and transportation of other waste in Cook Islands Waters by vessels and to give effect to various international conventions on marine pollution and protection of the marine environment	Ministry of Transport
Maritime Transport Act (2008)	Provide for the maritime safety of the Cook Islands and Cook Islands vessels and protect the marine environment	Ministry of Transport
Maritime Rules (Offences) Regulations (2014), as applicable	Regulations for Charterers, owners and masters of vessels registered in the Cook Islands	Ministry of Transport
Maritime Zones Act (2018)	Declares the territorial sea (LAT to 12 NM), contiguous zone (LAT to 24 NM), EEZ (LAT to 200 NM), and continental shelf of the Cook Islands as the maritime zones of the Cook Islands. Declares, and expresses the rights of the Cook Islands and other States in relation to, the maritime zones of the Cook Islands consistently with international law. Repeals with Continental Shelf Act (1964) and the Territorial Sea and Exclusive Economic Zone Act (1977).	All

National Seabed Minerals Policy (2014)	Sets out the Government's sustainable management and regulation of seabed minerals	Seabed Minerals Authority
Te Tarai Vaka (Cook Islands Environmental and Social Safeguards Policy)	Sets out the Government's objectives for environmental and social safeguards for the Cook Islands	Central Policy and Planning Office of the Office of the Prime Minister, Ministry of Finance and Economic Management
Part 7, Employment Relations Act (2012)	Regulations to ensure health, welfare and safety of employees.	Ministry of Internal Affairs
Policy: Workplace Health and Safety (Draft June 2020)	Policy aims to further the aims of the National WHS Policy by providing a clear framework for dealing with priority WHS issues.	Ministry of Internal Affairs: Labor and Consumer Division
International Convention for the Prevention of Pollution from Ships (MARPOL)	The main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.	International Maritime Organization
International Convention on Safety of Life at Sea, as applicable to class of vessel used to execute the Exploration Work Plan (SOLAS)	International maritime treaty which sets minimum safety standards in the construction, equipment and operation of merchant ships.	International Maritime Organization
International Safety Management Code (1994, as amended) (ISM Code)	International standard for the safe management and operation of ships and for pollution prevention.	International Maritime Organization
International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)	The Convention prescribes minimum standards relating to training, certification and watchkeeping for seafarers which countries are obliged to meet or exceed.	International Maritime Organization
Cook Islands Occupational Safety and Health National Reform Final Draft National Occupational Safety and Health Policy (2019)	Approach to Occupational Safety and Health (OSH), including a comprehensive OSH regulatory framework.	CI Ministry of Internal Affairs

5. APPROVAL OF MANAGEMENT PLAN

CIC will enter into charter party agreements with established, reputable marine operators to charter ships to execute the EWP. As such, the ship operator will provide the final IRMP that will apply to all activities. However, CIC will ensure, through application of this document, that the IRMP meets best practices applicable to the EWP and complies with the Maritime Transport Act.

Prior to the finalization of a charter agreement, the following activities will be undertaken by CIC with support from Odyssey:

- Review the vessel's risk management processes and identify its major hazards and the critical controls in place to manage those risks; confirming, as a minimum, the major hazards listed in this document are identified and appropriate response plans exist.
- Examine the emergency procedures created to mitigate the impact of a failure of those critical controls.
- Review the associated documentation that provides input and support to the emergency response process.
- Review the procedures in the event of an incident, ensuring that as a minimum, incidents listed in this document are identified and appropriate response plans exist.
- Ensure that a reliable incident management and reporting system is in operation onboard the vessel.

The following shall therefore be reviewed and agreed between the vessel manager/Operator, CIC and Odyssey prior to formalizing a charter agreement:

- Regulatory Environment
- Risk Management
- Emergency Response Plan and Procedures
- Emergency Response Infrastructure
- First response Escalation Triggers and ongoing response
- Emergency Response Personnel
- Training and Assessments

The objective of this review is to establish the effectiveness of the vessel's emergency response procedures and capabilities to mitigate the consequence of a Priority Unwanted Event (PUE) and to ensure that appropriate procedures exist to manage any other incidents of a lesser severity.

6. MARINE ENVIRONMENTAL CONDITIONS

The marine environment is defined as:

- The ocean in which the vessel transits
- The ocean in which the EWP is performed including the ocean's surface and water column
- The seabed on which exploration activities are conducted
- Marine birdlife in the vicinity of the vessel
- Marine Life (pelagic and mammal) in the vicinity of the vessel during operations

Exploration operations will take place in the Cook Islands' EEZ and will be conducted 50 or more nautical miles away from any coastlines or lagoons. Most of the work will be take place much further offshore. Research activities in the proposed licence area will take place on the abyssal seafloor at an approximate water depth of 4,500 to 5,400 metres. No individual exploration activity will impact more than 10,000 m2 of the seafloor (a bit larger than a rugby pitch). Independent marine science institutions and academics from around the world have collected over 50 years of general research on the mineralogy and environment of polymetallic nodule deposits in the Pacific Ocean. In that time 15

research cruises have been specifically dedicated to the study of nodules in the abyssal zone of the Cook Islands' EEZ. The CIC EWP will deliver extensive scientific data that will contribute to the overall understanding of ocean resources in the Cook Islands, offering a benefit to the islands above and beyond the economic potential of the mineral resource alone

Exploration activities will take place in the relatively flat terrain of the abyssal plain where water pressure is immense, food is scarce and marine life is significantly less abundant than in shallower water closer to the coast. In general, the abundance of organisms and species diversity for most groups (particularly macrofauna and megafauna) decreases with depth.

The water column overlaying the contract area is a subcomponent of a large pool of Western South Pacific oceanic water. At abyssal depths in the area, the dominant water mass is known as Antarctic Bottom Water (AABW), a cold (~1 degree Celsius), dense water mass some 1,000 meters thick that migrates slowly north towards the equator from Antarctica.

The oceanic waters of the Cook Islands are considered part of a large biogeographic zone. In the expansive habitat of the open ocean, biomass is dominated by small-bodied invertebrates and fishes, which are broadly distributed and occur in generally low abundance. Large-bodied predators such as tunas, billfishes, sharks and dolphinfish are variable in their distribution. Cetaceans (whales and dolphins) and seabirds also occur in the area. CIC recognises that the entire Cook Islands' EEZ is a designated whale sanctuary and will enact whale detection and avoidance strategies to avert interference or contact

Incidents may affect the marine environment through:

- Unattended foreign objects floating on the sea surface that pose a danger to navigation
- Plastics and solid pollutants floating in the water column that pose a danger to marine life
- Foreign objects deposited on the seabed
- Liquid pollutants floating on the sea surface or within the water column that pose a danger to marine life and the environment and / or
- Excess smoke or toxic fumes released into the atmosphere

Odyssey, CIC's exclusive marine operations partner, will carry marine insurance providing indemnification against any environmental liabilities from a mechanical or any other cause of failure during operations performed under the Exploration Licence. It is important to note that during 26 years of conducting extensive offshore operations on many ships and in many locations throughout the world, Odyssey has never had to file a pollution claim with its insurers.

7. INCIDENT IDENTIFICATION

7.1 GENERAL

In the execution of activities under the EWP, the vessel will not proceed or continue with activities if either the crew or onboard personnel are aware of evidence that continuing makes it reasonably likely that an incident will occur, or the vessel will be unable to respond to any incident through implementation of the Incident Response and Management Plan.

7.2 RISK AND HAZARD IDENTIFICATION

The following significant risks are to be addressed at a minimum in the final IRMP:

- Main Engine Failure
- Electrical power failure
- Grounding

- Fire
- Piracy
- Irreparable propulsion or steering failure
- Man overboard
- Flooding
- Collision at sea
- Helicopter ditching (if fitted with helideck)
- Helicopter crash on deck (if fitted with helideck)
- Serious injury/illness
- Contagious diseases and quarantine requirements, including Covid-19 outbreak
- Oil pollution and hazardous spill

7.3 RISK ASSESSMENT

A standard 5 x 5 risk matrix (Figure 1) will be used to assess risks and to identify appropriate mitigation actions.

Risks will be ranked based on their consequence (from insignificant to catastrophic, in one of 6 categories: Safety, Health, Environmental, Social & Community, Legal & Regulatory, and Reputation), and likelihood of occurrence (from rare to almost certain).

Annexure 2 contains a guideline Baseline Risk Assessment against which the vessel and Operator's risk identification will be verified. Where necessary, a detailed risk assessment of all activities to be conducted in the EWP shall be undertaken by a multi-disciplinary, multi-level team comprising CIC, vessel personnel, and Vessel Operator personnel, as described in Odyssey QHSE-3004 Risk Assessment Procedure and QHSE-3004-A Risk Assessment Form.

		1	2	3	4	5
		Rare	Unlikely	Possible	Likely	Almost Certain
5	Catastrophic	11	16	20	23	25
4	Major	7	12	19	21	24
3	Moderate	4	8	13	18	22
2	Minimal	2	5	9	14	19
1	Insignificant	1	3	6	10	15

FIGURE 1: Risk Matrix

Severity Level (consider the maximum reasonable potential consequence of the event)					
Impact Type	**1**	**2**	**3**	**4**	**5**
	Negligible	**Minor**	**Serious**	**Critical**	**Catastrophic**
(S) **Harm to People-Safety**	First aid	Medical treatment	Lost time	Permanent disability or single fatality	Numerous permanent disabilities or multiple fatalities

Severity Level (consider the maximum reasonable potential consequence of the event)					
Impact Type	**1**	**2**	**3**	**4**	**5**
	Negligible	**Minor**	**Serious**	**Critical**	**Catastrophic**
(H) **Harm to People-Occupational Health**	Exposure to health hazard resulting in temporary discomfort	Exposure to health hazard resulting in temporary alterations/ limitations (no lost time)	Exposure to health hazards/ agents (over the OEL) resulting in reversible impact on health (with lost time)	Exposure to health hazards/ agents (significantly over the OEL) resulting in irreversible impact on health with loss of quality of life or single fatality	Exposure to health hazards/ agents (significantly over the OEL) resulting in irreversible impact on health with loss of quality of life of a numerous group/ population or multiple fatalities
(E) **Environmental Impact**	Lasting days or less; limited to small area (metres); receptor of low significance/ sensitivity (industrial area)	Lasting weeks; reduced area (hundreds of metres); no environmentally sensitive species/ habitat)	Lasting months; impact on an extended area (kilometres); area with some environmental sensitivity (scarce/ valuable environment).	Lasting years; impact on sub-basin; environmentally sensitive environment/ receptor (dangerous species/ habitats).	Permanent impact; affects a whole basin or region; highly sensitive environment (dangerous species, protected habitats)
(C)	Minor disturbance of culture/ social structures	Some impacts on local population, mostly reparable.	On-going social issues. Isolated complaints from community	Significant social impacts. Organized community protests	Major widespread social impacts. Community reaction affecting business continuity.

Social / Community Impact		Single stakeholder complaint in reporting period	members/ stakeholders	threatening continuity of operations	"License to operate" under jeopardy

Severity Level (consider the maximum reasonable potential consequence of the event)					
Impact Type	**1**	**2**	**3**	**4**	**5**
	Negligible	**Minor**	**Serious**	**Critical**	**Catastrophic**
(L&R) **Legal & Regulatory**	Technical non-compliance. No warning received; no regulatory reporting required	Breach of regulatory requirements; report/involvement of authority. Attracts administrative fine	Minor breach of law; report/investigation by authority. Attracts compensation/ penalties/ enforcement action	Breach of the law; may attract criminal prosecution of Operating Co. and/or of Directors/ Managers. And penalties/ enforcement action. Individual licence temporarily revoked	Significant breach of the law. Individual or Class action law suits, criminal prosecution of Co., Directors/ Managers. Suits against parent Co.; permit to operate substantially modified or withdrawn
(R) **Impact on Reputation**	Minor impact; awareness/ concern from specific individuals	Limited impact; concern/ complaints from certain groups/ organizations (e.g. NGOs)	Local impact; public concern/ adverse publicity localised within neighbouring communities	Suspected reputational damage; local/ regional public concern and reactions	Noticeable reputational damage; national/ international public attention and repercussions

7.4 ENVIRONMENTAL INCIDENTS

Identification of, and response to, serious environmental incidents are described in this document. However, the vessel must be prepared to respond to all pollution incidents, in accordance with the Prevention of Marine Pollution Act. Such incidents include:

- Oil or pollution discharged into the sea
- Oil or pollution escaping into the sea
- Discharge of garbage into the sea less than 35 NM from land, or without a permit
- Discharge of sewage into the sea
- Discharge of plastics into the sea

The vessel shall carry adequate and appropriate type approved equipment to remove, clean up or disperse any pollutant in or on the sea. Any incident described above must be recorded, and reported to the vessel managers and CIC immediately by voice to CI Maritime Authorities at the first opportunity and in writing within 24 hours.

8. STANDARD FOR RESPONSE PERSONNEL

8.1 GENERAL REQUIREMENTS AND TRAINING

The Ship Master (ship's captain) shall initiate all response mechanisms. The ship's Emergency Response Structure must identify a deputy, to act if the Master is incapacitated for whatever reason.

Crew and shore-based personnel shall meet the requirements of the Marine Transport Act as well as the following unless otherwise required by applicable regulations:

- All personnel are trained in firefighting, first aid, and breathing apparatus use; and these skills are refreshed at least every five years
- Some officers are trained to a higher level in both firefighting and first aid; (e.g., Advanced Medical Care and resources such as the Ship's Captain Medical Guide, or similar)
- Paramedic or advanced medical care facilities are accessible on shore
- Further on-board training is provided by a subject matter expert

It is further recommended that the following minimum standard of refresher training apply unless otherwise required by applicable regulations:

- One-day refresher training be undertaken every 2.5 years or two trainings per five-year cycle counting the STCW as one.
- All personnel be required to undertake all roles prescribed in firefighting a minimum of once per year.
- All personnel demonstrate the ability to don or use a breathing apparatus (BA) a minimum of once per year including a minimum of 5 minutes under air.
- Those individuals identified as part of a BA team be provided with opportunity to go under air a minimum of four times per year.

Records are required (hardcopy or digital) to be available on board confirming the qualifications of each crewmember, as well as dates of refresher training.

8.2 COMPETENCIES

The Ship Master (Master) shall ensure that persons are not knowingly exposed to risk, and that the vessel and operations conducted onboard and off the vessel do not cause any unnecessary danger or risk to any person or property. The vessel IRMP must clearly define the Ship Master's roles and responsibilities in a major event and how those responsibilities integrate as part of the shore-based Emergency Response Team.

The Master, officers and crew shall have an ability to effectively respond appropriately to any given event through evidence of initial and ongoing training related to the incident management process. The structure and responsibilities of the shore-based Emergency Response Team must also be well documented, and evidence provided to verify that the individuals identified to fulfil the designated roles described in the shore-based Emergency Response and Preparedness Plan have had initial or ongoing training in their selected function.

Shore-based emergency response must have a special focus on internal, contract and external emergency services, medical services and the community in the Cook Islands. Where possible, the Vessel Managers must provide an Incident Management process that integrates, or is compatible with, the system used by external response agencies in the vicinity of the Cook Islands.

Documentary evidence must be provided that onboard personnel possess the competencies (skills, training and experience) to perform the roles and duties allocated to them in the onboard Plans. Task cards or Tool Box Talks as described in Odyssey QHSE-3009 can be constructed or held to assist in the process of carrying out the responsibilities of each of the team members.

Trigger Action Response Plans (TARPs) should also be formulated to cover all emergency scenarios to assist personnel in identifying the appropriate action to take at any time of an emergency (e.g., escalate / de-escalate, access/locate additional resources etc.).

Ship's personnel must possess competencies in a greater range of emergency risk than those prescribed by legislation – see sections 4 and 8.3 - to prevent any element of complacency.

Formal mechanisms must be in place to identify the need to escalate the response to any incident e.g., more personnel, more resources etc. This will avoid sole dependence on the expertise, knowledge, and experience of the Ship Master to prompt the escalation.

8.3 DRILLS

Incident and emergency drills must be carried out in compliance with the Flag State statutory requirements. The events of the exercise must be recorded in the Emergency Exercise Book and the Official Logbook. The Master shall ensure that drills are carried out for the identified emergencies as per the Marine Operator Safety System (MOSS) emergency drills/exercise schedule or as required.

The purpose of the drills is to:

- Improve awareness of potential hazards facing personnel and the ship.
- Improve the standard and speed of response to identified potential incident situations.
- Ensure that emergency equipment is tested and ready for use.

If a drill is not carried out in the required period, the Master shall make an entry in the Official Logbook stating the reason why the drill was not carried out. That drill is to be scheduled for as soon as is practicable thereafter.

The following drills should be periodically carried out:

- Fire in accommodation, engine room and storerooms
- Abandon ship

- Critical equipment failure
- Grounding
- Collision
- Man overboard
- Personal injury / Illness / Covid-19 suspected case
- Oil pollution Power failure
- Steering gear failure
- Escape from enclosed spaces
- Structural failure
- Piracy attacks or suspect vessel approaching the ship
- Sinking
- Helicopter ditching/ crashing on deck (if fitted)

Entries in the Emergency Exercise Book shall include: the type of incident, personnel involved, equipment used, and details of problems encountered; and shall be signed by the Master. The effectiveness of the drill is to be reviewed at the onboard safety meeting.

9. STANDARD FOR SHIPBOARD RESPONSE PLAN

9.1 GENERAL STANDARD

The Shipboard Response Plan is devised to assist the Master and Operators of the vessel to deal with accidents or emergency situations by providing guidance and advice. The Plan is to be kept updated by the Designated Person Ashore, and the Master must be able to advise of possible changes required to the manual. The Shipboard Response Plan must contain sufficient detail to provide a framework on which the Master can build, to cope with a situation at hand, and must include:

- Ship profile: length, beam, cruising speeds.
- Manning and shifts.
- Ship-based emergency response structure and infrastructure.
- Any other characteristic that may be valuable to response teams in the event of an emergency or incident.
- Reference to the SOPEP Manual where an oil pollution or hazardous spill has occurred (vessel >400GRT).
- Where a security emergency or incident has occurred reference should be made to the Ship Security Manual.
- Response to each incident identified in section 7 of this document to regain control of the situation.
- The roles and responsibilities of all personnel during an emergency or incident.
- Masters are to be guided by their primary responsibilities, which are, in decreasing precedence, for the safety of life, safety of the ship, the protection of the marine environment, and the safety of the exploration equipment. All other considerations are secondary to these.
- The Master has the responsibility to take whatever action he sees fit to minimize the risks to safety of life and property, or to protect the marine environment.
- The Master is to summon assistance in good time when the ship is in danger.
- The standard marine reporting system in effect around the Cook Islands is to be used to notify others of the seriousness of the situation (e.g., Mayday, Pan-Pan etc.).
- Communication methods to use onboard and between ship and shore.
- Procedures for requesting assistance from third parties, if required.
- Emergency contact details (e.g., telephone numbers, cell phone numbers, radio frequencies, etc.) for notifying parties as per the communications plan.
- Checklists or task cards to aid in monitoring and reporting.

- All emergency actions taken are to be recorded in the Deck Logbook including the Official Logbook.
- The Vessel Operator Company and CIC is to be informed at the first available opportunity, followed by the CI maritime Authority as per the Communications Plan.
- Where the Master has had to breech the requirements of the Act, in the interests of safety, the CI authorities are to be informed as soon as practicable, and the Master must provide a report in respect of the action.
- In salvage situations, the Master remains in command even when Salvors are appointed. A detailed record of any salvage services received must be kept.
- Masters and crew are not to liaise with the media, and any queries are to be directed to the appointed CIC Manager ashore.

9.2 SPECIFIC RESPONSIBILITIES

It is suggested that (to be agreed with finalization of the Plans):

- Master shall take total control of the ship during any shipboard accidents or emergency situations.
- Chief Engineering Officer shall take control of all machinery spaces during accidents or shipboard emergencies.
- Chief Officer shall take control of all deck operations (e.g., fire party, security party, clearing away lifesaving equipment and lifeboats, anchoring, tow lines etc.), during accidents or shipboard emergencies.
- Second Engineer (if required) will assist the Chief Engineer, or as otherwise directed, during accidents or shipboard emergencies including taking soundings of tanks, bilges etc.
- Other crew are to carry out functions as directed by the Master or Senior Officers or as per the Shipboard Response Manual.

9.3 COMMUNICATION

Prior to commencing with offshore work, a Communication Plan shall be drawn up by CIC, Vessel Managers, CIC Agents, and Odyssey. This plan is then submitted to the Ministry of Transport and Seabed Minerals Authority to ensure that all relevant national bodies that require notification are correctly identified, together with contact details. This plan shall also include the response agencies operating in the Cook Islands.

As such, the Master has an obligation to report incidents under the terms of the Act.

In the event of either a major accident or incident resulting in serious harm or an emergency, the Master must report the matter to the Flag State, the Cook Islands Port Authorities, the Vessel Operator, and CIC as soon as possible.

