

フィジー国稲作研究開発計画

パイロットインフラ整備事業に係わる施工監理業務

総合報告書

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平成元年 1 月

国際協力事業団

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主要関係者リスト

フィジー側関係者

第一次産業省

排水かんがい局

施工業者 (圃場工事)

施工業者 (圃場管理棟)

次 官

次官代理

局 長

主幹技師

技 師

ADP Navua事務所

ADP Nausori事務所

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社 長

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植 嶋 直 己

吉 田 芳 夫

水 落 俊 一

渡 辺 裕

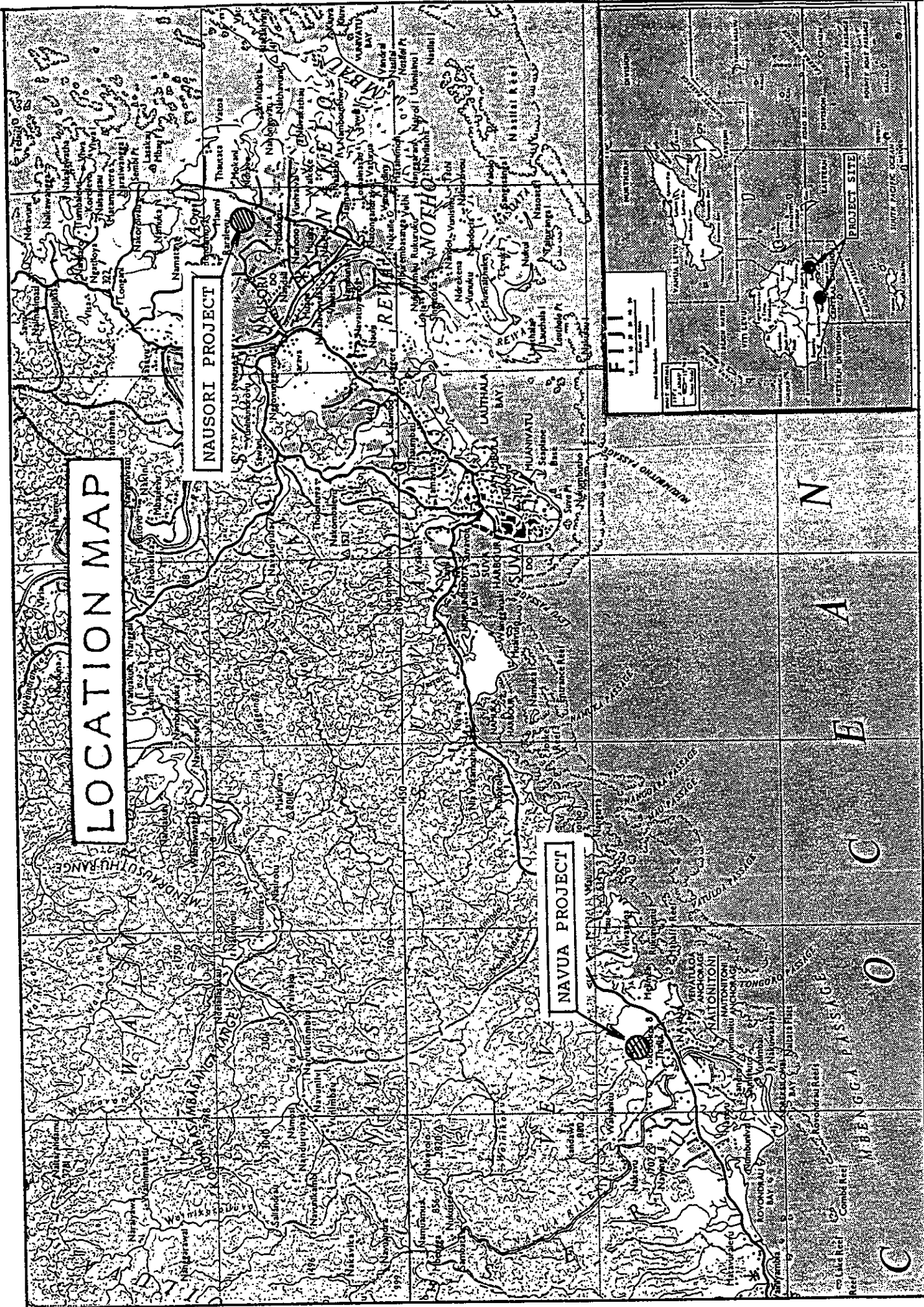
三 浦 昌 司

引 地 三千男

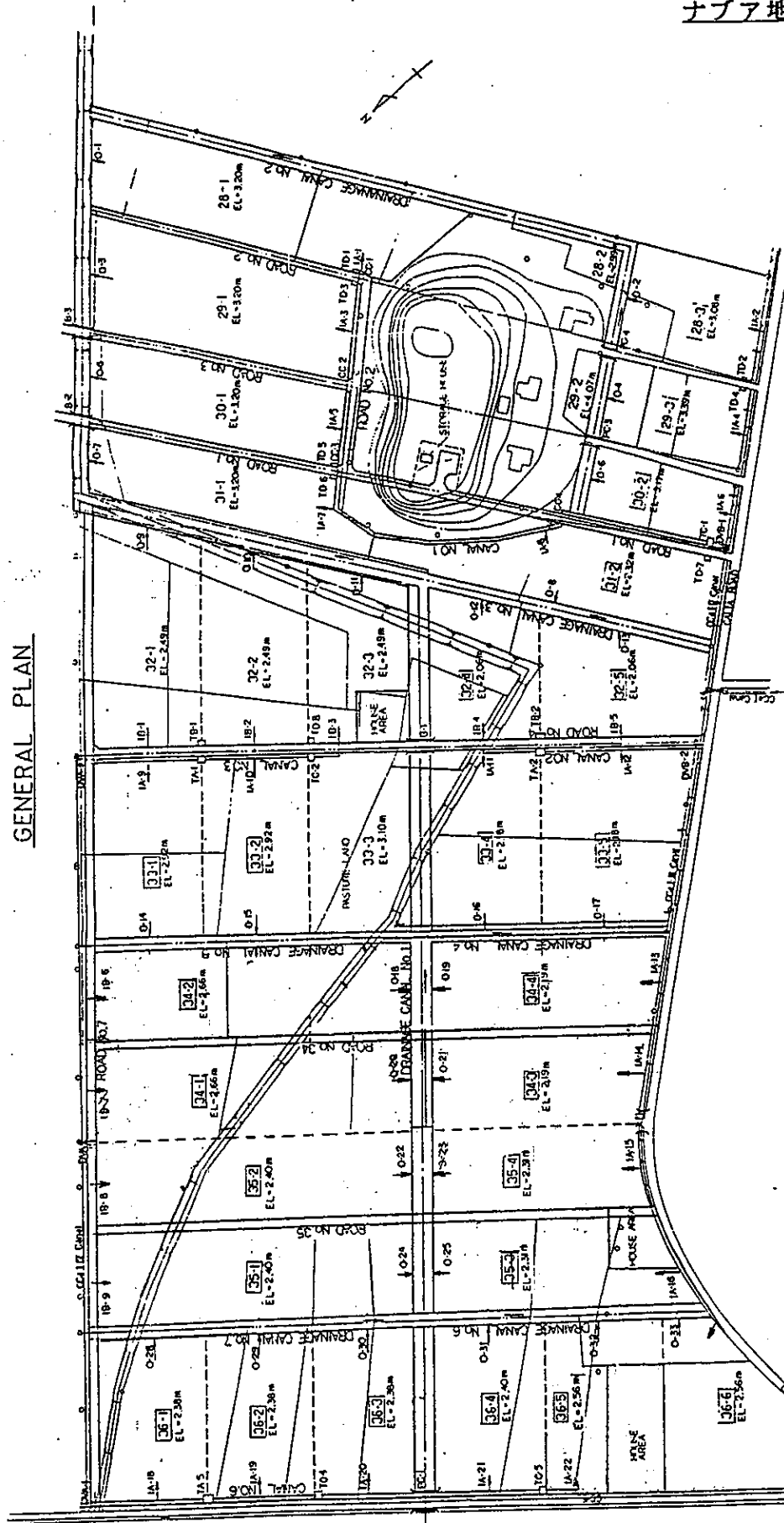
宇 田 昌 義

増 見 国 弘

LOCATION MAP



GENERAL PLAN



LEGEND

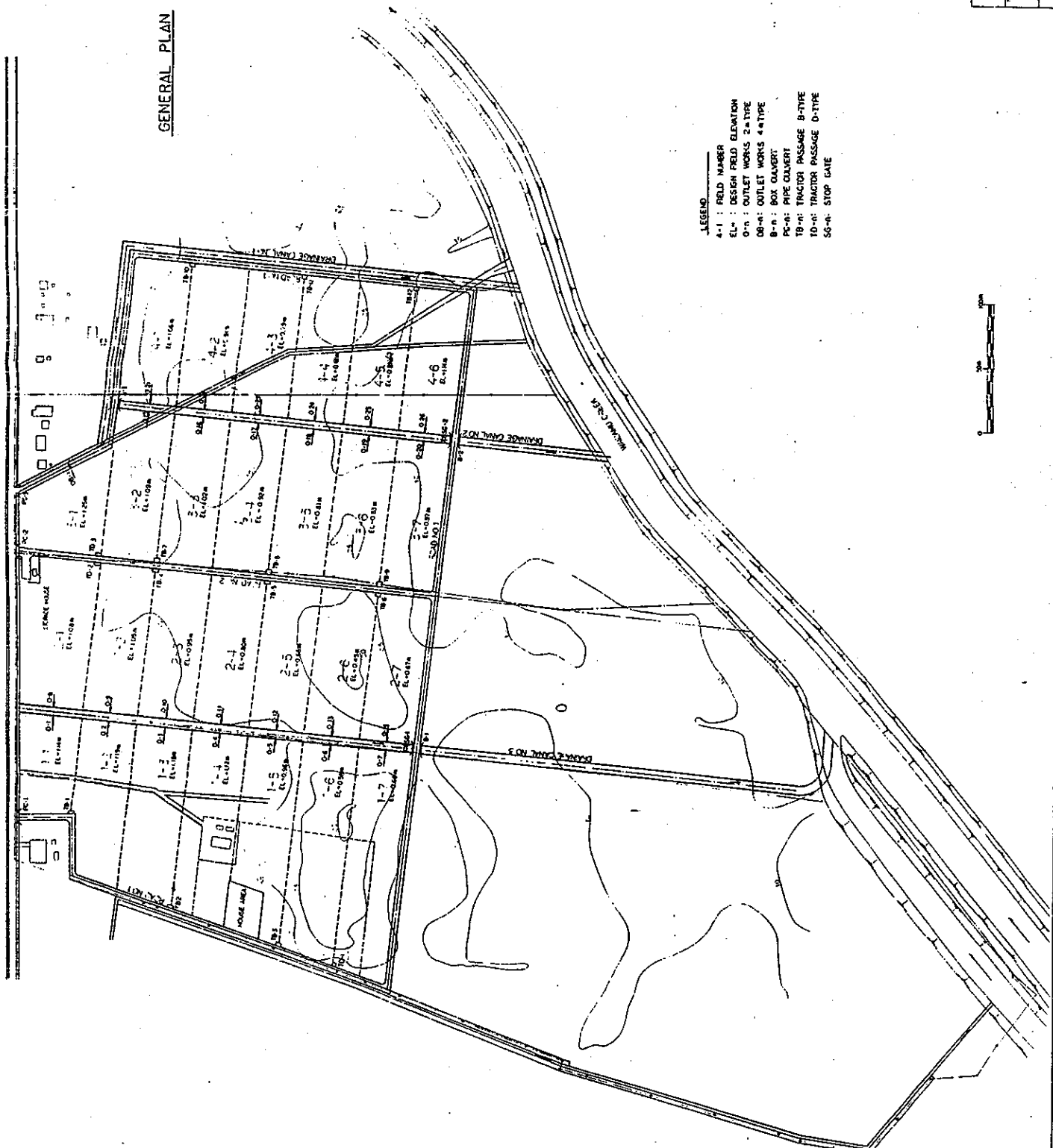
- 28-1 : FIELD NUMBER