An initial report must be submitted in writing within 24 hours of the accident or incident and is to contain the following:

- Name of ship and port of registry
- Ship's position, course and speed, and activity being performed
- Call sign
- Closest CI port
- Nature of accident or emergency
- Nature and extent of damage
- Names, nature and number of fatalities

- Nature of service required (towage, helicopters, lifeboat, medical etc.)
- Services already summoned
- State of weather and sea, present and forecast
- Name, nationality, type of situation of other ships involved
- Current situation as to stability status, steaming, at anchor, aground etc.
- Number of people onboard
- Helicopter deck operational or not (if fitted)

The Operator must inform CIC, who in turn must inform the CI Authorities, within forty-eight (48) hours after it becomes aware of any information or circumstance that could materially affect its ability to satisfy the requirements of the approved IRMP.

9.4 MINIMUM LIST OF ONBOARD INCIDENT PROCEDURES

- Shore-Based Emergency Preparedness Response Plan
- Shipboard Response Plan
- Emergency Drills Schedule
- Emergency Exercise Reports
- Training Service providers verifications (Flag state, STCW)
- Provision of Emergency Medical Services and Medical Emergency Flow Chart
- Work Procedures and Controls (critical tasks as identified in Section 7)

9.5 PROLONGED EMERGENCY SITUATION

The Shipboard Response Plan and the Shore-Based Emergency Preparedness Response Plan must indicate the contingency plans to be activated if the emergency incident extends beyond 24 hours, in order to ensure that those dealing with the incident are not fatigued to the point where judgement becomes impaired. These contingencies must also detail the shift handover arrangements in order to ensure accurate handover practices.

9.6 ASSISTANCE TO PERSONS IN DANGER

The Master and vessel have an obligation, to the extent that it can be done without endangering the vessel and crew, to render assistance to any person found at sea in danger of being lost, vessels involved in a collision, vessels, aircraft, or survival craft in distress.

10. STANDARD FOR ONBOARD RESPONSE EQUIPMENT

The Operator shall ensure that sufficient resources (including marine protection products) are provided to ensure compliance with the relevant safety standards. In addition, medical supplies and facilities onboard must comply with the provisions of the Act.

CIC will, in conjunction with the Vessel Managers, ensure that adequate and appropriate personal protective clothing and equipment is provided to crew and personnel to protect them where a level of risk remains, in spite of reasonably practicable measures to control the risk being implemented. In addition, adequate information, education, training, and supervision will be provided to all onboard personnel so that they can fulfil their work duties without risk to themselves or others.

10.1 SHIPBOARD EMERGENCY INVENTORY

The following must be available in the shipboard Emergency Operations Centre (Bridge):

- Shipboard Response Manual

- GMDSS equipment
- Conference Telephone
- Charts covering area of operation
- Parallel Rulers and Dividers
- Stationery
- Calculator
- Stability Booklet
- Fire Plan
- General Arrangement Plan
- Tank Plan
- SOPEP Manual
- Medical First Aid Guide (MFAG)
- Ship's Captain Medical Guide
- Emergency Logbook
- Local telephone directories of areas of work
- Updated Muster Bill

11. INCIDENT RECORDING, REPORTING AND AUDITING

11.1 Recording of Incidents

The vessel shall maintain an approved register (paper, or electronic with backup) of accidents and incidents incurred on the vessel. This register must be available for review when requested by the authorities or CIC. Details of incidents arising during the EWP activities and actions taken in connection with the incident response and management plan must be included in CIC's Annual Reports to the Authority.

The Incident Register shall contain the following typical information:

- The name of the worker(s) involved
- Their occupation or job title
- The time and date of the incident Activity being undertaken
- A precise description of how the incident occurred
- The nature of resultant harm (quantities and types of pollutant; items damaged or lost; injury and the body part(s) affected
- In the case of injuries, names and positions of witnesses to the injury, if any
- The name and position of the person making the entry, and
- Once available, details of corrective or preventative action proposed, in order to prevent a recurrence of the incident.

On becoming aware of an incident in excess of an agreed consequence level, in relation to the EWP, CIC will notify the Authority immediately by telephone, and within 24 hours in writing. The vessel crew and onboard personnel will immediately implement the approved incident response and management plan and take other steps that are necessary in the circumstances to limit the adverse effects of the incident. Once the Authorities have been notified, and respond with any further instructions, CIC will ensure that any instructions received from the Authority, in consultation with affected Crown agencies, are undertaken within any time frame stipulated.

11.2 Reporting of Incidents

The expectations for the reporting and subsequent investigation of direct and contributing factors, and the development of corrective and preventative actions once the consequences have been dealt

with in accordance with the Shipboard Response Plan are outlined below as well as illustrated in Figure 2.

The objectives of the incident investigation and analysis process are to:

- Gather all relevant information and evidence,
- Determine what happened,
- Define the sequence of events leading up to, including, and after the incident,
- Determine the direct and contributing factors of the incident to understand how and why it happened, and
- Define actions to prevent similar incidents from occurring

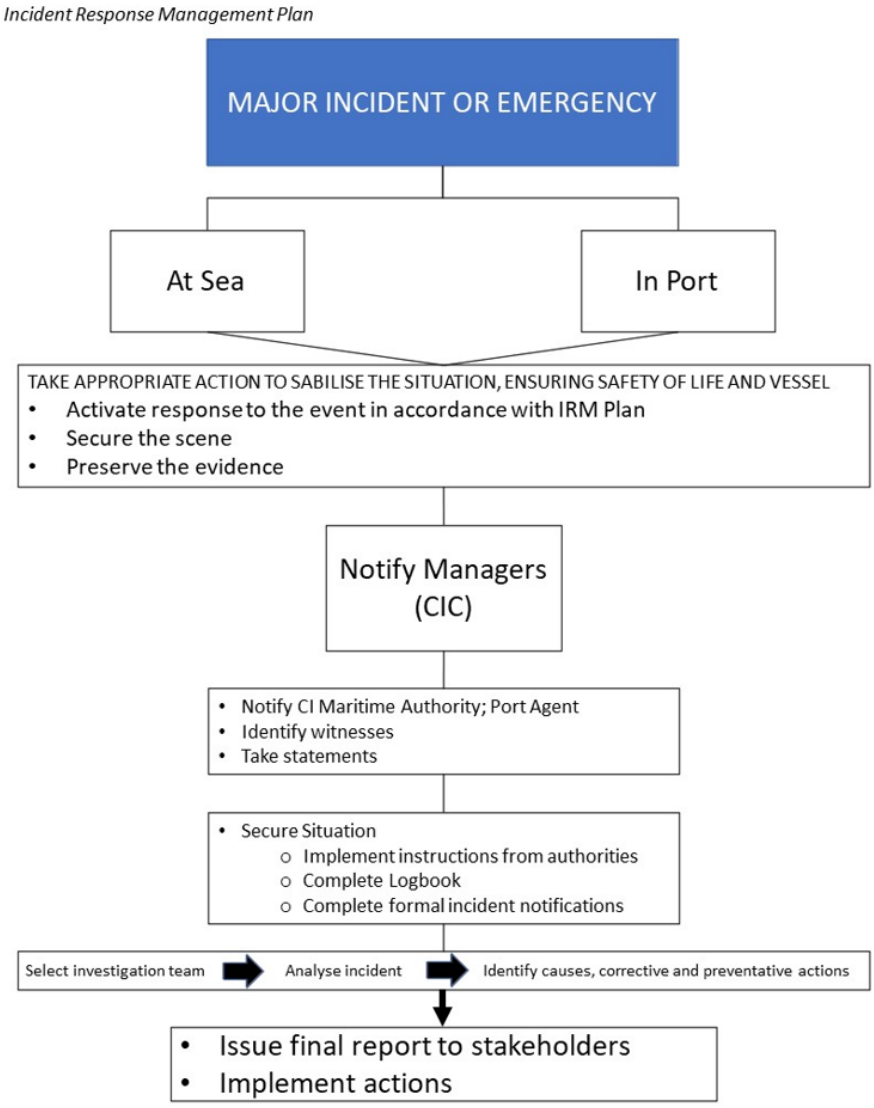


Figure 2: Incident Reporting and Investigation Process

A matrix for evaluating the consequences of incidents should be included in the reporting of each incident.

	Direct Financial Loss	Injury to People	Damage to the Environment	Loss or Damage of Assets	Immaterial Loss
Catastrophic					
Critical					
Serious					
Marginal					
Negligible					

Figure 3. Incident Reporting Matrix

First Response

Any Team Member who observes an incident, or near incident, is responsible for taking whatever steps they can take to safely stabilize the situation, and for then reporting the incident to their supervisor. When aboard a vessel, any incident shall be reported to the bridge watch first, in accordance with the vessel specific requirements. Timely reporting to the bridge is especially important to maintaining safe operations. All Team Members should be prepared to assist in making additional notifications to regulators or flag-state officials, as required by project specific notification checklists.

Immediately after an incident, the Ship Response Plan must be followed, after which evidence is preserved, witnesses identified, and statements taken.

For incidents which are not significant, the appropriate response must be taken to ensure the scene or situation is made safe, further release of a hazard is prevented, or the necessary engagement with stakeholders or employees is undertaken.

Second Step

Stakeholders are notified as detailed in the Plan. Further evidence is gathered, and a Preliminary Report issued.

Third Step

Depending on the severity of the incident (See Figure 3), an Investigation Team is assembled, and a detailed investigation of the incident conducted. The Team gathers all the evidence and assesses it to determine the root cause of the incident, control failures, and to identify corrective and preventative measures to prevent a repeat, or similar incidents.

Fourth Step

The Investigation Report is communicated to stakeholders and the actions identified in Step Three are implemented.

This Investigation Report will also be made available to the Authority should a formal enquiry be initiated by the Authority.

11.3 Auditing and Review of the IRMP Process

Within the field of safety management, results from audit-based rating systems for companies' safety management systems are used as a Key Performance Indicators (KPI) for the quality of an incident response management system as it is planned and documented.

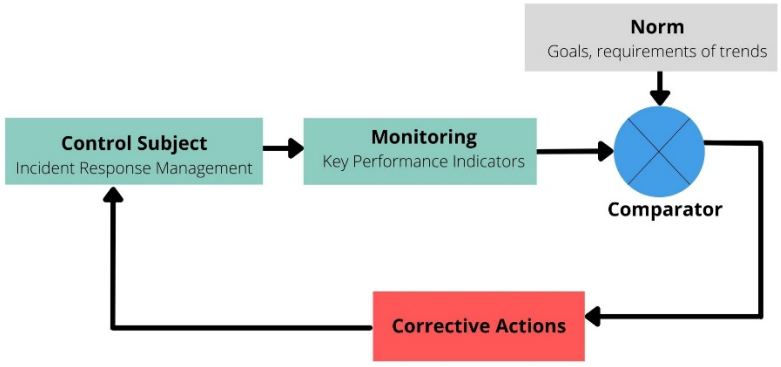
Audit-based rating systems resulting in KPIs regarding the management structure are based on the following principles:

- An ideal model defining the elements of the management system and its contents.
- A scale is established for measurement of each element with respect to degree of compliance with the standard model.
- A set of criteria is used in evaluating actual performance in relation to the ideal model.
- The organization compares actual performance with established goals

As Odyssey is providing Mariner Operations Services, Incident Recording, Reporting and Auditing is further supported by Odyssey's project procedures, Odyssey's overriding QHSE goals for all projects is to achieve zero accidents with no harm to the environment or reputation.

- Deliver project with zero Total Recordable Cases. Target is zero.
- Deliver project with zero Recordable Environmental Incidents. Target is zero.
- Deliver the project with zero Security Incidents. Target is zero ISPS security incidents.
- Deliver the project with no impact on the credibility or reputation of any of the contractual parties.

11.4 Monitoring of the Performance of the IRMP



KPIs are often used as input for feedback control, which is a regulating mechanism that produces corrective action. The performance of a control object is monitored and compared to a norm. Any difference between actual performance and the norm is used as input to decisions with respect to actions or improvements of the management system. In that sense, feedback control can be used in evaluating whether a given control subject works as intended or not. Consequently, KPIs are important for the monitoring part of the feedback loop, and are thus the key input for decision-making.
The principles for establishing norms for different indicators may vary. There might be a fixed goal established for a specific period of time, e.g., average time of response during a month should not be more than four hours. Another norm might be that an indicator must show continuous improvement

from one period to the next. Furthermore, performance indicators might be used to evaluate whether a process is stable, by using control charts for several periods of time.
Leading and lagging KPI are recorded on the Daily Progress Reports in support of the objectives and goals outlined above and in previous responses to SBMA.

The licence holder shall summarize the KPI information from the Daily Progress Reports in its Annual Report to the Authority. The Authority and the licence holder shall then determine if corrective actions are necessitated. To the extent that the audit of the actual performance necessitates plan changes, the Authority and the licence holder shall agree to changes in the IRMP. These proposed changes shall be presented to the responsible Minister for implementation in a finalized and approved revised contingency plan under section 20(4) of the Act.

12. GENERAL

The number of persons onboard the vessel at sea at any time shall not exceed that permitted by law (crew and passengers). Sufficient flotation devices, as required by SOLAS and CI Maritime legislation shall always be provided and maintained in a serviceable and operable condition.

ANNEXURE 1: DEFINITION OF SERIOUS HARM

SCHEDULE 1(s2(2)) Serious Harm
Maritime Transport Act (2008)
As supplemented by draft OHS Act

Any of the following conditions that amounts to or results in permanent loss of bodily function, or temporary severe loss of bodily function:

- Respiratory disease
- Noise-induced hearing loss
- neurological disease
- Cancer
- Dermatological disease
- Communicable disease
- Musculoskeletal disease
- Illness caused by exposure to infected material
- Decompression sickness
- Poisoning
- Vision impairment
- Chemical or hot-metal burn of eye
- Penetrating wound of eye
- Bone fracture
- Laceration
- Crushing
- Amputation of body part
- A serious head injury
- A serious eye injury
- Burns requiring referral to a specialist medical practitioner or specialist outpatient clinic
- The separation of his or her skin from an underlying tissue (such as degloving or scalping)
- A spinal injury
- Serious lacerations

- Loss of consciousness from lack of oxygen
- Loss of consciousness, or acute illness requiring treatment by a medical practitioner, from absorption, inhalation, or ingestion, of any substance
- Any harm that causes the person harmed to require treatment other than first aid, or to be hospitalized for a period of 48 hours or more commencing within seven days of the harm's occurrence.

Similarly, the definition of "Accident" in the above Act will be used to identify major incidents that must be reported immediately to the Authority, and in writing within 24 hours.

ANNEXURE 2: GUIDELINE RISK ASSESSMENT

All Risk Assessments are subject to revision due to the nature of the offshore work environment, different scopes of work, etc. These risk assessments will be revised for each cruise with the cooperation of CIC, Odyssey, the Vessel Operators and the Vessel Master.

CIC BASELINE RISK AND CONTROL ASSESSMENT

Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Vessel	Affect all exposed operations onboard and the vessel as a whole	Climatic/ Natural Events	High Winds - naturally occurring	Monitor weather forecast. At set point, Cease operations. Bow to wind Seek shelter	4: Likely	4: Maj	21 (H)	Yes
Maintenance	Electrical work	Electrical	Failing to Isolate Power Supply	Electrical isolation critical controls	3: Possible	4: Maj	18 (S)	Yes
Vessel	All areas subject to fire risk / Hot work, hydraulics, electrical systems, engines, waste disposal, chemical storage, cooking, helicopter ops.	Fire	Hot work, electrical heating, faulty electrical components or systems, spontaneous combustion of waste or incorrectly stored chemicals, cooking food (overheating oil or oil splashing onto hot surfaces), incinerator fault or overcharge/incorrectly charged with explosive material, , hydraulic systems overheating or bursting, IC engines and hot exhausts, overheated brakes, smoking, helicopter fire on deck.	Hot work critical controls Fire critical controls	3: Possible	5: Cat	22 (H)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Vessel	Affects all operations onboard	Climatic/ Natural Events	Swell	Monitor weather forecast. At set point, Cease operations. Bow to swell Seek shelter	3: Possible	4: Maj	18 (S)	Yes
All spaces contributing to buoyancy	Mining system / plant pipe failures, ship structural failures in way of hull or tanks, human error, heavy weather.	Water	Mining system / plant pipe failures, ship structural failures in way of hull or tanks, human error, heavy weather.	Watertight integrity Stability book	2: Unlikely	5: Cat	19 (S)	Yes
Affects the ship as an entity / Steaming to or from port	Affects the ship as an entity / Steaming to or from port or between spreads or during RAS ops.	Land	Equipment Failure (loss of propulsion or steering control) or Human error (poor navigating or negligent conduct) or bad weather.		2: Unlikely	5: Cat	19 (S)	Yes
Any of the fuel tank vents, engine room, generator room, pump room, bunkering points on deck, fuel hose supplying the fuel	Working with fuel	Chemical	Equipment failure (bunker hose failure) or human error (not controlling the operation effectively or monitoring tank levels etc.).		2: Unlikely	4: Maj	14 (S)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Vessel	Always affects the ship as an entity / All occasions and when the vessel is afloat at sea or in port	Other - Stability	Human error (negligence in managing the stability of the vessel).	Stability book	2: Unlikely	5: Cat	19 (S)	Yes
Engines	All engines onboard. / Running an engine and any maintenance or inspections done on or near a running engine.	Mechanical (Fixed)	Equipment failure (engine overspeed due to various factors, crankcase explosion due to ignition of oil mist by a hot spot in the crankcase, turbocharger overspeed due to various factors, any failure of internal parts such as valves, pistons, conrods, crankshaft etc.) or Human Error (failure to run and manage a running engine correctly according to manufacturer's instructions).	Planned maintenance Rounds at set periods	1: Rare	4: Maj	10 (M)	Yes
Enclosed spaces	Entry into enclosed spaces	Confined Spaces	Human Error (Negligence in establishing a safe work environment or ignorance of safety rules and regulations or lack of supervision of lack of understanding of the hazards.)	Confined space critical controls	3: Possible	4: Maj	18 (S)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Vessel	All around the ship near the ship's side or when specifically working over the side.	Water	Drowning - Equipment Failure (working at heights equipment failure or structural failure of whatever is holding the person) or Human Error (failing to adhere to safety rules and regulations or use safety gear correctly)	Lifejackets when working within 1m of ship side	3: Possible	4: Maj	18 (S)	Yes
All Areas	Working on Energised Equipment or Machinery	Energised equipment - unexpected motion	Failure to Lockout, Inadequate Lockout, Lack of Skill or Training, Lack of appropriate Equipment to Lockout, Failure to assess risks associated with upstream, downstream and adjacent equipment.	Lockout / energy isolation critical controls	3: Possible	4: Maj	18 (S)	Yes
Rotating machinery	Work near around or on Machinery where any nip points, rotating or reciprocating parts are exposed.	Mechanical (Fixed)	Equipment Failure (Mechanical failure of a guard due to inadequate maintenance, corrosion, vibration or damage) or Human Error (Hazards not identified and guarded, unauthorised removal of guarding, failure identify guarding deficiencies).	Safeguarding Interlocks	4: Likely	4: Maj	21 (H)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Catering	Macerator operation	Mechanical (Fixed)	Cut by blades	Guard in place: procedure training: supervision: interlock on guard	1: Rare	3: Mod	6 (M)	No
Catering	Macerator operation	Mechanical (Fixed)	caught (clothes) by blades	Guard in place: procedure training: supervision : interlock on guard	1: Rare	3: Mod	6 (M)	No
Catering	Galley Range/Stove	Electrical	Shocked If water spilled onto stove	Inspect the stove before start cooking. Procedure for pots not to be filled to the top request assistance when lifting pots with food . Secure pots with safety bar.	4: Likely	4: Maj	21 (H)	Yes
Catering	Galley Range/Stove	Gravitational (Objects)	Pots falling of stove during ship rolling,	Inspect the stove before start cooking. Procedure for pots not to be filled to the top request assistance when lifting pots with food . Secure pots with safety bar.	4: Likely	4: Maj	21 (H)	Yes
Catering	Galley range extractor vents	Thermal	Working over hot range.	Wearing correct PPE, Lockout galley vent, Regular cleaning to prevent fat build-up reduces risk of fire hazard and food poisoning.	1: Rare	1: Ins	1 (L)	No
Catering	Galley range extractor vents	Fire	Fire hazard	Wearing correct PPE, Lockout galley vent, Regular cleaning to prevent fat build-up reduces risk of fire hazard and food poisoning.	1: Rare	1: Ins	1 (L)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Catering	Carrying big pots and trays	Gravitational (People)	slipping & falling	Correct PPE, Safety posters and Manual lifting and carrying procedure.	3: Possible	3: Mod	13 (S)	No
Catering	Slippery Decks	Gravitational (People)	Injuries caused by slipping and tripping	Good housekeeping, Wearing PPE, 5 min. safety talks, warning signs.	4: Likely	2: Min	12 (M)	No
Catering	Washing Kitchen utensils	Other	Risk of being cut by unseen knives or broken glasses/plates	Rubber cloves, Safety posters, Dishwasher	2: Unlikely	3: Mod	9 (M)	No
Catering	Tumble Dryer	Fire	Fire hazard	Good housekeeping, Safety posters, Strict control of laundry keys Equipment should be inspected before use, faults and damage if found should be reported immediately do the maintenance department.	2: Unlikely	4: Maj	14 (S)	Yes
Catering	Cabins and all areas cleaning	Chemical	Exposure to chemicals	Wearing correct PPE, Hazardous data sheets, Supervision. Caution must be exercise when opening the cardboards and lockers especial when the vessel steaming.	2: Unlikely	2: Min	5 (L)	No
Catering	Cabins and all areas cleaning	Gravitational (People)	slipping on wet floors.	Wearing correct PPE, Hazardous data sheets, Supervision. Caution must be exercise when opening the cardboards and lockers	2: Unlikely	2: Min	5 (L)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
				especial when the vessel steaming.				
Catering	Cabins and all areas cleaning	Gravitational (Objects)	Falls of tools, materials from height, (lockers and cardboards) due items shifted during rough weather or when vessel steaming.	Wearing correct PPE, Hazardous data sheets, supervision. Caution must be exercise when opening the cardboards and lockers especial when the vessel steaming.	2: Unlikely	2: Min	5 (L)	No
Catering	Bain Marie	Fire	Exposure to electrical fire	Supervision, see that bain-marie is always filled with water. Always switch power outlet off when not in use	3: Possible	3: Mod	13 (S)	No
Catering	Handling of Stores	Gravitational (People)	Movement of vessel	Supervision, 5 minutes safety talk, safety posters	3: Possible	3: Mod	13 (S)	No
Catering	Cutting meat and vegetables	Personal / Behaviour	Fingers/Hands injury due to cut	Chain gloves to be worn all times	2: Unlikely	1: Ins	2 (L)	No
Catering	Deep fryer operation	Thermal	(Safety) Burned by hot oil	Training; supervision procedure; request for help when lifting oil drum to change oil. Old oil disposal procedure in place Care should also be taken to avoid overheating the oil as it can ignite	3: Possible	3: Mod	13 (S)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT

Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Catering	Deep fryer operation	Waste	(Environment) spill while disposed used oil properly	Training; supervision procedure; request for help when lifting oil drum to change oil. Old oil disposal procedure in place Care should also be taken to avoid overheating the oil as it can ignite	3: Possible	3: Mod	13 (S)	No
Catering	Used Oil Disposal	Waste	Pollution from incorrect used oil segregation	Training; supervision procedure; request for help when lifting oil drum to change oil. Old oil disposal procedure in place Care should also be taken to avoid overheating the oil as it can ignite	2: Unlikely	2: Min	5 (L)	No
Launch service	Launch approaching and during replenishment operation.	Mechanical (Mobile)	Collision	Watch keeping guideline	2: Unlikely	4: Maj	14 (S)	Yes
Launch service	Launching Rescue boat	Gravitational (Objects)	Boat falling in water due to Winch failure	- PMO covers maintenance of FRC and crane - Load tested and certified equipment by external contractor - Procedure and on the job training. JSA and Safety Talk	3: Possible	4: Maj	18 (S)	Yes
Launch service	Launching Rescue boat	Gravitational (Objects)	Boat falling in water due to Wire failure	- PMO covers maintenance of FRC and crane- Load tested and certified equipment by external contractor. Procedure and on the job training.	2: Unlikely	4: Maj	14 (S)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT

Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of theEvent (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Launch service	Launching Rescue boat	Gravitational (Objects)	Boat falling in water due to Hook failure	- PMO covers maintenanceof FRC and crane - Load tested and certified equipment by external contractor. Procedure and on the job training.	1: Rare	4: Maj	10 (M)	Yes
Launch service	Launching Rescue boat	Personal / Behaviour	Boat falling in water due to Human error	- Experienced and suitably qualified Personnel to be used- Painters to be used and always manned - SafetyTalk and JSA to be done prior to operations	3: Possible	4: Maj	18 (S)	Yes
Launch service	RAS While Vessel is on DP	Mechanical (Mobile)	DP Runoff	Procedure- Taut wire on standby- DP Operator familiarization	3: Possible	2: Min	8 (M)	No
Launch service	RAS While Vessel is on DP	Mechanical (Mobile)	Blackout	System alarms monitoring- two-way switchboard Split- All available Generators to be on standby-	2: Unlikely	2: Min	5 (L)	No
Launch service	RAS While Vessel is on DP	Mechanical (Fixed)	Ropes Caught in Props	- Monitor rope and maintain enough tension to keep it floating- Slow steam ahead when letting go to keep linesclear of prop wash	2: Unlikely	2: Min	5 (L)	No
Engineering Change	1.0 Modification of equipment	Other	Failure of equipment due to modification	Engineering Change procedure	3: Possible	2: Min	8 (M)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Engineering Change	1.0 Modification of equipment	Other	Injury or fatality due to modification	Engineering Change procedure	3: Possible	3: Mod	13 (S)	No
Engineering Change	2.0 Modification to structure	Other	Damage to vessel	Engineering Change procedure	2: Unlikely	4: Maj	14 (S)	Yes
Engineering Change	3.0 Emergency Repairs	Other	Injury or fatality due to modification	Engineering Change procedure SSN-ADP-017	2: Unlikely	3: Mod	9 (M)	No
Engineering Change	Some modification done without following engineering change process	Other	Risk of modification not assess resulting in incident	None	2: Unlikely	3: Mod	9 (M)	No
Hazardous Materials	Receiving and handling	Chemical	1. Inhalation and absorption of Toxic gasses 2. Ingestion and in contact with toxic liquid. Chemicals burns from handling. 3. Water / Air pollution due to spillages	MSDS, chemical labelling, IMDG code, PPE, procedure Emergency response Manual and Team.	3: Possible	2: Min	8 (M)	No
Hazardous Materials	Storage	Chemical	1. Fire due to Reaction of incompatible chemicals due to improper storage or segregation of products. 2. Possibility of Structural damage due to oxidation. 3. Release of hazardous vapours from leaking containers. 4. Water / Air pollution due to spillages	MSDS, chemical labelling, IMDG code - Segregation tables. Ventilation system of all storage areas. Weekly & Monthly inspection of chemicals and storage. Weekly & Monthly inspection of chemicals and storage. Ventilation system of all storage areas. Storage areas design with containment, drainage and venting systems.	2: Unlikely	3: Mod	9 (M)	No
Oxy Acetylene System	1.0 Transfer from launch to vessel	Gravitational (Objects)	Dropping cylinder from crane	Designated lifting cages for transport to be used	3: Possible	4: Maj	18 (S)	Yes
Oxy Acetylene System	3.0 Connecting cylinders to manifold	Chemical	Oxygen cylinder explosion due to grease or oil	Boilermakers to ensure their hands and gloves are free of oil & grease. Inspect fittings prior to connection.	2: Unlikely	4: Maj	14 (S)	Yes
Oxy Acetylene System	3.0 Connecting cylinders to manifold	Pressure / Explosions	Gas leaking, Risk of explosion	Check for leaks as per procedure	3: Possible	4: Maj	18 (S)	Yes
Oxy Acetylene System	3.0 Connecting cylinders to manifold	Other	Gas Leaking, Loss of production on vessel due to inability to effect repairs	Check for leaks as per procedure	3: Possible	1: Ins	4 (L)	No
Oxy Acetylene System	4.0 Stock control	Other	No gas stock left on board for emergency procedures	Stock control as per procedure	2: Unlikely	3: Mod	9 (M)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Oxy Acetylene System	5.0 Gas cutting	Fire	Ruptured hose causing fire	Procedure and maintenance plan for Oxy/Acet fittings	3: Possible	2: Min	8 (M)	No
Diving Ops at Anchor	Isolation process involving Main and auxiliary propulsion, sea chests, cathodic protection system, plant systems.	Other	Isolating incorrect equipment.	Isolation to be championed by CEO and 2EO with-Isolation to be conducted as per Guidelines-Isolation checklist-Diving supervisor to sight and confirm Isolation-Diving team to Collect Personal Locks, Isolation Box to be used and All Divers to lock with Personal Locks-Test Starting all equipment before commence of diving ops.	4: Likely	4: Maj	21 (H)	Yes
Diving Ops at Anchor	Diving operation	Other	Failure in communications	Ship's crew to be stationed at Diving area with radio and in communication with Bridge and Diving team	4: Likely	2: Min	12 (M)	No
Diving Ops at Anchor	Diving operation	Climatic/ Natural Events	-Personal and fatal injuries due to	1. Sharp lookout 2. No Galley slops to be dumped overboard	1: Rare	4: Maj	10 (M)	Yes
Helicopter Operations	Chopper descending to land on deck	Gravitational (Objects)	Chopper can crash on deck / into the side of the ship	1. Efficient communication between ship, log base and helicopter. 2. Accurate weather reporting to Helicopter. 3. Helideck perimeter lightings.	1: Rare	5: Maj	15 (S)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
				4. Helideck Team on standby monitoring helicopter progress during landing and taking off. 5. Helideck clear of debris tested and on standby ready for use.				
Helicopter Operations	Chopper landing	Mechanical (Mobile)	Ground resonance	1. Monitor chopper's landing to see if landing gear is clear of any items and are firmly on helideck. 2. Green deck clear for landing and 3 greens signal given to helicopter by HLO	1: Rare	4: Maj	10 (M)	Yes
Helicopter Operations	Chopper landing	Mechanical (Mobile)	Flying debris	1. HLO inspection of helideck before landing. 2. Wash down Helideck twice a week.	3: Possible	3: Mod	13 (S)	No
Helicopter Operations	Chopper landing	Noise	Noise Induced Hearing Loss	PPE	5: Almost Certain	1: Ins	11 (M)	No
Helicopter Operations	Helideck crew approach chopper	Gravitational (People)	Can slip and fall	1. Chopper briefing. 2. Helideck surface coated with non-slip material and surface friction tested annually.	1: Rare	1: Ins	1 (L)	No
Helicopter Operations	Helideck crew approach chopper	Mechanical (Mobile)	Can be struck by blades	1. Chopper briefing. Approach chopper in a crouched position 2. Approach chopper at a 90° angle.	1: Rare	5: Maj	15 (S)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Helicopter Operations	Loading and Offload Passengers	Gravitational (People)	Crew joining can slip and fall	1. Chopper briefing. 2. Helideck surface coated with non-slip material and surface friction tested annually. 3. HLO monitoring and controlling people embarking or disembarking.	3: Possible	1: Ins	4 (L)	No
Helicopter Operations	Loading and Offload Passengers	Mechanical (Mobile)	Crew joining can be struck by blades	1. Chopper briefing at log base. 2. Approach chopper in a crouched position 3. Approach chopper at a 90° angle.	1: Rare	4: Maj	10 (M)	Yes
Helicopter Operations	Offload / load baggage	Pressure / Explosions	Loose items can be sucked into the blades	1. Chopper truck to be opened carefully 2. Light items to be put under the heavier baggage	3: Possible	1: Ins	4 (L)	No
Helicopter Operations	Offload / load baggage	Personal / Behaviour	Back injuries resulting from loading / offloading heavy items	1. Bosun to ask for assistance if loads are too heavy. 2. Items to be offloaded in accordance with agreed Procedure	3: Possible	2: Min	8 (M)	No
Helicopter Operations	Chopper takes off from helideck	Pressure / Explosions	Flying debris	1. PPE 2. Heli deck team musters on A Deck	3: Possible	3: Mod	13 (S)	No
Helicopter Operations	Chopper takes off from helideck	Gravitational (Objects)	Boot door / cabin door not properly closed	1.Bosun to check whether doors are closed	1: Rare	1: Ins	1 (L)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
				2. Pilots have an onboard indication of whether doors are closed				
Rescue Boat Operations	Lifting the boat from cradle and put boat against the gunwale.	Gravitational (Objects)	2. Boat falling heavily on the cradle or on the water causing damage to the boat.	All controls levers to be in their respective neutral positions. All By-pass valves closed.	2: Unlikely	2: Min	5 (L)	No
Rescue Boat Operations	Lowering the boat into the water "free fall"	Gravitational (Objects)	Quick release hooks failure. Boat dropping into the water uncontrollable may cause damage to the boat and injury to people.	Remove the safety pin only once the boat is ±1m from sea surface	4: Likely	4: Maj	21 (H)	Yes
Rescue Boat Operations	Lowering the boat into the water "free fall"	Gravitational (Objects)	Mechanical failure of crane, wire and other accessories.	Monthly PMO (maintenance & inspections). Annual load testing & inspection by 3rd party.	3: Possible	4: Maj	18 (S)	Yes
Rescue Boat Operations	Dis/Embark Crew to the craft	Gravitational (People)	Embarkation ladder failing.	Boat Lowered and Recovered with full complement, no Ladders are to be used	2: Unlikely	4: Maj	14 (S)	Yes
Rescue Boat Operations	Dis/Embark Crew to the craft	Water	Crew falling in water.	Crew to embark using boarding ladder.	2: Unlikely	4: Maj	14 (S)	Yes
Rescue Boat Operations	Dis/Embark Crew to the craft	Water	Drowning	Lifejackets	4: Likely	4: Maj	21 (H)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Rescue Boat Operations	Operating Quick release hook	Mechanical (Fixed)	Finger injuries	Training	3: Possible	2: Min	8 (M)	No
Launch Operations	Climbing up / down crane ladder	Gravitational (People)	Fall from height.	Be vigilant and watch every step you take. Check your boots are free of grease.3 points principle. Only 1 hand or one foot of the ladder at a time.	2: Unlikely	4: Maj	14 (S)	Yes
Launch Operations	Climbing up / down crane ladder	Gravitational (Objects)	Objects falling from height from crane operator's hands / pockets	Do not carry anything up in your hands or in your overall pockets. Crane checklist book to be carried in shoulder strap bag provided.	5: Almost Certain	3: Mod	20 (S)	No
Launch Operations	Working on open deck	Climatic/ Natural Events	Exposure to weather.	Wear proper PPE. Assess area	5: Almost Certain	1: Ins	11 (M)	No
Launch Operations	Working on open deck	Gravitational (People)	Slipping and falling on wet deck	Wear proper PPE. Assess area	5: Almost Certain	2: Min	16 (S)	No
Launch Operations	Working on open deck	Other	Injuries arising from other operations on deck	Check surrounding area for other operations. Barricade area where launch operations are taking place.	2: Unlikely	4: Maj	14 (S)	Yes
Launch Operations	Launch coming alongside	Climatic/ Natural Events	Incidents related to working the launch in bad weather	Launch Captain/Officer on Deck to assess situation and if not safe or in doubt, operation to be cancelled	5: Almost Certain	4: Maj	23 (H)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Launch Operations	Launch coming alongside	Other	Vessel and launch moving away from each other due to vessel making a long move from one priority to the next	Inform launch if such a move is to be done and stop crane operation until move is done.	1: Rare	1: Ins	1 (L)	No
Launch Operations	Launch coming alongside	Other	Chopper operations compromised due to launch alongside	Launch informed if chopper operations are to take place (in advance) and launch will back away from vessel until chopper operations are complete	1: Rare	5: Maj	15 (S)	Yes
Launch Operations	Crane operation itself (Moving lift toand from the launch)	Gravitational (Objects)	Damage to cranes	Ensure SWL is not exceeded. Weigh all skips before backload. Cranes to inspected and tested and entry made in crane logbook. Always use two or more taglines to control the swing, taglines to remain taught always Do not leave suspended weight unattended. Crane driver to confirm the load with Load moment indicator	1: Rare	2: Min	3 (L)	No
Launch Operations	Crane operation itself (Moving lift to and from the launch)	Gravitational (Objects)	Wire parting.	Ensure SWL is not exceeded. Weigh all skips before backload. Check condition of lifting equipment before use	1: Rare	3: Mod	6 (M)	No
Launch Operations	Crane operation itself (Moving lift to and from the launch)	Gravitational (Objects)	Falling and dropping weights/loads	Never stand or pass under a weight / load Be vigilant and aware of your surroundings	3: Possible	5: Maj	22 (H)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
				Check condition of lifting equipment before use				
Launch Operations	Crane operation itself (Moving lift to and from the launch)	Other	Uncontrollable swinging of loads.	Always use two or more taglines to control the swing Taglines to always remain taught Counter swing from Crane operator	5: Almost Certain	4: Maj	23 (H)	Yes
Launch Operations	Crane operation itself (Moving lift to and from the launch)	Gravitational (Objects)	Loose Items falling from cages, open racks, oil and gas racks, MC, TC, etc.	Never stand or pass under a weight / load Ensure items are properly secured inside skips and cages. Skips and open cages are not overfilled. Inspect the cages and open racks for loose items that fall through meshes such loose bolts and nuts, rod bars etc. Ensure doors are properly secured and lashed with seizing wires to prevent them from opening accidentally. Ensure Loading moment indicator is working. Avoid passing load over areas where personnel cannot retreat, such as the launch's Bridge (Rather ask the Launch to re-position if necessary)	3: Possible	5: Maj	22 (H)	Yes
Launch Operations	Slinging loads	Gravitational (Objects)	Lifting equipment failure.	Inspect slings and crane pennants before use. Ensure Compliance to SWL	4: Likely	3: Mod	17 (S)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Launch Operations	Slinging loads	Gravitational (Objects)	Loads slipping through the sling and falling to deck.	Bosun to supervise slinging technique used and ensure load is correctly slung	1: Rare	3: Mod	6 (M)	No
Launch Operations	Slinging loads	Mechanical (Fixed)	Fingers nipped between load and sling.	Be vigilant and aware of your surroundings Wear proper PPE. Practise good seamanship techniques	5: Almost Certain	2: Min	16 (S)	No
Launch Operations	Unhook loads	Mechanical (Fixed)	Hands caught in the hook	Use tight fit hand gloves.	1: Rare	1: Ins	1 (L)	No
Launch Operations	Landing loads on deck	Gravitational (Objects)	Load landing on your feet.	Beware of the load. Avoid squeezing load in an awkward position. Maintain good communication with crane operator.	3: Possible	4: Maj	18 (S)	Yes
Launch Operations	Landing loads on deck	Mechanical (Fixed)	Hands and fingers caught between load and ship structures.	Beware of the load. Avoid squeezing load in an awkward position. Maintain good communication with crane operator.	5: Almost Certain	4: Maj	23 (H)	Yes
Launch Operations	Handling taglines	Other	Caught in the bight of the rope.	Always watch your feet and keep the rope away from your feet.	4: Likely	4: Maj	21 (H)	Yes
Launch Operations	Handling taglines	Other	Burns from chaffing rope through your hands.	Use gloves when handling taglines.	5: Almost Certain	2: Min	16 (S)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Launch Operations	Heavy Loads (when applicable)	Personal / Behaviour	Exceeding SWL of Crane	Item weights to be carefully considered before lifting Maximum Length of Boom that can be used to be pre-determined and adhered to Ask Launch to reposition if necessary, to avoid over extension Ensure Crane overloads protection systems functional	4: Likely	1: Ins	7 (M)	No
Launch Operations	Communication	Personal / Behaviour	Misinterpretation of the message by the receiver.	Only one person to communicate the operation between the launch, the ship and the crane operator. BOSUN. Speak clearly and give clear signals and directions to crane driver. Radios to be checked before launch operation (Battery)	5: Almost Certain	3: Mod	20 (S)	No
Lifting Operations	Working on open deck	Climatic/ Natural Events	Exposure to weather and the elements.	Conduct Weather Assessment and Wear proper PPE	3: Possible	1: Ins	4 (L)	No
Lifting Operations	Working on open deck	Gravitational (People)	Slipping and Falling on deck	Wear proper PPE, assess area and clear where necessary				
Lifting Operations	Working on open deck	Other	Other operations on deck causing injury	Be vigilant of all other operation happening within the area Barricade/Cordon off lifting operational area	1: Rare	1: Ins	1 (L)	No
Lifting Operations	Climbing up the ladder	Gravitational (People)	Trips and slips and falling from heights	Be vigilant and watch every step you take Do not carry anything up in your hands or in your overall pockets	3: Possible	4: Maj	18 (S)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
				Check your boots are free of grease				
Lifting Operations	Transferring loads	Other	Crane can stall while there is a load in the air	Pre crane checks to be completed before the operation commences Crane SWL not to be overloaded	4: Likely	2: Min	12 (M)	No
Lifting Operations	Transferring loads	Other	Load can injure crew on deck when being lifted and slung	Only Authorised crane drivers to use the cranes Siren to be operated when loads are being lowered and slung Deck crew to stand clear of loads that are being moved Area of operation to be cordoned off Crane driver to have someone always guide him	2: Unlikely	4: Maj	14 (S)	Yes
Lifting Operations	Transferring loads	Gravitational (Objects)	Breaking of slings, wires, chains etc. whileloads are suspended on it	Deck crew to stand clear of loads that are being moved Area of operation to be cordoned off Siren to be operated when loads are being lowered and slung Use the correct SWL pendant, slings, chains etc. Crane SWL and the SWL of the Pendant, slings, wires to be checked against the load Abnormal lifts or lifts where the weight is not known, are to be approved by the CNO first and load tested	1: Rare	4: Maj	10 (M)	Yes