- EL-3.20 : FIELD ELEVATION TO BE DONE SURFACE SOIL INVOLVING
- EL-3.20 : DESIGN FIELD ELEVATION
- 0-1 : OUTLET WORKS
- IA-1 : INLET WORKS A-TYPE
- IB-1 : INLET WORKS B-TYPE
- CC-1 : CANAL CROSSING WORKS
- 9-1 : BOX CULVERT
- PC-1 : PIPE CULVERT
- TA-1 : TRACTOR PASSAGE A-TYPE
- TB-1 : TRACTOR PASSAGE B-TYPE
- TC-1 : TRACTOR PASSAGE C-TYPE
- TD-1 : TRACTOR PASSAGE D-TYPE



ナウソリ地区

GENERAL PLAN

- LEGEND
- 4-1 : FIELD NUMBER
 - EL : DESIGN FIELD ELEVATION
 - 0-0 : OUTLET WORKS 2.4 TYPE
 - 08-01 : OUTLET WORKS 4.4 TYPE
 - 8-0 : BOX CULVERT
 - PC-01 : PIPE CULVERT
 - TB-01 : TRACTOR PASSAGE 8-TYPE
 - TD-01 : TRACTOR PASSAGE 0-TYPE
 - SG-01 : STOP GATE



THE GOVERNMENT OF JAPAN