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Lifting Operations	Transferring loads	Other	Load can swing out of control	Cranes not to be used in Bad weather Crane driver to have someone always guide him at all times2 Tag lines minimum One load at a time to be moved	5: Almost Certain	3: Mod	20 (S)	No
Lifting Operations	Transferring loads	Personal / Behaviour	Crane booms can overlap when more than one crane is used	Multiple crane operations to be checked and approved by Cochrane arc diagram to be checked beforehand	1: Rare	2: Min	3 (L)	No
Lifting Operations	Transferring loads	Pressure / Explosions	Hydraulic hose burst	1. Deck crew to know the position of the pollution control equipment All attempts should be made not to leave the lift in the air Deck crew to stand clear of loads that are being moved 2. Area of operation to be cordoned off	4: Likely	2: Min	12 (M)	No
Lifting Operations	Transferring loads	Mechanical (Fixed)	Damage of adjacent equipment to transfer operation	1. Crane driver to have someone always guide the driver at all times 2. Tag lines minimum Operation area to be checked before operation commences	2: Unlikely	2: Min	5 (L)	No
Lifting Operations	Transferring loads	Personal / Behaviour	Injuries arising from the incorrect use of taglines	Tag lines to be of sufficient length Tag lines not to be secured to fixed structures, but rather use the cleats provided	3: Possible	3: Mod	13 (S)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Lifting Operations	Transferring loads	Other	Miscommunication during operation	Hand signals to be used. Crane operator, guides man and crew to communicate in an agreed language Crane operator and guides man to have a radio each	2: Unlikely	2: Min	5 (L)	No
Lifting Operations	Transferring loads (regarding the deck crew)	Personal / Behaviour	Injuries from loads being lifted, lowered, slung etc.	Deck crew to stand clear of loads that are being moved Area of operation to be cordoned off Tag line to be hooked on and not knotted on	1: Rare	4: Maj	10 (M)	Yes
Lifting Operations	Shutting down the crane	Personal / Behaviour	Cranes can be left on	Cranes to be shut down after operation is completed	3: Possible	2: Min	8 (M)	No
Lifting Operations	Climbing down the ladder	Gravitational (People)	Trips, slips, miss steps and fall from heights	Be vigilant and watch every step you take Do not carry anything up in your hands or in your overall pockets Check your boots are free of grease	3: Possible	2: Min	8 (M)	No
Incinerator Operations	Sorting out garbage	Other	Injuries caused by sharp objects	Proper PPE such gloves to be worn at times.	4: Likely	3: Mod	17 (S)	No
Incinerator Operations	Operation of Incinerator	Personal / Behaviour	Incinerating materials unsuitable for incineration (Hazardous, Explosives, etc.)	Procedural Control (Garbage to be sorted before incineration)	3: Possible	3: Mod	13 (S)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Cleaning Sea Water Strainers	Cleaning Sea Water Strainer	Water	Flooding	Alarms	3: Possible	4: Maj	18 (S)	Yes
Cleaning Sea Water Strainers	Cleaning Sea Water Strainer	Chemical	Accidental discharge overboard due to over-filling of holding tank	Tank level monitoring and alarm system, procedure	3: Possible	1: Ins	4 (L)	No
Cleaning Sea Water Strainers	Cleaning Sea Water Strainer	Chemical	Accidental discharge overboard via overboard valve	Valve locked closed	3: Possible	1: Ins	4 (L)	No
Cleaning Sea Water Strainers	Cleaning Sea Water Strainer	Mechanical (Fixed)	Pump run with valve/s closed, damage to pump	Procedure in place for pump operation	3: Possible	1: Ins	4 (L)	No
Cleaning Sea Water Strainers	Cleaning Sea Water Strainer	Other	Failure to comply will legal requirement to enter all bilge operations in Oil Record Book	Procedure and standing orders	3: Possible	3: Mod	13 (S)	No
Sampling tool	Sampling tool and attachment maintenance	Gravitational (People)	Fall off Ladder when using tools	Fall Protection systems and Use Modular Scaffolding for access to Tool	3: Possible	4: High	18 (S)	Yes
Sampling tool	Sampling tool and attachment maintenance	Gravitational (Objects)	Components falling	Inspect Interface and lifting attachments.	5: Almost Certain	1: Ins	11 (M)	No

CIC BASELINE RISK AND CONTROL ASSESSMENT								
Business Area	Step in Operation	Hazard	Description of Unwanted Event	Current Controls	Likelihood of the Event (given current controls)	Consequence (should the event happen) (S)	Max Risk Rank	Priority Unwanted Event
Sampling tool	Move sampling tool and components	Other	tool swinging excessively damage to equipment	Tag Lines with turns around a secure point. Ensure good weather window.	5: Almost Certain	1: Ins	11 (M)	No
Sampling tool	Move sampling tool and components	Other	Equipment swinging excessively injury to people	Tag Lines with turns around a secure point. Ensure good weather window.	2: Unlikely	4: High	14 (S)	Yes

Cook Islands Exploration Licence Number EL1

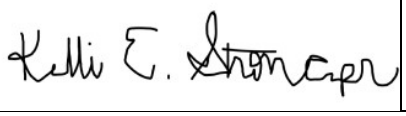
Occupational Safety and Health Plan (CIC072)

As of January 5, 2022

APPROVAL(S)

Name & Title	Signature	Date
Gregory P Stemm Managing Director CIC Ltd		January 5, 2022

AUTHOR(S)

Name & Title	Signature	Date
Kelli Shultz Marine Operations Manager Odyssey Marine Exploration		January 5, 2022

REVIEWER(S)

Name & Title	Signature	Date
Adam Stemm COO CIC Ltd		January 5, 2022

CHANGE HISTORY

Date	Change Req No.	Revision	Description of Change
January 5, 2022	N/A	0	Issued

Tables and Figures

TABLE OF CONTENTS

1. Executive Summary

CIC LIMITED (CIC LTD or CIC) is a private Cook Islands company focused on responsible seafloor exploration. The company adheres to international best practices in environmental sustainability and strives for excellent performance in environmental and occupational health and safety (OSH). This document details the Occupational Safety and Health (OSH) Plan for CIC's operations in the Cook Islands' Exclusive Economic Zone (EEZ).

This policy links with:

- Environmental, Community, Occupational Health and Safety Policy
- Risk Management Plan
- Quality and Best Practice as defined in the Environmental Data and Sample Quality Assurance processes of the Exploration Program (see Sections 4.2 - 4.5 in this document)

CIC LTD is the license holder, and its controlling affiliate is CIC LLC. Odyssey Marine Exploration, Inc. (Odyssey) is a CIC Consortium member and the exclusive marine operating partner for the CIC Exploration Work Program (EWP). For purposes of this document, when CIC is referenced, it could imply CIC LTD or its Consortium or both.

For practical purposes, all funding, management, and operational activities are performed by CIC personnel under intercompany agreements. Parties to contracts with contractors and consultants will be at subsidiary level whenever practical, and as such meet the requirements for local content and spending. The policies covered in this document applies to all CIC employees and contractors in all of our land-based and offshore operations.

CIC recognizes that breaches of this policy at the level of the individual employee to business units has the potential to cause economic, social, and ecological impacts. All suspected breaches will be investigated, and appropriate disciplinary and remedial action will be taken.

CIC is committed to the following principles:

- Complying with the environmental laws and regulations of the jurisdictions in which we operate.
- Developing an ecosystem-based environmental management framework that centralizes ourenvironmental knowledge base, identifies project environmental risks, prioritizes environmental studies, and operationalizes this policy in Environmental ImpactAssessments.
- Respecting traditional knowledge and customary practices of environmental management and incorporating these cultural environmental aspects into our environmental managementframework.
- Applying the Precautionary Principle where appropriate in our operations.
- Recognizing the significant potential for deep-sea harvesting to contribute to economic development in our areas of operation and the responsibility to adhere to global and jurisdictional Sustainable Development Goals and Policies.

- Developing and nurturing a culture of environmental management across the company and implementing programs of employee awareness, energy and emissions reduction andsustainable supply chains.
- Fostering a culture of corporate environmental stewardship and collaboration among regulators, stakeholders and research partners and installing an adaptive management approach to continually improve environmental performance.
- Applying best available scientific and technological approaches to environmental management.

2. Definitions, Abbreviations and Acronyms

Field	Description or Definition
CBD	Convention on Biological Diversity
CIC	CIC LIMITED, CIC LTD, or the Consortium
CIM	Canadian Institute for Mining
CMS	Conservation of Migratory Species
COSHH	Control of Substances Hazardous to Health
CP	Competent Person
CPT	Cone Penetrometer Testing
CTD	Conductivity, Temperature, and Depth
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ESG	Environmental Social and Governance
EWP	Exploration Work Plan (CIC065)
HSW	Health, Safety and Wellbeing
IMMS	International Marine Minerals Society
IMO	International Maritime Organization
IRMP	Incident Response Management Plan (CIC071)
IMS	Information Management System
ISA	International Seabed Authority
ISO	International Organization for Standardization
JORC	Australasian Joint Ore Reserves Committee
KPI	Key Performance Indicator
MSDS	Material Safety Data Sheets
NES	The Cook Islands National Environment Service
NI 43-101	National Instrument 43-101
NIWA	New Zealand's National Institute of Water and Atmospheric Research
NM	Nautical Miles
Odyssey	Odyssey Marine Exploration, Inc.
OSH	Occupational Safety and Health

QA/QC	Quality Assurance/Quality Control
QHSE	Quality, Health, Safety and Environment
QP	Qualified Person
ROV	Remotely Operated Vehicle
SMS	Seafloor Massive Sulfide
SPC	Secretariat of the Pacific Community
STCW	Standards of Training, Certification and Watchkeeping
TAB	CIC Technical Advisory Board
TDMe	Total acid soluble metal
UNC-CH	University of North Carolina – Chapel Hill (UNC-CH)
USFCMS	University of South Florida College of Marine Science

3. Local and International Legislation, Policies and Guidelines

3.1 Cook Islands' Legislation, Policies and Guidelines

The key legislation, policies, guidelines, and programs in place for the Cook Islands are listed below.

Table 1. Cook Islands' legislation, policies, guidelines, and programs

Instrument	Description	Responsible Department/Agency
Legislation		
Seabed Minerals Act (2019), Seabed Minerals Amendment Act (2020), Seabed Minerals Amendment Act (2021),Seabed Minerals (Exploration) Regulations (2020)	Sets out the governance requirements for the licensing of exploration and exploitation activities. Upholds the requirements of the Environment Act (2003) and establishes compliance requirements.	Seabed Minerals Authority (SBMA), Seabed Minerals Commissioner, Seabed Minerals AdvisoryBoard
Cook Islands Environment Act (2003)	Core legislation under which an Environmental Impact Assessment (EIA) will be completed, and which controls the permitting of activities that have the potential to cause significant environmental harm.	The Cook Islands National Environment Service (NES)
Marae Moana Act (2017)	Requires that the Cook Islands' EEZ area be managed for the primary purpose of protecting and conserving the ecological, biodiversity and heritage values of the Cook Islands' marine environment. Founded on the traditional principals of '*rā'ui*' – a form of traditional spatial management applied in ancestral society. Allows for seabed harvesting.	Marae Moana Council, Marae Moana Technical Advisory Group, and other agencies
Marine Resources Act(2005)	Establishes the entire Cook Islands' EEZ as a whale sanctuary and ashark sanctuary. This declarationprovisions for the protection of whale and shark species against commercial exploitation and the management of tourism, fisheries and scientific research and other activities that have the potential to intentionally or inadvertently interact with these species.	Ministry of Marine Resources

Cook Islands Natural Heritage Trust Act (1999)	Establishes a Cook Islands Natural Heritage Trust with the necessary resources and powers to investigate, identify, research, study, classify, record, issue, preserve and arrange publications, exhibitions, displays and generally educate the public on the science of, and traditional practices and knowledge relating to, the flora and fauna of the Cook Islands.	Cook Islands Government, Director of Cook Islands Natural Heritage Trust: Gerald McCormack
Prevention of Marine Pollution Act (1998)	An act to provide for the prevention of marine pollution, the dumping and transportation of other waste in Cook Islands' Waters by vessels and to give effect to various international conventions on marine pollution and protection of the marine environment.	Ministry of Transport
Maritime Transport Act(2008)	Provide for the maritime safety of the Cook Islands and Cook Islands' vessels and protect the marine environment.	Ministry of Transport
Maritime Zones Act (2018)	Declares the territorial sea (LAT to 12 NM), contiguous zone (LAT to 24 NM), exclusive economic zone (LAT to 200 NM), and continental shelf of the Cook Islands as the maritime zones of the Cook Islands. Declares, and expresses the rights of the Cook Islands and other States in relation to, the maritime zones of the Cook Islands consistently with international law. Repeals with Continental Shelf Act (1964) and the Territorial Sea and Exclusive Economic Zone Act (1977).	All

Traditional Knowledge Act (2013)	Gives legal recognition to and protection of the rights in the traditional knowledge of the traditional communities of the Cook Islands (e.g., traditional canoe carving, traditional conservation practice, fishing practice, etc.)	Ministry of Cultural Development
Policy		
National Seabed Minerals Policy (2014)	Sets out the Government's sustainable management and regulation of seabed minerals.	Seabed Minerals Authority (SBMA)
Te Tarai Vaka (Cook Islands Environmentaland Social SafeguardsPolicy)	Sets out the Government's objectives for environmental andsocial safeguards for the Cook Islands.	Central Policy and Planning Office of the Office of the Prime Minister, Ministry of Finance and Economic Management
Guidelines		
Te Tarai Vaka (Cook Islands Environmentaland Social SafeguardsGuideline)	Guidance for environmental andsocial safeguards for the development seabed harvesting in the Cook Islands.	Central Policy and Planning Office of the Office of the Prime Minister, Ministry of Finance and Economic Management
Te Kaveinga Nui (Cook Islands National Sustainable Development Plan 2016-2020)	Sets out Cook Islands sustainable development goals.	Central Policy and Planning Office of the Office of the Prime Minister, Ministry of Finance and Economic Management

The Cook Islands Marae Moana Act (2017) establishes the entire EEZ as an area to be managed for the primary purpose of protecting and conserving the ecological, biodiversity and heritage values of the Cook Islands' marine environment. Marae Moana is somewhat unique in that it considers the whole EEZ as a connected ecosystem that is 'protected', while also identifying areas within the EEZ where industry can be allowed. As such, Marae Moana is considered an overarching ocean management framework, within which deep-sea mineral harvesting is identified as an allowed, spatially defined activity. The Marae Moana Act (2017) also establishes formal marine protected areas of 50 NM around each land mass, where commercial activities are prohibited. CIC's Licence Area is outside these 50 NM protected areas.

Marae Moana is underpinned by indigenous approaches of '*rā'ui*' – a traditional form of natural resource management that prevented access to certain areas or during certain times, which is reflected in modern marine spatial management and ecosystem-based management. Marae Moana has strong bilateral government support and strong support from the community. The Marae Moana Act is administered by the Marae Moana Council that is chaired by the Prime Minister and comprises the opposition lead, a religious leader, a representative of the Finance Ministry, and community leaders. The Marae Moana Act was established in consultation with the House of Ariki: the 'house' of chiefs. The Seabed Minerals Amendment Act (2020) upholds the requirements of the Marae Moana Act (2017) and in practice, a deep-sea mineral harvesting application received by the Seabed Minerals Authority would be assessed against the nine Marae Moana principles of ecologically sustainable use.

3.2 International Regulations and Guidelines

CIC endeavours to follow any international regulation or guidelines as deemed appropriate by the Cook Islands Seabed Mineral Authority. Though not required, CIC recognizes that these regulatory instruments and guidelines form a growing body of international best practice in the deep-sea mineral extraction industry since they have been developed through collaboration with scientists and a diversity of interests, these are likely to inform the expectations of stakeholders in the Cook Islands.

Table 2. International regulations and guidelines.

Instrument	Description	Responsible Department/Agency
Regulations and Recommendations		
Consolidated Regulations and Recommendations on Prospecting and Exploration (2015)	Compilation of guidelines and regulations related to prospecting and exploration in The Area	International Seabed Authority (ISA)
Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area	2020 recommendations for EIA during exploration	International Seabed Authority (ISA)
Draft Regulations on Exploitation of Mineral Resources in the Area (ISA 2019)	Draft 2019 for exploitation regulations in The Area	International Seabed Authority (ISA)
MARPOL	Global shipping environmental controls	International Maritime Organization (IMO)

Guidelines		
Pacific-ACP States Regional Environmental Management Frameworkfor Deep Sea Minerals Exploration and Exploitation	EU-funded project with SOPAC to harmonize approaches to deep sea mining in Pacific states, including assistance with the establishment of state legislation. Establishes regional scale framework and recommendationsfor environmental management.	EU-Pacific Community (SPC)
Pacific-ACP States Regional Scientific Research Guidelines forDeep Sea Minerals	EU-funded project with SOPAC to harmonize approaches to deep sea mining in Pacific states, including assistance with the establishment of state legislation. Recommends approaches to engaging in scientific research.	EU-NIWA-Pacific Community (SPC)
Pacific-ACP States Regional Financial Framework for Deep SeaMinerals Exploration and Exploitation	EU-funded project with SOPAC to harmonize approaches to deep sea mining in Pacific states, including assistance with the establishment of state legislation. Establishes regionalscale financial framework.	EU-Pacific Community (SPC)
Various think piecesand guidelines published as ISA technical studies	Documents and workshop presentations that collectively informs the growing 'best practice' basis in the Area.	International Seabed Authority (ISA)

3.3 Conventions and Treaties

Cook Islands is signatory to the treaties listed in Table 4. These agreements generally set out the Government's aspirations and duties for environmental protection and sustainable development and they recognize the importance of cooperation among Pacific Island states, particularly in relation to transboundary issues.

Table 3. Cook Islands signatory international treaties.

Treaty	Description
Convention on Biological Diversity (CBD) (1992); Adopted at the 1992United Nations 'Conference on Environment and Development' in Riode Janeiro, Brazil	Aims to conserve biological diversity and species in natural surroundings, and to rehabilitate degraded ecosystems. Activitieswhich may adversely affect biodiversity require: • Article 7. Identify and monitor impacts. • Article 8. Establish a system of protected areas (including withinthe marine environment). • Article 14(a). Conduct environmental impact assessments. • Article 14(c). Promote consultation. The CBD adopts an ecosystem approach as its primary frameworkfor action, defining the 'ecosystem' as a dynamic complex of plant,animal and micro-organism communities and their non-living environment, interacting as a functional unit.
Convention on Biological Diversity (1992) - Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization	Provides a legal framework for the effective implementation of one ofthe three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources. The '2020 Aichi Targets' includes a target that by 2020, parties areto implement at least 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, that are ecologically representative and connected.
1992 United Nations 'Conference on Environment and Development' – Agenda 21	A non-binding voluntarily implemented action plan for sustainable development. It outlines key policies for achieving sustainable development that meets the needs of the poor and recognizes the limits of development to meet global needs. Specific chapters applicable to environmental management of deep- sea minerals development include: • Chapter 8. Integrating environment and development in decision-making. • Chapter 15. Conservation of biological diversity. • Chapter 17. Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas and coastal areas, and the protection, rational use, and development of their living resources.

Nouméa Convention (1982) The Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (Nouméa Convention), adoptedin 1982	Promotes two main objectives: 1) to prevent, reduce and control pollution from any source; and 2) to ensure sound environmental management and development of natural resources. Article 8 'Pollution from Seabed Activities' of the Nouméa Convention states, 'The Parties shall take all appropriate measures to prevent, reduce and control pollution in the Convention Area, resulting directly or indirectly from exploration and exploitation of theseabed and its subsoil'. Article 17 'Scientific and Technical Co-Operation': 1) the Parties shall co-operate, either directly or with the assistance of competent global, regional, and sub-regional organizations, in scientific research, environmental monitoring, and the exchange of data and other scientific andtechnical information related to the purposes of the Convention; and 2) in addition, the Parties shall, for the purposes of this Convention, develop and co-ordinate research and monitoring programs relating to the Convention Area and co-operate, as far as practicable, in the establishment and implementation of regional, sub-regional and international research programs. The Nouméa Convention is complemented by two Protocols: The Dumping Protocol and the Pollution Emergencies Protocol, which are applicable to Parties' EEZ and to areas of the high seas beyond national jurisdiction that are completely enclosed by this EEZ. In particular, parties must prevent, reduce and control pollution causedby discharges from vessels, resulting directly or indirectly from exploration and exploitation of the seabed and its subsoil. It contains an EIA requirement, which must include opportunity for public comment and consultation with other States who may be affected.

The International Marine Minerals Society (IMMS) Code for Environmental Management of Marine Mining Voluntary code for environmental management of marine mineral activities (explorationand exploitation)	1. Environmental principles for marine mineral extraction: • to observe the laws and policies and respect the aspirations of sovereign States and their regional sub-divisions, and of international law, as appropriate to underwater mineral developments. • to apply best practical and fit-for-purpose procedures for environmental and resource protection, considering future activities and developments within the area that might be affected. • to consider environmental implications and observe the precautionary approach. • to consult with stakeholders and facilitate community partnerships on environmental matters throughout the project's life cycle. • to maintain an environmental quality review program and deliveron commitments. • to report publicly on environmental performance and implementation of the code. 2. A set of operating guidelines for application at a specific mineral extraction site. Guidelines to set an environmental management program for an exploration or extraction site, which can be used by all stakeholders; including government agencies, intergovernmental and non-governmental organizations, scientists, and local communities to check environmental management plans and their implementation.
Convention on the Conservation of Migratory Species of Wild Animals (CMS) (Bonn Convention) (1979)	Platform for the conservation and sustainable use of migratory animals and their habitats.
Memorandum of Understanding for the Conservation of Cetaceans and their habitats in the Pacific Islands region (2006)	Agreements to take steps to conserve all cetaceans. Action plan toaddress: a) Threat reduction b) Habitat protection, including migratory corridors c) Research and monitoring d) Education and public awareness e) Information exchange f) Capacity building g) Responses to stranding and entanglements h) Sustainable and responsible cetacean-based tourism i) International cooperation

United Nations 'Conference on Environment and Development' in Riode Janeiro, Brazil (1992)	Recognizes the importance of preserving the environment to the success of long-term economic progress. The following principles particularly address issues in regard to the management, protectionand preservation of the environment. • Principle 2. States are responsible to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond limits of the national jurisdiction. • Principle 3. The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations. • Principle 4. Environmental protection shall constitute an integral part of the development process. • Principle 7. States shall cooperate to conserve, protect and restore the Earth's Ecosystem. • Principle 9. States should cooperate to strengthen capacity-building for sustainable development by improving scientific understanding. • Principle 10. Environmental issues are best handled with participation of all concerned citizens. • Principle 11. States shall enact effective environmental legislation. • Principle 14. States should cooperate to discourage or prevent relocation or transfer of substances that cause severe environmental degradation. • Principle 15. The precautionary approach shall be widely applied. • Principle 16. Internalization of environmental costs so the polluter bears the costs of the pollution. • Principle 17. Environmental impact assessments shall be undertaken for activities that are likely to have a significant adverse impact on the environment. • Principle 19. Prior and timely notification of adverse transboundary environmental effects.

4. Technical Capability

Through CIC's Consortium, scientists, affiliated academic institutions and Technical Advisory Board (TAB), the project will be guided by leading accredited academics and experts in the fields of marine geology, marine sciences, environmental studies, and deep-ocean exploration. The EWP will operate in a responsible and sustainable manner in accordance with ESG (Environmental, Social and Governance) principles and best practises.

4.1 Technical Advisory Board (TAB)

The TAB will report directly to the executive management of CIC and their work product will be incorporated into all reports to the Cook Islands' Government to help provide assurance that the project is being conducted with the highest possible level of technical integrity that can be achieved. The TAB recognizes that responsible environmental stewardship is placed at the forefront of all project activities and has a remit to reinforce this value.

The TAB provides guidance, detailed reviews and approves all technical aspects of the project. The TAB will also scrutinize:

1. JORC or NI 43-101 compliance on resource and reserve estimates.
2. QP/CP review and signoff of geological and environmental reports.
3. CIC and its supporting companies with regards to methodologies, processes and procedures assuring they meet and exceed international industry and environmental standards.

Currently the members of the TAB include:

- Dr. James Hein – Geologist Emeritus, United States Geological Survey (USGS), Pacific Coastal and Marine Science Center
- Dr. Charles Morgan – Principal, Moana Hohonu Consulting, LLC
- Mr. Robert Goodden – Deep Sea Drilling Pioneer and Subsea Mining Consultant
- Dr. Mark Luther – Associate Professor, University of South Florida - College of Marine Science
- Mr. David Weight – Past President of the Cobalt Institute
- Dr. John Wiltshire – Professor Emeritus, University of Hawai'i at Manoa: School of Ocean & Earth Science & Technology
- Mr. Jean-Noel Calon – Founding Member of Blue Fish and Project Manager for Boulogne Seafood Cluster (Boulogne sur mer, France)
- Dr. Akira Usui – Professor, Kochi University, Japan
- Mr. Jonathan Gardner – Professor, Victoria University of Wellington
- Mr. Tom Albanese – Former CEO, Vedanta Resources and the Rio Tinto Group

4.2 Institutional and Academic Affiliations

Leading academic and scientific institutions will be involved with independently collecting, analyzing, and reporting on data so that objective, academically sound marine scientific research is assured. The scientists supervising and conducting the research are doing so with their interest focused on scientific objectivity and will have the freedom to publish their peer-reviewed results.

Academic researchers and scientists involved with the project through the Consortium, the Technical Advisory Board, and other project partners have extensive combined experience in oceanographic data collection, geological and environmental research, and modelling. CIC also will be partnering with local, regional, and international academic institutions that either have already performed or have an interest in marine scientific research and ocean mineral research within the Cook Islands.

Some of the institutions that are partnering in the project, providing scientists, or contributing research resources include:

- The University of South Florida - College of Marine Science (USF-CMS) (USA)
- The University of North Carolina - Chapel Hill (UNC-CH) (USA)
- Eckerd College (USA)
- The University of Hawai'i (Manoa)
- Kochi University (Japan)
- The International Marine Minerals Society (IMMS)
- The United States Geological Survey (USGS)
- The Natural History Museum of London (United Kingdom)
- The National Oceanography Centre at the University of Southampton (United Kingdom)

University of South Florida - College of Marine Science (USFCMS) and University of North Carolina-Chapel Hill (UNC-CH)

CIC has partnered with the University of South Florida College of Marine Science (USFCMS) and the University of North Carolina – Chapel Hill (UNC-CH) for collaboration on physical oceanographic, environmental and other aspects of the project. Project participants from this team have over a century of combined experience in oceanographic data collection and modelling, with applied experience from the Atlantic/Gulf of Mexico, Pacific and Indian Oceans. Dr. Mark Luther (USF-CMS) and Dr. Chris Martens (UNC-CH) will be leading the effort.

Activities will include modelling oceanographic currents, collecting data on sedimentation rates, ambient turbidity, sound, water current velocity and dissolved oxygen, as well as predicting sediment plumes which would occur in future nodule recovery operations.

Dr. Luther, the team member overseeing current and plume modelling, is a director of the Coastal Ocean Monitoring Prediction System, a founding member and past board chairman of the Alliance for Coastal Technologies and is presently the chairman of the International Seakeepers Society Science Advisory Council. USF-CMS, Dr. Luther's home institution, is a leader in integrated marine sciences, with research activities spanning the globe. The institution was an active member of the Gulf of Mexico Research Initiative, an independent research program established following the Deepwater Horizon oil spill; through the program, USF-CMS established the Centre for Integrated Modelling and Analysis of Gulf Ecosystems (C-IMAGE), an international Consortium of academics, researchers and students representing 19 collaborating institutions. The initiative studied geological, biological, chemical and physical aspects of environment and ecosystems over the span of a decade.

4.3 Marine Operations Partners

Odyssey Marine Exploration (Odyssey)

Odyssey is a member of the CIC Consortium and is the exclusive marine operating partner that will carry out CIC's EWP. The company has vast experience that is directly applicable to the Cook Islands Nodule Exploration Program.

For over 20 years, Odyssey has combined tools, team and technology to search for, study and recover a variety of marine seafloor assets and resources. Work has ranged from extensive mineral assessments to robotic archaeological excavations of shipwreck cargoes. These operations were conducted in water depths up to and exceeding those found in the nodule fields of the Cook Islands' EEZ.

The company has conducted search and recovery of base and precious metal cargos from extremely deep shipwrecks. Search operations were performed using a high-resolution dual-head towed multibeam and an ROV with depth rating of 6,000 meters. Once the recovery portion of a project commenced specialized tools including a hydraulic shear, grab, hot stab and deck plate remover were used to surgically cut open steel ship hulls and access cargo. Custom-fabricated robotic tooling was designed and constructed to recover cargos of metal ingots from the interior of the wreckage.

During the past decade, Odyssey has managed and completed over 1,000 days of complex deep ocean ROV operations at depths between 4,500 and 6,000 meters, utilizing and testing technology that is on a smaller scale but very similar to the harvesting system designed by Boskalis.

Additionally, Odyssey has planned and executed offshore mineral operations for projects such as ExO's Phosphate Resource, which have demanded the application of available and custom-designed technology to determine mineral resources as well as environmental and oceanographic parameters pertaining to their setting. The extent of the phosphate resource off the western coast of Mexico in 80 meters of water was determined through bathymetric survey and ore matrix sampling.

Offshore operations and subsequent management of sample description, assay and analysis led to the production of a resource statement formatted to JORC or NI 43-101 standards which outlines a geological resource of 588 million tonnes of measured, indicated and inferred phosphorite ore as empirically ground-truthed from 6-meter vibracore acquisition and the associated chain of custody procedures, laboratory assay and Quality Assurance / Quality Control (QA/QC) protocols. Combined with geotechnical data acquisition, the project required the gathering of environmental baseline data to support engineering and environmental impact analysis. This analysis included deployment of current meters, CTD and sediment traps, and commissioning plume modelling, ecotoxicology, and sound propagation studies.

Odyssey also conducted multiple operations on South Pacific Seafloor Massive Sulphide (SMS) projects. Odyssey's vessels, equipment and technical personnel were deployed to conduct ship-mounted multibeam echosounder survey, side-scan sonar, Tow-Yo water chemistry, geologic and ROV multibeam, video surveys and sampling at depths ranging from <1,000 to 3,000 meters in South Pacific jurisdictions, including those of multiple Secretariat of the Pacific Community (SPC) member states.

The following projects are examples of subsea mineral programs that Odyssey has supported with offshore services.

Neptune Minerals: Contractor and Shareholder (2010-2011)

- Odyssey performed offshore exploration services on behalf of Neptune Minerals, Inc. and its subsidiaries in 2010 and 2011 utilizing the vessel RV *Dorado Discovery*.
- Work was conducted in Licence areas obtained in the respective Exclusive Economic Zones (EEZ) of Papua New Guinea, the Solomon Islands, Vanuatu, New Zealand and Tonga.
- As of 2013, Neptune held approximately 92,327 km^2 of granted tenement area, and an additional approximately 82,157 km^2 of tenement area under application.
- Survey, sampling and other work included:
    - Conductivity, temperature, depth (CTD) sensor array deployments and sensor deployments via ROV:
        - Additional sensors, including for reduction potential, pH and helium were used for active volcanogenic plume detection
    - Side-scan sonar operations
    - Multibeam echosounder for bathymetry and reflectivity to map project areas and typify seabed
    - ROV visual data collection and geological sampling
    - Grab sampling of geological features
    - Work resulted in the identification of several venting systems and sulfide mineral targets, and contributed to resource quantification

Dorado Ocean Resources (later known as Neptune Minerals): Port Moresby to Nuku'alofa: PNG, Solomon Islands, Vanuatu, Tonga (2010): Shareholder and Contractor

- 59 deployments
- 29 Tow-Yos (463-line km; 219 hours of wire time; 25 volcanogenic features; 211 samples)
- 30 Vertical casts (47 hours of wire time; 233 samples)
- 21 plumes on 12 different prospects; 12 discoveries of potential new venting sites
- Unique 1040-km-long section along San Christobal-northern New Hebrides arcs
- 14 stations, 140 samples for ^3He and total acid soluble metal (TDMe)
- No down time due to CTD instrumentation
- 152 MAPR-ORP records (128 CTD Tow-Yo, 17 ROV, 10 Side-scan)

Chatham Rock Phosphate, Ltd: Contractor and Minority Shareholder (2011-2012)

- Odyssey participated as a contractor in a multi-party effort to characterize the environment and mineral resources at the Chatham Rise, in the EEZ of New Zealand, on behalf of Chatham Rock Phosphate, Ltd.
    - Participating personnel included representation from NIWA (New Zealand's National Institute of Water and Atmospheric Research)
- Odyssey utilized the chartered vessel RV *Dorado Discovery* to host four cruises between December 2011 and April 2012.
- Work was conducted at Licence Area CSL 50270, an 820 km^2 area, 450 kilometers east of Christchurch, New Zealand, at approximately 400 meters water depth.
- Survey, sampling and other work included:
    - Side scan sonar operations
    - Sub-bottom seismic sonar
    - Magnetic survey
    - Multibeam echosounder for bathymetry and reflectivity to map the project area and typify seabed
        - Approximately 750 km^2 surveyed
    - Recovery of two mooring buoy arrays
    - Cone penetrometer testing (CPT) on 199 stations
    - Box coring (>250 stations)
    - Vibracoring (>715 station)
    - Jet testing for sediment mobilization conducted via ROV
    - ROV visual data collection and biological sampling
        - >150 hours of video and >17,000 still photos from >77 line kilometers of ROV transect
    - Grab sampling and box coring
        - >32 tonnes sediment collected via grab
        - Subsampling via push core, vane shear, subsampling of distinct lithologies and biological subsampling

Royal Boskalis Westminster N.V.

Royal Boskalis Westminster N.V. is a leading global maritime services company operating in the market segments: Dredging, Offshore Energy, Inland Infra, Towage & Salvage services. As a partner Boskalis is able to realize complex infrastructural works for clients within the chain of design, project management and execution, on time and within budget, even at vulnerable or remote locations around the world. The company strives for sustainable design and realization of solutions.

Boskalis is active in projects in the energy, ports and infra markets. The company's main clients are oil, gas and power companies, port operators, governments, shipping companies, international project developers, insurance companies and mining companies.

Under brands such as Boskalis, SMIT, Smit Lamnalco, Gardline and Horizon, Boskalis offers more services than any other company in those industries, making the company a one-stop solutions provider. Boskalis' solutions for the market cover:

Dredging & Dry Earthmoving

- Construction, maintenance and deepening of ports and waterways
- Land reclamation
- Coastal defence and riverbank protection
- Underwater rock fragmentation
- Tunnel construction
- Engineering and design

Pipeline and Cables

- Landfall solutions
- Pre-and post-lay trenching and backfilling
- Deepwater seabed preparation
- Subsea Rock Installation
- Survey with AUV and Deepwater IRM with ROV
- Installation of subsea cables or umbilical's
- Shallow water pipeline installation, pull-in, pull-out

Exploration & Production Facilities - Fixed

- Transportation of modules and topsides
- Jacket installation
- Seabed preparation/gravel bed installation
- Ballasting and scour protection of GBS
- Platform installation/commissioning
- Platform removal/decommissioning
- Installation and IRM with divers or ROV

Exploration & Production Facilities – Floating

- Transportation of platform and spar
- Mooring, handling and installation FPSO and spar
- EPIC and subsea IRM of SPM and PLEM
- Terminal services
- Installation of pipeline end manifold or subsea structures
- Ballasting TLP foundation

Renewable Energy: Wind, Tidal and Wave

- Installation of Monopile/Jacket/GBS type OWF including scour protection and seabed preparation
- Subsea cabling installation, burial and landfalls
- Offshore High Voltage Station installation
- UXO (Unexploded Ordnance) survey and removal
- Subsea IRM through air or saturation diving or with ROV

Inland Infrastructure

- Building of roads, dikes, railways and dams
- Construction of bridges, overpasses and terminals
- Earthmoving, soil improvement and remediation

Towage/Salvage

- Harbour towage
- Terminal services
- Assistance to vessels in distress
- Salvage
- Wreck clearance
- Environmental care services and advice

Onshore & Offshore Mining

- Removal of overburden
- Open pit mining of minerals
- Deepsea mineral mining
- Soil separation and remediation by soil washing plant
- Processing of Mature Fine Tailings through capping & drains
- Logistical management with floating super pallets

Survey (Gardline & Horizon Geosciences)

- Marine Geotechnical Surveys
- Marine Geophysical Surveys
- Marine Environmental Surveys
- UXO Surveys

Boskalis has, including its share in partnerships, more than 9,600 employees and operates in 90 countries across six continents. The company has a versatile fleet of over 700 units, including trailing suction hopper dredgers (TSHD), self-propelled seagoing heavy-duty cutter suction dredgers, backhoe dredgers, grab dredgers, fall-pipe vessels, side stone dumping vessels, anchor handling tugs, floating sheerlegs, diving support vessels, multipurpose vessels, barges, cable laying vessels, submersible heavy lift vessels and harbor tugs. The relevant vessels meet the strict requirements of the international ISM and ISPS codes. Boskalis holds ISO 9001, ISO 14001 and ISO 45001 certification.

Boskalis Safety Program NINA (No Injuries No Accidents)

Safety has been a priority within the Boskalis organization for years and this has resulted in a clear improvement of our safety record. To further improve our safety culture and reach our goal of an incident-free working environment, Boskalis has launched the NINA safety program. NINA - No Injuries, No Accidents – is setting clear standards and explaining what we expect from our people with regard to their safety behavior.

NINA is supported by an extensive training and workshop program so that all our employees understand the NINA principles and how to lead by example. NINA is embedded in our organizational systems and managed by leading indicators.

Our Safety Vision

Our vision statement clearly expresses what we stand for with regard to safety:

"Our people are our most valuable assets, making safety a core value. Our goal is: No Injuries No Accidents. This is embedded in our company's culture and supported through Values and Rules. All employees, including our sub-contractors, are expected to take these values and rules to heart."

The vision statement is supported by five Values and five Rules that have been specifically developed to further detail where we stand on safety and to provide guidance to all employees, including those of subcontractors, with regard to both expected behavior and risk management.

For more information, visit: www.boskalis-nina.com

4.4 Previous Title Obligations and Compliance

CIC Consortium members and exclusive marine operating partners Odyssey and Boskalis have excellent records complying with title obligations and executing EWP in compliance with national and international licence conditions and requirements on mineral programs.

Odyssey will be the primary operator executing the EWP and has extensive experience in conducting deep-sea mineral operations. Boskalis is the primary harvesting operator and is globally recognized as a leader in seafloor mineral extraction and dredging.

Table 4. Odyssey and Boskalis Compliance History

#	Item	Remark
A	Details of any minerals (or petroleum) permits, or licences held by the licence holder and each supporting entity that have been revoked anywhere for non-compliance.	No Instances
B	Details of any current or past investigations or actions taken by regulators in relation to any breach of law, non-compliance in areas of Occupational Health, Safety and Environmental Work Programme or licence condition in relation to minerals prospecting, exploration or extraction by the licence holder or supporting entity. This should include contact details for the person within the regulator who is dealing/dealt with this matter.	No Instances
C	Details of any non-compliance of the licence holder or supporting entity with any reporting obligations and obligations to pay fees and royalties associated with current or previously held minerals (or petroleum) permits or licences held by the licence holder or supporting entity.	No Instances

Odyssey has worked on a number of environments and projects similar to the Cook Islands. The company has also conducted extensive exploration activities on a portfolio of mineral projects in compliance with government regulations, requirements, enactments, international obligations and licensure terms. Odyssey has sought and received exploration licences and has maintained an exemplary track record of licence compliance.

The ExO Phosphate Project off the coast of Mexico's Baja Peninsula is similar wherein exploration and delineation of a mineral resource (phosphate ore resource) was achieved while baseline environmental data were also collected and used to complete an EIA. Additionally, working on the Chatham Rock Phosphate project required compliance with all New Zealand Health, Safety and Wellbeing (HSW) rules and regulations, which are similar to those of the Cook Islands.

The following is a short list of Odyssey projects that most closely align with the scope of work and obligations that CIC is licenced to undertake in the Cook Islands' EEZ, with the project title, year of commencement, location and / or jurisdiction and water depth specified.

ExO Phosphate Project
2012 • Gulf of Ulloa, Mexico • 80 meters
The Odyssey team aboard the RV *Dorado Discovery* conducted a site survey, resource assessment and environmental program which included multibeam utilization, CTD, multi-core and six-meter core acquisition on the ExO submarine phosphate deposit within the Mexican EEZ. ROV *ZEUS* was utilized for guided sediment sampling, equipment placement and recovery (current meter and sediment traps), visual site inspection and environmental inspection/baseline edification. All Mexican government licence requirements were met.

Chatham Rock Phosphate
2011 • Chatham Rise, New Zealand • 450 meters
Utilizing the RV *Dorado Discovery*, Odyssey provided vessel and technical support for the project by acquiring multibeam echosounder data for depth and backscatter, side-scan sonar, sub-bottom profile, and environmental data along with box core, vibracore and grab samples. ROV *ZEUS* II and the RESON 7125 multibeam were both utilized during this project. All New Zealand government exploration licence requirements were met.

SMS Campaign
2010 • South Pacific, multiple jurisdictions • 1,000-3,000 meters
Odyssey's RV *Dorado Discovery*, equipment and technical personnel were contracted to conduct ship-mounted multibeam/backscatter sonar, side-scan sonar, Tow-Yo water chemistry, geologic and ROV multibeam, video surveys and sampling at depths ranging from < 1,000 m to 3,000 m in the EEZs of Papua New Guinea, Solomon Islands, Vanuatu, Tonga, and New Zealand. All appropriate government exploration licence requirements were met.

The following is a short list of Boskalis projects that most closely align with the scope of work and obligations that CIC is licenced to undertake in the Cook Islands' EEZ, with the project title, year of commencement, location and / or jurisdiction and water depth specified:

Suralco Total Mining
2015 • Surinam • Lelydorp
Suralco LLC, an indirect joint subsidiary of Alcoa Inc. and Alumina Ltd., has awarded Boskalis a contract for the mining of bauxite in Lelydorp, Suriname. Boskalis is responsible for the entire mining process, from engineering and overburden removal to bauxite mining and ore delivery.

Diamond Dredging Samicor
2005 • Namibia • 75 meters
Dredging of the overburden and the diamond containing ore off Luderitz, Namibia.

Ocean Diamond Mining
1998 • Namibia • 75 meters
Dredging of diamond containing soil/gravels in the Namibian concession in water depths of 75m. Placement of the material in the mining recovery area off Luderitz, Namibia with the Nautilus.

Benoni Gold
1997 • South Africa • 75 meters
Dredging of gold containing slimes and overburden with various equipment.

Namrod
1996 • Namibia • 75 meters
Boskalis developed the Namrod, a remotely controlled system for screening and sampling of seabed soils to water depths of 120 meters. Namrod is equipped with two booms. The first, used for excavation, can reach 2 meters below the seabed: it is fitted with a backhoe bucket or grab attachment to remove coarser seabed material. This cargo is then transferred to a dual-stage separator, a passive bar unit with rotating trommel for finer materials: the latter are directed into a collection hopper, via a belt conveyor, then pumped to the surface through an 8-inch pump and flexible hose.

A second, suction boom incorporates an electrically driven centrifugal pump system which can cope with solids up to 120 mm diameter. Once larger particles have been removed by the excavation device, the suction head draws the sample area down to bedrock level for any finer materials remaining. The suction boom can also be fitted with a high-power jetting ring to break up solids. Namrod sits on landing pads, adjustable remotely from the onboard control station to optimize screening and conveyor operations.

The operator can also monitor the machine's inclination and screening system rotational speed. High resolution cameras give a clear view of excavation work, irrespective of water depths or darkness.

Ocean Minerals Company
1970-80's • Various Locations • 5,000 meters
The Ocean Minerals Company (OMCO, including the Dutch companies Shell and Boskalis) developed nodule mining and processing technology, working with Lockheed Martin, and conducted mining equipment tests at depths of up to 5000 m.

Various large EPC / Multi-Disciplinary Projects
The envisaged project will require an approach in which many disciplines are managed properly. A selection of additional large multi-disciplinary projects that have been executed by Boskalis in recent years is available upon request.

4.5 CIC Operates Under a Robust Set of Risk Management Systems and Policies

Odyssey is CIC's exclusive marine operations partner for the EWP as well as a member of the CIC Consortium. The following is a summary of their Risk Assessment Program, which is a subset the company's comprehensive Risk Management Program. An Exploration Program Specific Risk Management System and Policy will be provided to the SBMA for dissemination prior to the commencement of offshore operations. Odyssey's Risk Management system is separate and different from CIC's Incident Response Management Program (IRMP) (Annex 4 – CIC 071) and both will be incorporated into each cruise plan prior to mobilisation.

Introduction
Risk Assessments are important tools used to identify significant hazards and manage risks associated with an operation. A hazard is something that has potential to cause damage or harm to personnel, equipment, the environment and/or the reputation of the company or its clients and stakeholders.

The operation may be a routine task or a one-off project activity. However, risks within each operation must be assessed to ensure that adequate control measures have been put in place to ensure the safety of the operation and that no harm will come to personnel, equipment or the environment.

Risk Assessment Methodology
Odyssey undertakes risk assessments in line with industry best practices established within the '*Step Change in Safety Task Risk Assessment Guide'*. A full copy of this guidance can be found within the Information Management System (IMS) Reference Document Register, the high-level process flow chart is appended to this procedure for reference.

Risk Assessment Form & Library
QHSE-3000A is the Odyssey Task Risk Assessment template which is based on the Step Change in Safety model format. A Master Library of Risk Assessments is stored on the company's Information Management System (IMS).

Project Assessments
Prior to mobilization of any offshore project a Project Risk Assessment will be generated as part of the review of project specific operations and constraints. The Project Risk Assessment may be reviewed in a risk assessment meeting which will include relevant personnel from all organizations and departments involved in the planned operations. Control measures will be identified within the Project Risk Assessment and the project manager will be responsible for ensuring that these are implemented.

The Risk Assessment Process
The purpose of the Risk Assessment Procedure is to provide tools that evaluate new risks as they arise and ensure that any changes can also be adequately assessed. Thus, helping to ensure that all reasonable, foreseeable hazards for non-routine tasks are identified and the risks are assessed and reduced to the lowest level (as low as reasonably practicable or ALARP).

The Risk Assessment process commences with an analysis of the task to allow any associated hazards to be identified. This may simply be done by listing all the activities of the task, the substances and equipment involved and any environmental conditions that may be appropriate. From the various components of the task, the hazards may be identified, analyzed and then risks assessed and reduced to ALARP.

The outcome may require modification to the procedures, equipment, process, or a more detailed analysis. These in turn may require further evaluation prior to final closeout. The Risk Assessment shall be suitable and sufficient for the level and likelihood of potential damage and/or injury to personnel.

Tolerability Criteria

This Risk Matrix Assessment process has been developed by Odyssey whereas the one found in the Incident Response Management Plan (IRMP)(Annex 4 - CIC071) is similar, has been developed by CIC.

Odyssey's Risk Assessment process is a compilation of the "qualitative" views of the risk assessment team. The risk values given are agreed as part of the risk assessment process. They are categorized as follows:

- High Risk (RED): Task must not proceed. It should be re-defined or further control measures put in place to reduce risk. The controls should be re-assessed for adequacy prior to task commencement.
- Medium Risk (YELLOW): Task should only proceed with approval of a line manager. Where possible, the task should be redefined to take account of the hazards involved or the risk should be reduced further prior to task commencement.
- Low Risk (GREEN): May be acceptable; however, review task to see if risk can be reduced further.

Risk Matrix

			Likelihood				
			<Low (1)	Low (2)	Medium (3)	>Medium (4)	High (5)
			Not credible ie the team have never heard of event occurring in industry	Conceivable but would require multiple failures of systems and controls	Less than average ie easy to postulate a scenario for accident but considered unlikely	average ie the team do not have direct knowledge but suspect that event may have occurred and represents a	Likely to occur and the team have knowledge of a similar event
Severity (Consequences)	<Low (1)	Injury/damage is not credible	1	2	3	4	5
	Low (2)	Only a minor injury/damage is credible	2	4	6	8	10
	Medium (3)	A single serious injury/damage is credible	3	6	9	12	15
	>Medium (4)	Fatality or multiple serious injury/damage is credible	4	8	12	16	20
	High (5)	Multiple fatality/damage is credible	5	10	15	20	25

1 - 6	May be acceptable; however, review task to see if risk can be reduced further.
7 - 14	Task should only proceed with appropriate management authorisation after consultation with specialist personnel and assessment team. Where possible, the task should be redefined to take account of the hazards involved or the risk should be reduced further prior to task commencement.
15 - 25	Task must not proceed. It should be redefined or further control measures put in place to reduce risk. The controls should be re-assessed for adequacy prior to task commencement.

CIC Risk Management Cross over

CIC has developed their standalone Incident Response Management Plan (IRMP) (Annex 4 – CIC071). The IRMP sets out the process and timeframe by which the appropriate systems, processes, and capabilities will be put in place and identify when suitable personnel and organizations are engaged. Within the IRMP, Guideline Risk Assessments have been developed.

All Risk Assessments are subject to revision due to the nature of the offshore work environment, different scopes of work, etc. These risk assessments will be revised for each cruise with the cooperation of CIC, Odyssey, Vessel Operators and Vessel Master.

4.6 Odyssey Marine Exploration Technology

The following is a list of core technical components that Odyssey plans to deploy in execution of the EWP.

Vessels

Two vessels with ocean survey capabilities that can work in remote oceans will be used to conduct offshore exploration operations. Both vessels will accommodate a technical and environmental crew allowing for multi-faceted operations across many disciplines as well as accommodating a combination of both Cook Islands' trainees, employees, and Government observers/regulators during offshore exploration campaigns.

A larger vessel will be one of several ships currently under consideration and will be an 80 to 90 meter dynamically positioned ship mobilized with a full-ocean depth multibeam sonar system. The ship will incorporate different technologies as dictated in the project plans, which may include box corers, bulk-sampling equipment, a 6,000-metre remotely operated vehicle (ROV), and geotechnical and oceanographic/environmental sampling tools. This ship will likely be used for five cruises lasting 30 to 45 days each.

A second vessel (the CAT research vessel) will be smaller catamaran, approximately 40 metres in length that will be stationed in the Cook Islands and used for multiple shorter (5 to 15 day) research cruises to monitor sensors, deploy equipment, and maintain and manage scientific research and data acquisition technology.

A charter on the two vessels cannot be fixed until an Exploration Licence is granted. In the event that any specific vessel presently under consideration is not available at that time, there are several other vessels also under consideration that have similar characteristics.

Both chartered vessels would have the space to accommodate a combination of Cook Islands' trainees and Government Observers/regulators during offshore exploration campaigns in addition to the technical and scientific team.

QHSE details and compliance will be provided upon the lease of a vessel. After an Exploration Licence is granted and prior to commencement of operations in the Cook Islands' EEZ, the licence holder will submit copies of the required certifications, including any risk management certifications relating to sea-based exploration or nodule harvesting to the SBMA or other relevant governmental agencies upon request. The licence holder does not presently have any such current certifications.

Towed Sonar

ARES is Odyssey's deep tow survey system capable of reaching 6,000 meters. The *ARES* system is made up of a Dynacon traction winch with 10 km of 0.68 umbilical, LARS (Launch and Recovery System), depressor and neutral buoyant towfish. The system primary sensors are two 7125 multibeam sonars with simultaneous collection of swath bathymetry and backscatter data. The extremely stable towfish platform surveys at speeds between one to five knots.

A proprietary feature is the ability to undertake Inverted USBL (iUSBL or ultra-short baseline) tracking of towfish over long laybacks. Rather than mounting the USBL transceiver on the vessel in the traditional manner, with iUSBL the transceiver is installed on the towed body itself providing a positioning solution for long layback tracking of the towfish. This method eliminates the need for repeated system calibration, whilst the accuracy and repeatability of the acoustics is improved as the transceiver is located in a low noise, dynamically stable environment.

Remotely Operated Vehicle (ROV)

Odyssey's ROV is configured to perform precision survey work or light work-class ROV intervention tasks. The vehicle frame is constructed of high strength 6061-T6 aluminum that is free flooding. The ROV is driven by four horizontal and two vertical thrusters and is rated to operate to depths of 6,000 meters.

The telemetry system is a Prizm mini mux with expandable 232/485/Ethernet cards and a spare SM fiber for additional mux capability or third-party equipment. The ROV is fitted with a suite of LED lights to enable high-definition still and broadcast quality video capture. The system is equipped with up to five cameras depending on the application, to include a Kongsberg full broadcast quality HD (dedicated fiber) camera, a Kongsberg digital stills camera, and composite surveillance cameras.

The ROV has two Hydro-Lek five function manipulators and comes with a complete LARS (Launch and Recovery System) with integrated HPU (High Pressure Unit) and winch holding 6,500-7,000 m of triple armored three fiber cable as well as a control workshop and spares container.

MV Offshore Guardian (Image courtesy of Guardian Offshore AU)

The 7150F echosounder multibeam installed.

The ARES Deep Tow System.

The ROV Clio.

5. Occupational and Maritime Standards and Occupational Health Safety

Exploration during the initial five-year licence period will be conducted on vessels owned by qualified and licensed entities secured under charter by CIC through Odyssey. Additional details on risk management certifications relating to sea-based exploration or harvesting, codes of conduct, principles, standards, compliance and association membership pertaining to Health, Safety and Environmental (HSE) protocols will be provided to the SBMA when a ship charter is secured for exploration. The vessel, ship management agency, ship company, and crew staffed through a crewing agency will be in good standing with various national, international and trade association codes and compliance, including International Organization for Standardization (ISO) standards, Standards of Training, Certification and Watchkeeping (STCW) and the ship's flag state requirements. Additionally, CIC abides by the codes of conduct, practises and principals of the IMMS and the Cobalt Institute. Risk management certifications relating to sea-based exploration or nodule harvesting will be provided to the SBMA or other relevant governmental agencies upon request.

Odyssey follows a risk, safety and environmental protocol described in the following subsections. Key aspects of this operating system include:

- Appointment of a Safety Officer during offshore operations who coordinates with the ship captain and technical crew for each shift:
    - This is usually the Senior Project Manager aboard each cruise
    - Meetings and briefings are conducted (see 'Toolbox Talks' referenced below) at the commencement of each shift to apprise all applicable crew of the prior shift's progress, operating plans for the upcoming shift and any associated risks for the shift
- Compliance with ship owner and vessel management firm protocols and integration of Odyssey procedures:
    - Every ship utilised will have a ship management system in place:
        - This system will account for reasonably foreseeable incidents, such as accidents, distress, spills and collisions
        - A past example was Odyssey's operation of the *Odyssey Explorer*, a research vessel owned by Odyssey:
            - Odyssey retained the services of third-party vessel manager MAR Vessel Management to assure adequate measures were in place to assure workplace and environmental safety
                - These included monthly safety meetings, offshore meetings at each shift start and as otherwise appropriate
                - Frequent drills for incident planning (spill, fire, etc.)
- Maintaining real-time satellite communication capability for contacting emergency services, the vessel management firm, and Odyssey management offices
- Though future protocols may vary slightly, past offshore procedures and protocols in addition to those described below will be provided upon request

Odyssey has a long track record of successful compliance, conducting operations in countries where the company has partnered to participate in projects. These countries include the United Kingdom, Ireland, New Zealand, Mexico, France and Portugal.

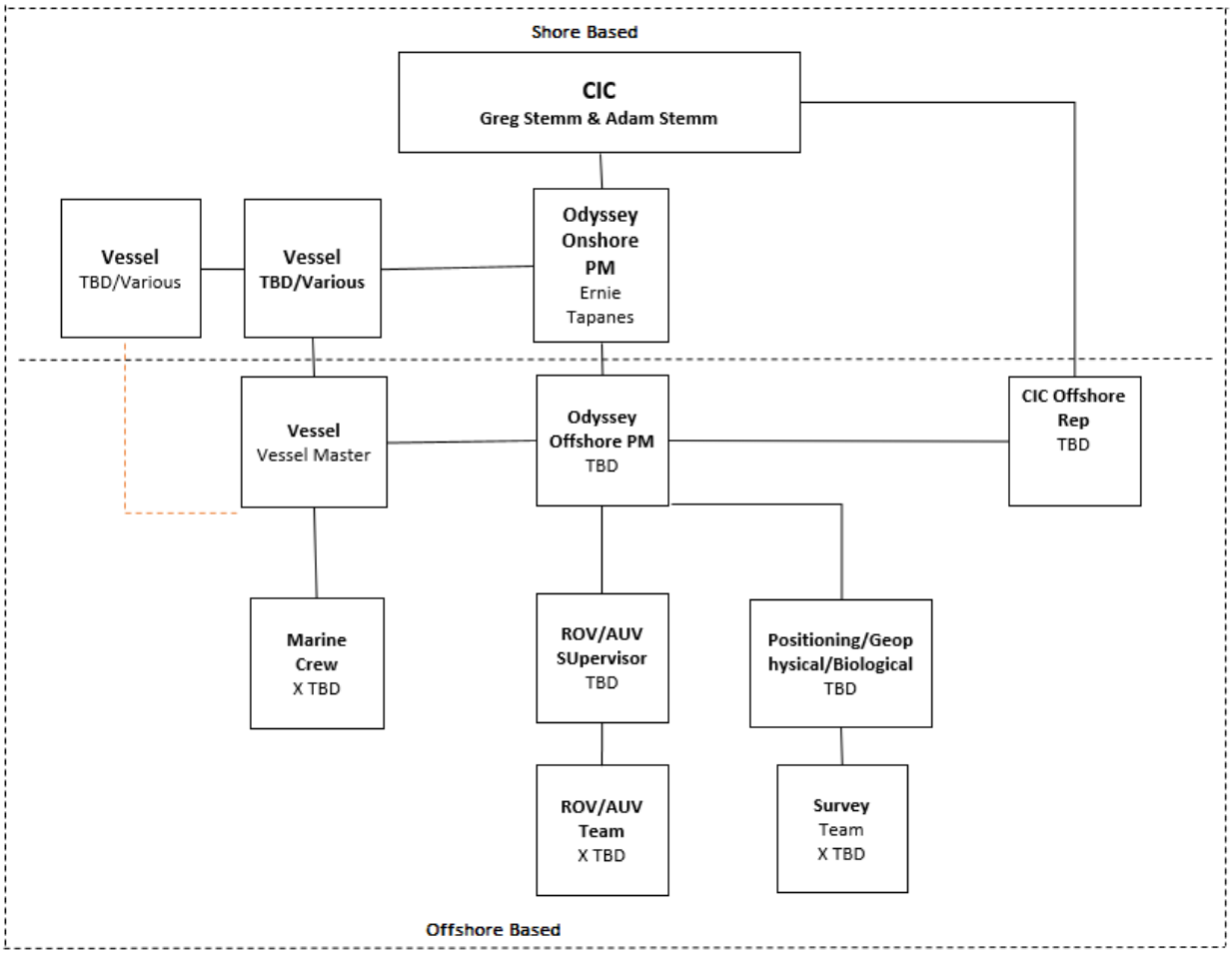
Odyssey has conducted operations from the following ports in the South Pacific and throughout the world and complied with health, safety and environmental requirements:

- Auckland, New Zealand
- Wellington, New Zealand
- Port Moresby, Papua New Guinea
- Rabaul, Papua New Guinea

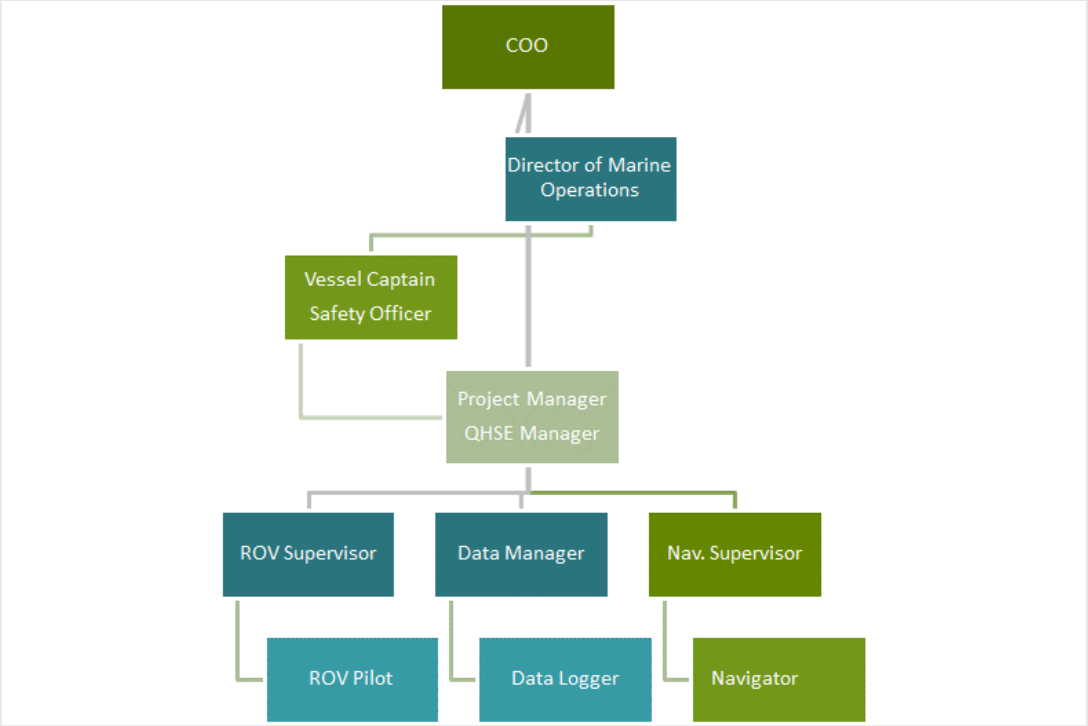
- Honiara, Solomon Islands
- Port Vila, Vanuatu
- Apia, Samoa
- Suva, Fiji
- Pago Pago, American Samoa
- Nuku'alofa, Kingdom of Tonga
- Brisbane, Australia
- Portland, UK
- Bristol, UK
- Falmouth, UK
- Hull, UK
- Cork, Ireland
- San Diego, USA
- Jacksonville, USA
- Charleston, USA
- Praia, Cape Verde

6. Occupational Health, Safety and Environment (OHSE)

1. The Figure below provides a summary of the formal lines of communication between the various contractual parties. CIC is at the top of the hierarchy for all procedures, including Occupational Health, Safety and Environmental (OHSE). Odyssey manages competence and training and the project execution with CIC overseeing all of these matters. As part of this system, job descriptions are provided for roles within the company as well as specific job role definition within the project specific documentation.



The following is a description of Odyssey's management structure (directors/managers/personnel) identifying specific responsibilities in process for health and safety and environmental requirements.



The safety of the vessels that Odyssey charters or manages is a joint responsibility of the shipowner and Odyssey's project manager. The shipowner's Safety Management System protocols are enforced by the project manager, ship's captain and/or safety officer in conjunction with Corporate Health, Safety and Environmental Policies and Procedures. Safety drills are conducted prior to leaving port and then carried out as dictated by vessel policy. Daily Toolbox Talks are led with the team during each shift to ensure that the personnel carry out the work fully understand the job, the hazards involved, procedures to be used and the precautions to be taken.

2. The offshore project manager, (to be determined) will be involved in decision making with respect to managing the Occupational Health, Safety and Environmental (OHSE) policies of offshore operations.

6.1 Safety and Environmental Management System:

Below is CIC's Quality, Heath, Safety, and Environmental (QHSE) Policy and various charts which outline the company's approach to health, safety and the environment.

1. Health, Safety, and Environmental (QHSE) Policy
2. *QHSE-3005 – COSHH*
3. *QHSE – 3009 Toolbox Talks*
4. *QHSE – 2003 Project Execution Plan*
5. *QHSE – 2005 Customer Satisfaction*

CIC is committed to providing quality professional services on a worldwide basis. Delivering these services is dependent upon effectively managing the Quality, Health, Safety, and Environmental (QHSE) aspects of our operations.

Maintaining healthy and productive work environments, both at home and abroad, requires cooperation and participation from everyone on our team, management, employees and contractors alike.

CIC is committed to working together in order to achieve excellence in all aspects of our endeavors, and to providing a framework for establishing and revising our QHSE objectives. To achieve these objectives and goals the company will:

- Accept safety, quality and care for the environment as every person's responsibility.
- Strive to meet client requirements and to enhance customer satisfaction.
- Target zero harm to individuals, equipment, reputation and the environment.
- Demonstrate our commitment through our actions at every level of the company.
- Commit to continuous improvement of our QHSE system.
- Evaluate our performance and recognize participation.
- CIC will comply with international, regional and Cook Islands' statutory laws, enactments and regulations including, but not limited to:
    - Cook Islands Seabed Minerals Act 2019
    - Cook Islands Seabed Minerals (Exploration) Regulations 2020
    - Cook Islands Seabed Minerals Amendment Act 2020
    - Cook Islands Seabed Minerals Amendment Act 2021
    - Marae Moana Act 2017
    - Maritime Rules (offenses) Regulations 2014
    - Seabed Minerals (Royalties) Regulations 2013
    - Employment Relations Act 2012
    - Official Information Act 2008
    - Marine Transport Act 2008
    - Environment Act 2003
    - Prevention of Marine Pollution Act 1998
    - Income Tax Act 1997
    - The Value Added Tax Act 1997
    - Legislation Governing Tax Arrangements in the Cook Islands
    - United Nations Convention on the Law of the Sea (UNCLOS)
- Respect our co-workers, colleagues, clients, and the public.
- Contribute to technological innovation within our industry.
- Encourage through support and education, safe working practices.
- Ensure that this policy is communicated and understood throughout the organization.

CIC's policies will be reviewed for continuing suitability and enhanced regularly to ensure a best fit to the services we provide. A collaborative effort from all of our staff will nurture performance that we can be proud of, as well as earn the confidence of our customers and clients.

6.2 QHSE-3005 – COSHH (Control of Substances Hazardous to Health)

1. Introduction

   CIC has the responsibility to ensure that employees and contractors are not exposed to substances hazardous to their health and that those substances are not carelessly introduced into the environment.

   This is implemented through carrying out COSHH assessments on any substances that carry a hazard warning. Hazard and risk codes are obtained from the Material Safety Data Sheets (MSDS), which are supplied with any substance hazardous to health. If these are not readily available, they can be downloaded online.

2. Procedure

   Odyssey has in place a master COSHH register which is located within the Information Management System (IMS) database. This contains the MSDS datasheets and COSHH assessments for all hazardous substances currently held either at Odyssey head office or at any of its remote locations such as the Portland Warehouse (UK) or on Vessels.

   When a new substance is received its MSDS must be entered into the "COSHH Assessments and MSDS" folder on the IMS. A new COSHH assessment should also be carried out if it contains a hazard code not already seen in previous assessments of similar compounds. COSHH assessments can be completed online via the HSE website http://coshh-tool.hse.gov.uk/ and then saved to the COSHH folder as a PDF.

   COSHH must be considered when risk assessing all tasks to ensure that personnel are not exposed to unacceptable levels of hazardous compounds. Things to consider include adequate / correct ventilation and protective barriers such as goggles and gloves.

   Prevention and containment of spills must also be considered to ensure that systems are in place to effectively limit environmental contamination.

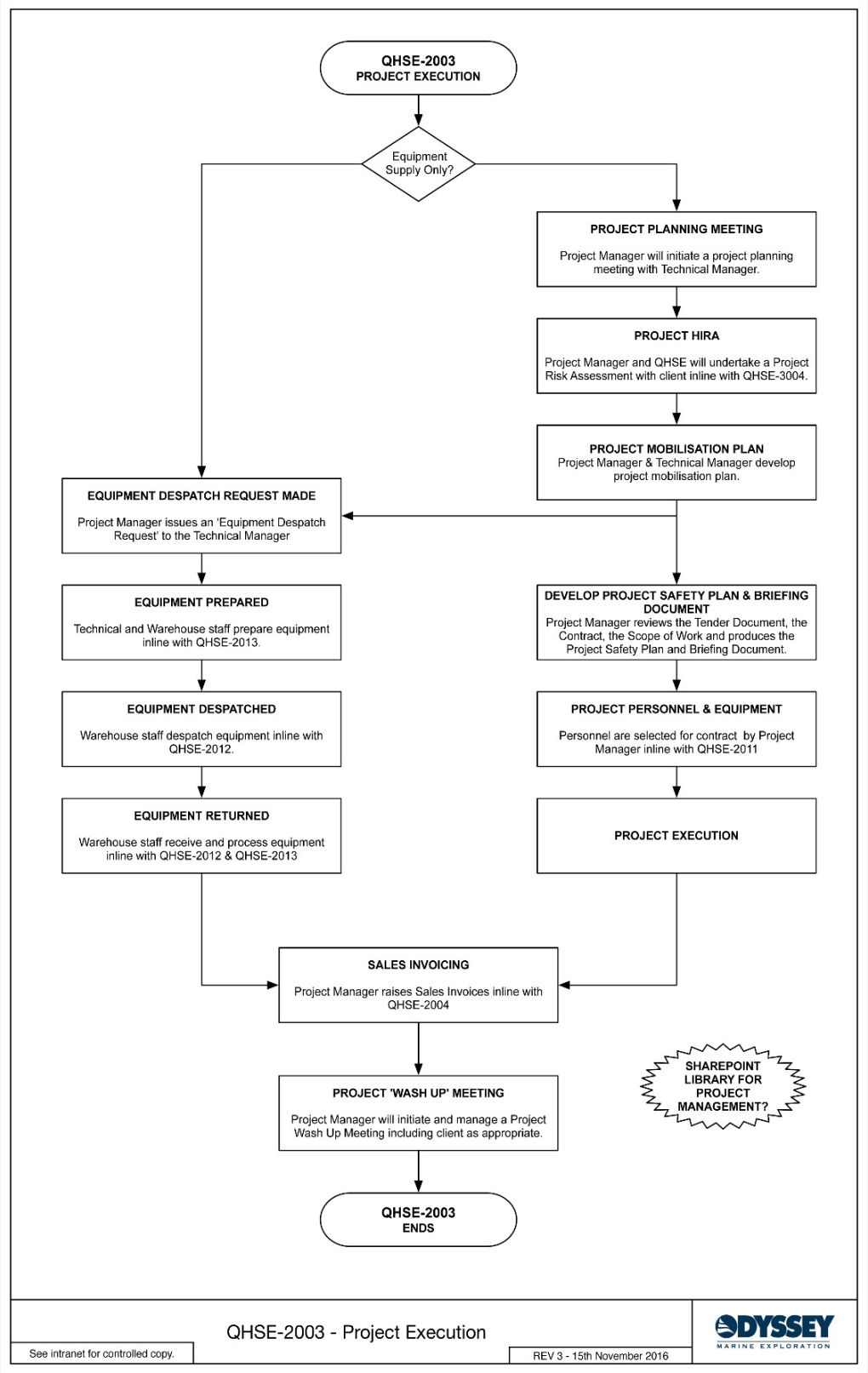
6.3 QHSE – 3009 Toolbox Talks

Toolbox Talks provide a forum for the supervisor and/or person in charge of a job to ensure that the personnel carrying out the work fully understand the job, the hazards involved, the procedures to be used, and the precautions to be taken.

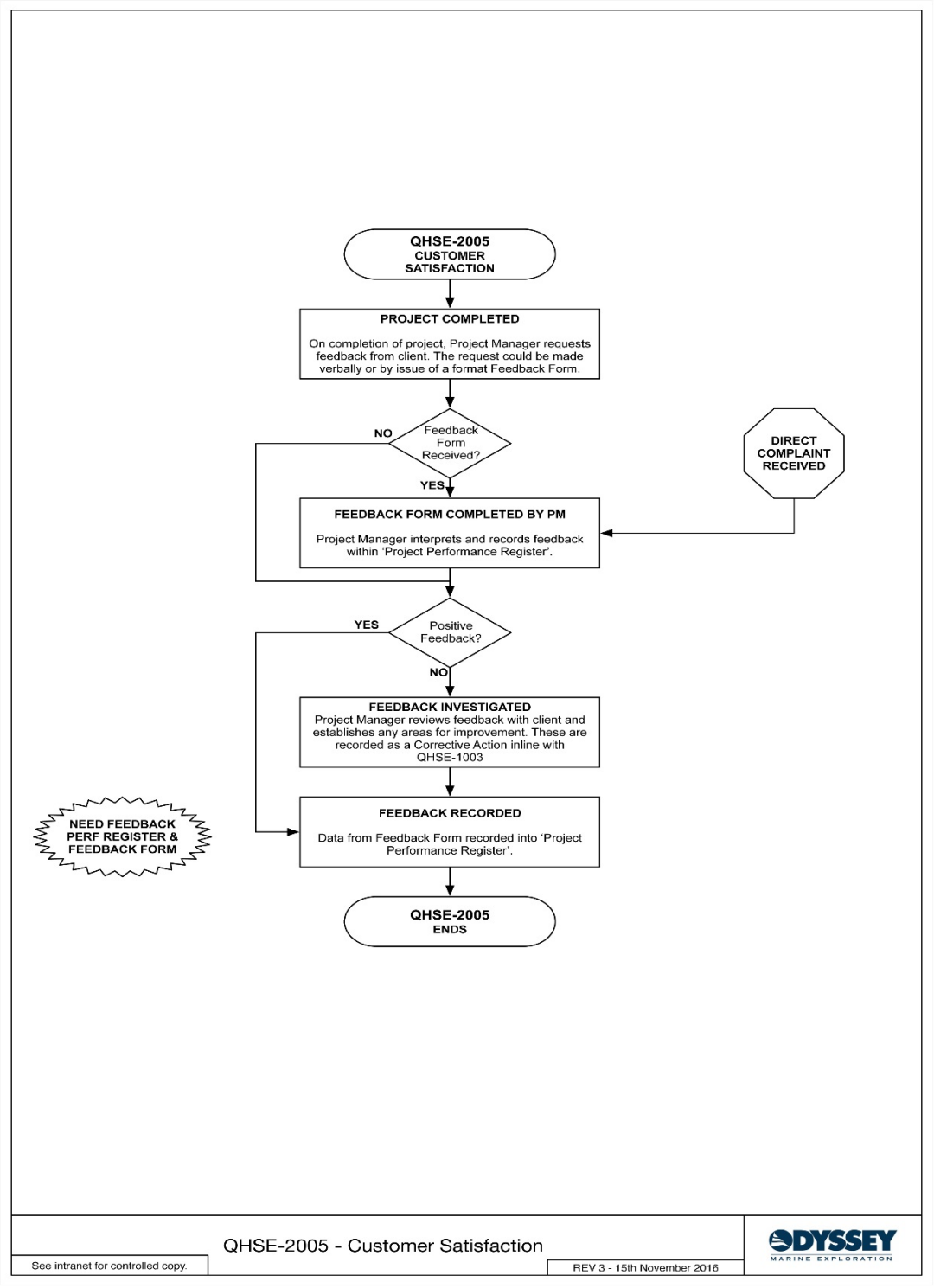
Toolbox Talks are incorporated into all non-routine tasks, tasks that personnel are not familiar with, or in circumstances where the tasks have changed from the original plan.

The need for a Toolbox Talk may be identified by the Project Team, Offshore Manager, Master/Vessel Superintendent, Department Head, Supervisor or any person about to undertake the work. Specific Toolbox Talks may be identified for various tasks within prescribed work scopes within the Project Safety Management.

6.4 QHSE – 2003 Project Execution Plan



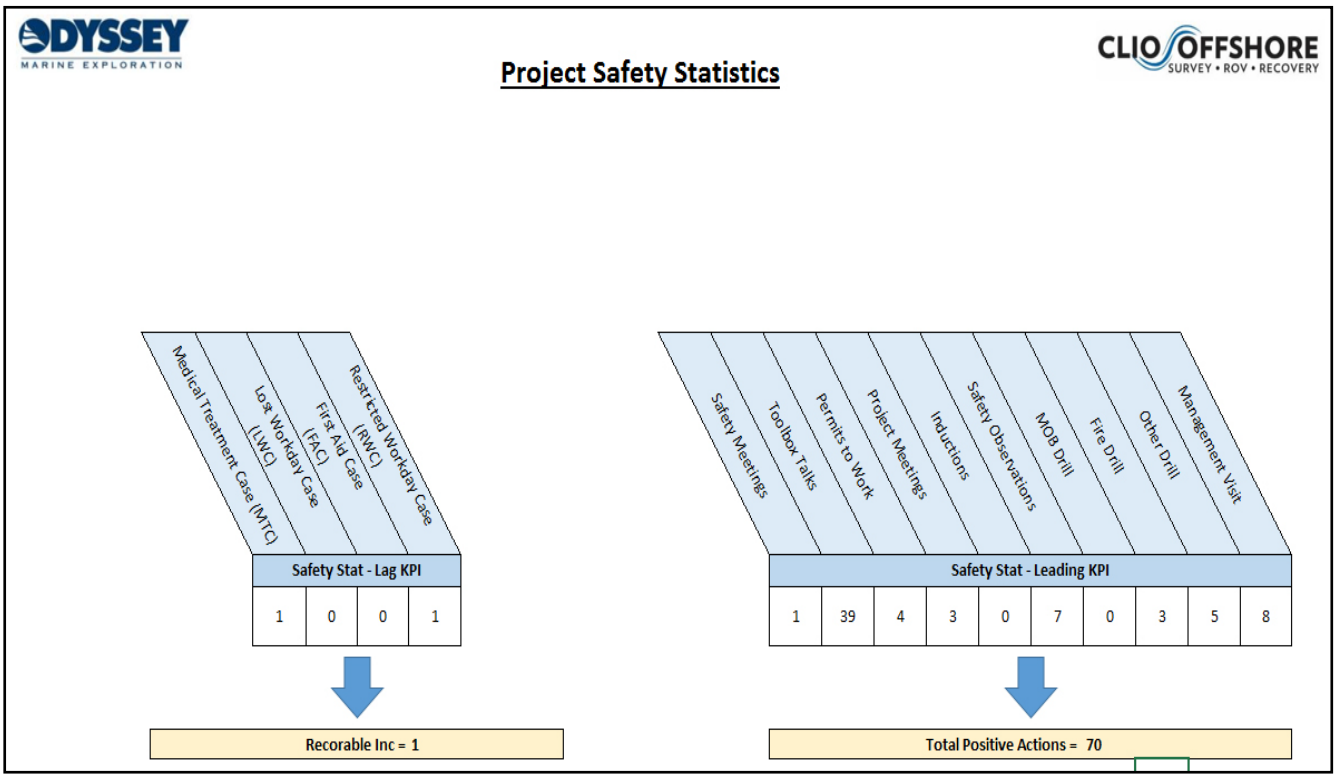
6.5 QHSE – 2005 Customer Satisfaction



6.7 The Past Record of Compliance with HSE Legislation

Odyssey's Project Safety Statistics for a third-party project from 2017 can be found below.

These recordable safety key performance indicators (KPI's) have been captured to measure progress toward specific safety goals outlined in the QHSE policies and procedures. This information is used to capture recordable medical incidents, lost workdays, first aid cases, and restricted workdays as well as frequency of safety meetings, toolbox talks, permits to work, project meetings, inductions, safety observations, various drills and management visits. Capturing these details helps indicate where further improvements and resources are required. To date it has been highly successful for increasing accountability and awareness. These KPI's are evolving as the organization and/or project requirements change. This further illustrates our commitment to providing quality professional work, with an emphasis on safety.



7. Securities

CIC, through its offshore operator, Odyssey and their chartered vessels, will carry marine insurance providing indemnification against any environmental liabilities from a mechanical or any other cause of failure during operations performed under the Exploration Licence in compliance with Schedule 2 S13 of the Act and 26(2)(a) and 28(1)(d) of the Regulations.

8. Bond

The Act and the Regulations indicate that at the Authority's discretion, licence holders may be required to post a bond as financial security sufficient to cover the costs associated with the implementation of the environmental obligations of the licence title holder. Additionally, the Act indicates that the amount, if any, shall be determined by the Authority. It is the opinion of CIC that any liabilities for environmental risk associated with exploration activities will be sufficiently financially mitigated by the aforementioned insurance policies.

8.1 Insurance

While an exploration project such as the one envisioned carries minimal risk of accidents which lead to pollution, the primary risk of creating any environmental liability during Exploration Operations is the release of pollutants.

Coverage for pollutants that may accidentally be released into the water in the course of operations is obtained as standard operating procedure (SOP). An example of a coverage policy is as follows, though actual amounts will be developed in cooperation between the licence holder, ship owner and Government:

Water Quality Insurance Syndicate (WQIS) Worldwide Vessel Pollution Policy Form 2011	
Section A - OPA/CERCLA	Coverage Limits $1,680,000
Section C - Fines & Penalties	Coverage Limits $25,000
Section D - Public Relations	
Section E - Automatic Acquisition	
Section F - Mitigation	
Section F - Property Ashore	

It is important to note that during 26 years of conducting extensive offshore operations on many ships and in many locations throughout the world, Odyssey has never had to file a pollution claim with its insurers.

After an Exploration Licence is granted and prior to commencement of operations in the Cook Islands' EEZ, the licence holder will submit copies of insurance certificates and policies relating to operational activities to the SBMA or other relevant governmental agencies upon request.

The types of insurance policies that the licence holder and its Associates will obtain, with prior consultation with the Cook Islands' governmental agencies, include, but are not limited to, a foreign commercial package, an equipment package, marine bumbershoot liability, maritime employers' liability, and marine general liability.

The licence holder and its associates will obtain any and all additional insurance policies as required by the Cook Islands' governmental agencies.

CIC Limited's Local Engagement, Training, and Business Development Plan (LDP) for Exploration Licence EL1 (CIC078)

As of January 5, 2022

"Responsible Exploration of Seabed Resources of the Cook Islands"

APPROVAL(S)

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Name & Title	Signature	Date
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REVIEWER(S)

Name & Title	Signature	Date
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CHANGE HISTORY

Date	Change Req No.	Revision	Description of Change
November 8, 2021	N/A	0	Issued

Table of Contents

1. Local Engagement, Training and Business Development Plan

1.1 Employment, Training and Capacity Building of the Cook Islands' Community

CIC's Local Engagement, Training, and Business Development Plan (LDP) (CIC078) will lead to a variety of employment, training, and capacity-building opportunities for Cook Islanders. This will assist in developing the Cook Islands' seabed mineral exploration sector by establishing new technical, administrative, and support services that will be able to cater to future maritime and research operations. If exploration and research activities determine that nodule harvesting will not create serious harm to the environment, creation of these services will be important in the development of one of the world's first deep-sea mineral harvesting programmes and create opportunities for future generations of Cook Islanders to pursue new technical career paths related to ocean exploration and scientific studies.

There will also be considerable direct benefits to the Cook Islands' local business economy. While it is recognised that a significant part of the economic activity conducted from the larger ship during exploration will focus on port stops in Pago Pago (American Samoa) or other ports with the required facilities, CIC will give priority to staffing the research team with Cook Islanders who either have appropriate previous experience or would qualify as trainees. CIC will also utilise local port and support facilities whenever possible.

It is expected that early-stage exploration and evaluation through to full-scale harvesting (if approved) will require progressively greater levels of ship-to-shore support, utilisation of local expertise and modern communications techniques and technologies, while being sensitive to local and community concerns. Examples of potential local support in the exploration phase include provisioning of the ship's operations with fuel, food and supplies from local businesses, emergency and standby support vessels and calling on islands in the event of an emergency. Local chartering services could also benefit, as will port facilities and operators.

When the smaller research vessel arrives for its intended multi-year mission, it will initially be staffed primarily from outside the Cook Islands by experienced DP/research vessel crew, but it will need to be supported by facilities, suppliers and other resources from the Cook Islands. As the project progresses and Cook Islands' trainees have gone through training programmes and are able to assume more responsibilities for running this vessel, it is anticipated that the crew will eventually be made up primarily of qualified local Cook Islands' seamen and officers whom CIC will assist in obtaining appropriate licencing and certification for running the vessel.

It is also expected that many of the planned environmental monitoring and support programmes will ideally include local hiring of Cook Islanders who have exceptional local knowledge relating to the waters and sea life around the Cook Islands. There will likely be a need for the development of onshore testing and laboratory facilities for biological, geological, and other sampling analysis and a programme established to train locals for a variety of technical positions which will be needed for onshore logistics and/or testing facilities.

The combination of these requirements will create both professional and non-professional job opportunities.

These expected direct benefits will be widely distributed throughout the Cook Islands, with the intent to create new direct employment and business opportunities for a wide range of activities. This will be matched with extensive community outreach efforts, both on the more populous islands (Rarotonga and Aitutaki), as well as on the Pa Enua (outer islands), where a combination of meetings, technical workshops, town halls, web-based communications, ship visits and seminars can ensure that everyone has the necessary information and understanding of the project to make their own informed opinions.

Over time, if harvesting is licenced and Cook Islanders desire to be involved in more of the nodule harvesting support activities, there will be opportunities for local sourcing of many different types of resources. Nevertheless, it is recognised that it will be important to avoid placing too much pressure on the country's current facilities, taking into account the opinions of the public and government as to how activities could cause detrimental effects to the Cook Islands' cultural or natural resources.

Even in the early evaluation days where on-shore activities will be relatively modest, CIC intends to create on-shore and at-sea development, apprenticeship and educational opportunities to build local competencies so Cook Islanders can learn the skills for the future roles in the seabed minerals sector.

As deep-ocean harvesting technology gains prominence and global interest, it will raise awareness of the implications of future seabed mineral harvesting technology as well as the potential for a new critical metals supply needed for developing electric vehicles and batteries for renewable energy sources. This may also create new career opportunities for Cook Islanders both at home and abroad.

It is expected that the final feasibility studies for the decision to proceed to harvest will review these direct and indirect benefits in more detail. Final feasibility studies will include projections for new employment in addition to mapping of second and third order economic benefits. There will be close engagement with the Cook Islands' Government and local stakeholders so that final planning incorporates and meets local expectations.

CIC recognises the importance of the Cook Islands' National Sustainable Development Plan (NSDP) 2016-2020 and intends to assist the Cook Islands in achieving as many of their goals outlined in this plan as possible by developing the seabed mineral sector.

The following are some of the ways CIC sees its assistance in the expansion of the Cook Islands' seabed minerals sector potentially contributing toward various goals presented in the Cook Islands' NSDP:

Table 1.1: CIC Contributions toward the Cook Islands NSDP 2016-2020

Strategic Goal	How CIC can contribute
1. Improve welfare, reduce inequality and economic hardship.	If exploration successfully leads to the discovery of an economically and environmentally viable deposit and is brought to production, the Cook Islands will be able to diversify its economic portfolio, which has the potential to significantly raise the Cook Islands' economic resilience and bring about a new source of revenue.
2. Expand economic opportunities, improve economic resilience and productive employment to ensure decent work for all.	Throughout both exploration and harvesting phases, CIC will make a variety of new technical work opportunities and training available to Cook Islanders. The skills garnered from these technical positions will be applicable to a variety of jobs within and outside of the seabed minerals sector.

3.	Promote sustainable practises and effectively manage solid and hazardous waste.	CIC is committed to environmentally and socially responsible practises and will ensure it will follow all applicable waste standards and regulations. This includes, but is not limited to, international standards and regulations such as The International Convention for the Prevention of Pollution from Ships (MARPOL).
4.	Sustainable management of water and sanitation.	Neither exploration nor harvesting would impact freshwater supplies or sanitation for the Cook Islands. After exploration, should the project proceed to harvesting, revenues from harvesting could be directed to develop and/or augment infrastructure relating to water supply and sanitation.
5.	Build resilient infrastructure.	Neither exploration nor harvesting would impact current infrastructure in the Cook Islands. After exploration, should the project proceed to harvesting, revenues from harvesting could be directed to develop and/or reinforce infrastructure to be more resilient.
6.	Improve access to affordable, reliable, sustainable, clean energy and transport.	CIC, together with the Cook Islands, can help deliver to the world the metals it needs to realise a clean energy future if nodule harvesting is found to create no serious harm to the environment. The battery metals found in the Cook Islands' polymetallic nodules are critical for the development and growth of the battery industry and could contribute to the development of renewable energy sources in the Cook Islands such as wind and solar.
7.	Improve Health and Promote Healthy Lifestyles	CIC intends to engage with the Ministry of Health, INTAFF (Internal Affairs) and CISNOC (Cook Islands National Olympic Committee) with an interest towards achieving the NSDP goal of Improving health and promoting healthy lifestyles.
8.	Ensure inclusive and equitable quality education and promote life-long learning opportunities.	Scholarships and bursaries from revenue will be generated by a successful seabed mineral harvesting programme. Apprenticeships and capacity building related to both technical and non-technical work during exploration and harvesting phases that will carry over into many other career opportunities.
9.	Accelerate gender equality, empower all women and girls, and advance the rights of youth, the elderly and disabled.	CIC encourages equal opportunity in both education and employment. The company recognises that equality exists between all genders, not only in the workforce of the Cook Islands but also at all community levels. CIC's programme will endeavor to provide opportunities that empower females, educate youth and include the elderly and disabled.

10. Achieve food security.	Increased revenue from a successful harvesting programme can be distributed to achieve this goal.
11. Promote sustainable land-use, management of terrestrial ecosystems and protect biodiversity.	Exploration will expand the Cook Islands' database of deep-sea biodiversity and assist in establishing the necessary precautions to preserve it. Additionally, CIC intends to support the development of land-use and terrestrial ecosystem management programmes.
12. Sustainable management of oceans, lagoons, and marine resources.	Development of a better understanding of the Cook Islands' marine environment is essential in establishing the necessary set-asides to preserve the ocean, its biodiversity and resources for future generations of Cook Islanders to come. The oceanographic and environmental data acquired throughout exploration and harvesting is property of the Cook Islands and can be used to establish sustainable management programmes to ensure that the newly established Marae Moana marine park is properly maintained and monitored.
13. Strengthen resilience to combat the impacts of climate change and natural disasters.	Benefits from the development of the seabed mineral sector will contribute to the nation's funding options to find the ideal practises for facilitating its climate change activities and achieving its development aspirations. CIC recognises and will aim to assist in the realisation of the following Cook Islands goals: • Achieving 100% renewable energy generation in all islands by 2025 • Achieving 100% energy efficiency across the country by 2025 • Confirm a zero emissions target for the Cook Islands by 2040 Additionally, if the Cook Islands goes forward with a nodule harvesting program, the nation can contribute to a de-carbonised society by supplying the critical metals needed for clean energy solutions.
14. Ensure a sustainable population, engaged in development for Cook Islanders by Cook Islanders.	Throughout both exploration and harvesting phases, if harvesting is determined to be viable, a variety of new technical work opportunities and training will be made available to Cook Islanders. The skills garnered from these technical positions will be applicable to a variety of jobs within and outside of the seabed minerals sector. For example, reapplying the skills gained from mineral/sediment assaying can be used for terrestrial soil and hydrologic analyses.

15. Promote a peaceful and just society and practise good governance with transparency and accountability.	CIC aligns with this goal and intends to work with the Cook Islands' Government through every stage of development to ensure transparency and accountability of an environmentally responsible and economically viable seabed mineral resource management programme, taking into account a deep concern and respect for Cook Islands' culture.
16. Preserve our heritage and history, protect our traditional knowledge, and develop our language, creative and cultural endeavours.	CIC has set up and funded The Cook Islands Traditional Arts Trust (Te Rito O Taku Peu Tupuna) and has already begun contributing to the preservation of Cook Islands' heritage, history, art and language through multiple programs and initiatives.

1.2 Public Engagement, Collaboration and Information

CIC welcomes advice and ideas with respect to public outreach and looks forward to establishing a formalised engagement plan in consultation with the Cook Islands' Government to ensure effective public engagement and education that is culturally appropriate.

CIC intends to utilise local expertise and communication techniques to effectively engage the public of the Cook Islands. With the help of trusted local experts and public input, CIC plans to provide Cook Islanders with the data and information needed to develop an informed view of impacts, consequences and merits of seabed exploration activities and harvesting. A proactive approach will be implemented that ensures consultation with all levels of the community regarding concerns related to seabed mineral exploration and harvesting. This would include, but is not limited to, meetings with traditional leaders, environmental organisations, Pa Enua leaders/communities, schools, churches, parliament, the various Ministries and all political parties.

Additionally, CIC intends to foster cooperation between academic experts from the University of South Florida College of Marine Science (USA), University of North Carolina at Chapel Hill (USA), The University of the South Pacific (Rarotonga), Eckerd College (USA), The University of Hawai'i (Manoa), Kochi University (Japan), The International Marine Minerals Society (IMMS), The United States Geological Survey (USGS), The Natural History Museum of London (UK), and The National Oceanography Centre at the University of Southampton (UK) as well as other institutions. Students and faculty will have an opportunity to co-author scientific articles and participate in scientific investigations related to the project.

The team is committed to engaging with Cook Islands' citizens and stakeholders for scientific collaboration, education, grant acquisition and employment opportunities pertaining to marine science and engineering.

Dr. Martens of the University of North Carolina at Chapel Hill, a co-leader of CIC's physical oceanographic data collection and current modelling plan, has experience with similar interagency and international team building. A specific programme he participated in organising focused on scientific investigation of Brazil's Amazon region through a long-term effort funded as part of NASA's Large-scale-Biosphere-Atmosphere Ecosystem Program (National Aeronautics and Space Administration). The programme resulted in training, employment and education through the doctoral level for many citizens and scientists including members of the regional community wherein the study was undertaken. Dr. Martens, as a member of the CIC team, can assist in implementing a similar successful programme within the Cook Islands.

CIC foresees the following steps in developing its engagement plans and conducting meaningful engagement:

- Stakeholder Identification and Collaboration. These stakeholders include, but are not limited to:
  - Parliament
  - Government Ministries and Crown Agencies
  - The Koutu Nui House of Ariki
  - Religious Advisory Council (RAC)
  - Local Non-governmental organisations – Te Ipukarea Society (TIS) and Korero O Te 'Orau
  - General Public – Village meetings in each of the three Rarotonga Vakas: Takitumu, Te Au Tonga and Puaikura as well as throughout the Pa Enua
  - Schools

  This list will be updated on a regular basis.
- Develop a list of expertise and services required for the project.
  - Advertising locally and looking in country for initial hires.
- Review of relevant local expertise and techniques, including marine scientists, fisheries experts, laboratory analysis capability, etc., in consultation with the Cook Islands' Government.
  - CIC to work in collaboration with the Cook Islands' Government to create a local database of qualified Cook Islanders in various skilled fields to draw from when required.
- Review of local businesses and the capability of the local community to offer supplies for the exploration vessel.
  - CIC to meet with local suppliers to discuss how they can meet the needs of the exploration vessels – giving local businesses first opportunity.
- Review of local communication techniques and technologies – e.g., newspaper, radio, TV, workshop and conferencing facilities.
- Establish an in-country CIC presence to ensure a local go-to person and response team for local interaction with the project.
- Conduct awareness campaigns, including visits to outer islands as advised by the Cook Islands' Government.
  - Awareness campaigns will be conducted in both English and Maori.
  - Ideally, these would be joint campaigns between CIC, the national government, and any relevant experts to collaboratively inform the public about the activities being undertaken, the regulatory regime related to these activities, the impact of the activities, and to answer any questions the community may have about the planned activities.
  - Campaign schedule to be decided in consultation with the Cook Islands' Government.
- Collaboration with the Ministry of Education to include seabed minerals and ocean exploration as part of its current curriculum.
- Open, inclusive, transparent workshops to discuss exploration plans and results in both Rarotonga and the outer islands.
- Development of information materials for dissemination (co-developed with Cook Islands' Government and translated into Cook Islands' Maori).
- Berths made available on CIC exploration ships to trained Cook Islands' Government representatives as well as local interested parties and researchers.
- Operation of a full-time, smaller research vessel is envisioned to be based in either Rarotonga or Aitutaki beginning in year one of the Exploration Programme. This will create opportunities for qualified Cook Islanders to regularly participate in exploration activities, support the local economy, and provide an enhanced research platform for other interested sea users and institutions.

1.3 Development and Investment in Local Business, Arts and Projects

Over the past 20 months, CIC has been engaged in various projects in the Cook Islands including:

- Sourcing, transporting and donating medical equipment for COVID-19 preparation in cooperation with *Te Marae Ora*, the Ministry of Health.
- Creating a dialogue with the Arts Department of the Ministry of Education to encourage the Arts curriculum within the schools. Working on this initiative with the Advisor for the Ministry of Education and coordinating these activities with The Cook Islands Traditional Arts Trust.
- Supporting Autism Cook Islands and contributing to its fundraising efforts for the Kara Run 2020.
- Securing sponsorship funds with the local BSP bank to construct bathroom facilities and to open a teaching cafe to support the Tavioni Arts program & Vananga.
- Support for classes in traditional arts skills and assisting author Michael Tavioni to distribute his educational motif book to several schools in Rarotonga and Aitutaki.
- Participating in World Clean-Up Day on the beaches and roadways.
- Providing a mental wellness workshop for the community.
- Contributing support and funds to the Cook Islands' 2020 Olympic kayak team.

Cook Islands Traditional Arts Trust (CITC)

In the traditional terrestrial mineral extraction industry, Foundations are often created for the purpose of community development funds over the life of the mine; however, investment in local traditional, cultural and educational programmes is not done directly or initiated by companies until after a mining licence is acquired, extraction has started, and cash flow is being generated from the processed metals.

To demonstrate CIC's commitment to contribute to various local non-profit cultural and educational projects, The Cook Islands Traditional Arts Trust has been established and has already developed plans and has begun making contributions in a variety of local traditional, cultural and educational programmes.

Objectives

The Trust is established as a charitable organisation for the purpose of providing financial assistance to such individuals, entities or projects as are approved by the Trustees for educational initiatives which advance and develop the cultural and traditional arts of the Cook Islands and will benefit the public of the Cook Islands.

PROJECT 1: THE TAVIONI ARTS SCHOOL/TAURA VANANGA TRUST

Construction work has already begun on the existing facility to help provide an operational footprint that will allow the Arts Centre to offer more courses, workshops and events in traditional arts and life skills. The physical working space requires these zones to be better structured and organised to ensure that the teaching areas are fit for purpose, safe and hygienic.

These new improvements are already providing a more structured teaching campus for the traditional teachings of Master Carver Mike Tavioni and other Cultural Arts programmes – with many classes and events being regularly planned and conducted for students of all ages.

Conclusion

CIC is pleased to have received Cook Islands' Exploration Licence EL1 as a result of the 2020/2021 Cook Islands Seabed Minerals Tender. As proven by the relationships already developed with stakeholders and the mitigation measures incorporated into the Exploration Programme, CIC will endeavour to make every effort to fulfil its responsibilities as an appointed steward of mineral resources as it has been licenced to explore in an environmentally sensitive manner.

CIC looks forward to working with Cook Islanders to better understand their marine minerals and deep-ocean environment in a manner that will allow all stakeholders to evaluate whether it makes sense to move toward commercial harvesting of subsea nodules. If the country decides to move forward, continued research and development of these marine resources have the capacity to boost both the nation's economy and the scientific understanding of the ocean environment.

CIC Limited

Proposed Schedule of Relinquishment

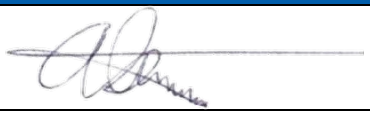
for Exploration Licence EL1

As of January 28, 2022

APPROVAL(S)

Name & Title	Signature	Date
Gregory P Stemm Managing Director CIC Ltd		January 5, 2022

AUTHOR(S)

Name & Title	Signature	Date
Adam Stemm COO CIC Ltd		January 5, 2022

REVIEWER(S)

Name & Title	Signature	Date
Charles Morgan Chief Scientist		January 5, 2022

CHANGE HISTORY

Date	Change Req No.	Revision	Description of Change
January 5, 2022	N/A	0	Issued

Overview

CIC Limited (CIC) has been informed that, subject to certain conditions, it will receive Cook Islands Exploration Licence EL1 under the 2020/2021 Cook Islands Seabed Minerals Exploration Tender. The Total Exploration Area of EL1 (which can be seen in Figure 1) is estimated to be 211,545 km^2 and is made up of 10 Contiguous Block Groups (CBGs) that are comprised of 2,592 5 minute by 5 minute blocks throughout the Cook Islands' EEZ.

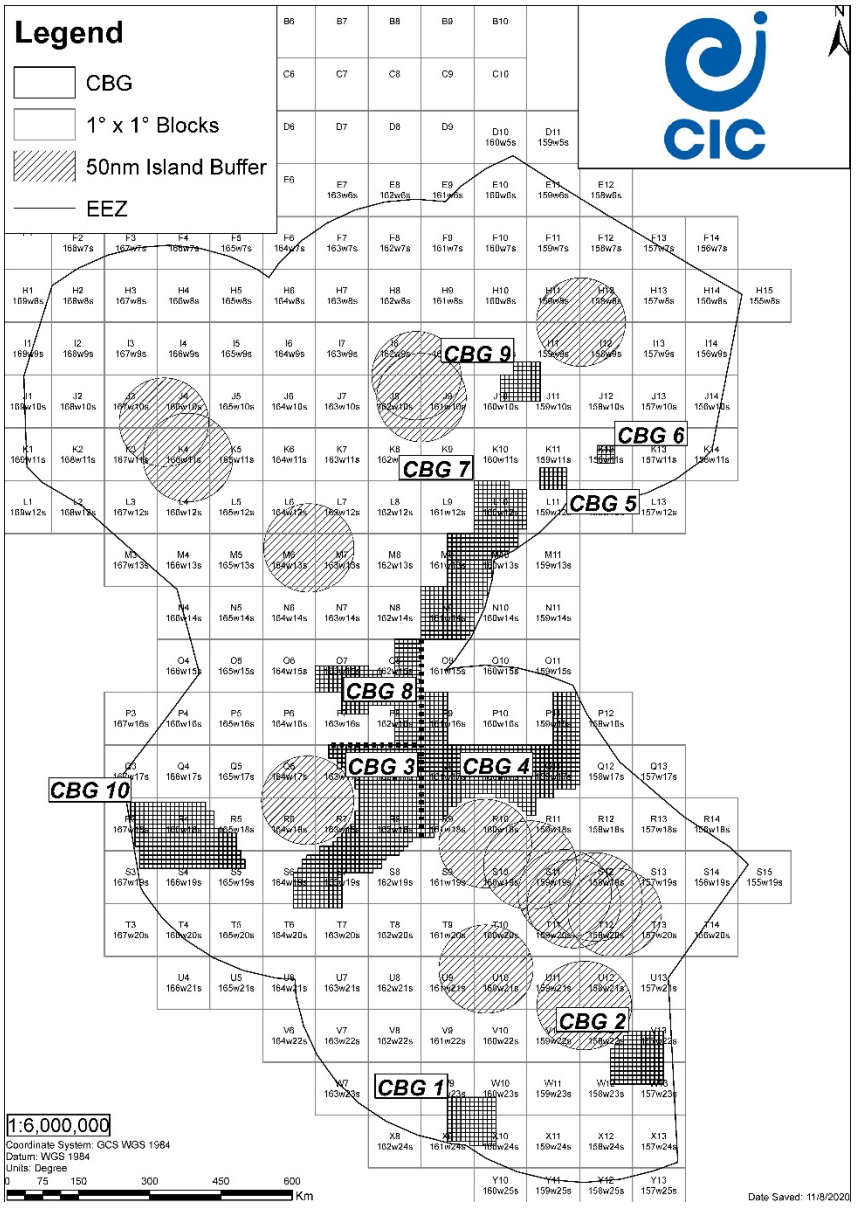


Figure 1. Regional Map of Exploration Area applied for by CIC Limited

CIC Proposed Relinquishment Schedule

The SBMA has requested that CIC propose a relinquishment schedule for the 5-year Exploration License term. After reviewing existing relinquishment legislation for other jurisdictions as well as the relinquishment process for mineral exploration areas in international waters by the ISA, CIC proposes the following relinquishment schedule:

- After completion of 3 years of exploration activities pursuant to the Exploration License, up to 20% of the Total Exploration Area
    - This will give adequate time to conduct extensive bathymetric surveys in order to rule out areas that contain environmentally sensitive features (e.g., seamounts) as well as areas with slopes that likely would not contain a high abundance of nodules.
- Prior to the expiration of the 5-year Exploration License, up to an additional 40% of the Total Exploration Area.

In each relinquishment period, the percentage proposed would be the maximum relinquishment required, but will be subject to discussions between the SBMA and CIC to consider whether there should be less than the proposed relinquishment, taking into account research that may still be in progress in certain areas and whether relinquishment would interfere with, or negatively impact, ongoing research activities. For the avoidance of doubt, the amount relinquished up to the proposed percentage amount would be in the sole discretion of the SBMA.

In proposing this Relinquishment Schedule and asking for consideration of relinquishment of less than than the maximum area, CIC has taken under consideration that exploration and research activities will end in areas as soon as they are relinquished. CIC believes that a thorough understanding of the regional connectivity, and the environmental baselines throughout the EEZ, will be critical in determining whether, and how, nodule harvesting can be accomplished in a sustainable manner with no serious harm to the environment – and in which areas these activities should take place. This is the primary reason that CIC has requested and received an Exploration License for a relatively large area.

If commercial harvesting is to take place, CIC believes it should take place in the portions of the EEZ with the lowest demonstrable environmental impact while still maintaining commercial viability. Relinquishment of large percentages of the licensed area will diminish the amount of exploration, research and data gathering needed to better understand the marine environment throughout a large portion of the Cook Islands' EEZ.

Studies of the larger area will also provide important data for the creation of a resource management plan for Marae Moana. CIC anticipates working closely with Marae Moana to develop parameters for research and data acquisition that will help them better understand the Cook Islands' EEZ.