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 GENERAL PLAN
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO, JAPAN

第1章 概 要

1.1 事業の目的と経緯

1983年6月、フィジー政府は日本政府に対し、稲作に関連する応用レベルの試験研究について、プロジェクト方式の技術協力を要請してきた。これに基づき1985年4月より、フィジー国稲作研究開発計画が開始され、1986年8月、コロンビア農業試験場内にモデル圃場が整備された。さらに、このモデル圃場における研究成果をふまえ、各種技術の展示と普及訓練のため、かんがい水田及び天水田にパイロット圃場を整備することとなり、1988年1月、「フィジー国稲作研究開発計画パイロットインフラ整備事業実施設計調査団」が派遣され、かんがい水田としてナブア地区(16.4ha)、天水田としてナウソリ地区(14.3ha)の圃場整備と関連施設の実施設計調査が実施された。

今回の工事实施は、この実施設計に基づくナブア地区16.4ha、ナウソリ地区14.3haの圃場整備と関連施設の整備事業をパイロットインフラ整備事業として行ったものである。

この報告書は、この工事状況をとりまとめたものである。

1.2 専門家の派遣と業務内容

1. 専門家の派遣

工事の契約及び施工監理業務の実施に当たって、1988年8月4日から1988年12月1日までの120日間にわたり坂梨良介(太陽コンサルタンツ株式会社)が、また、1988年9月3日から1988年12月31日までの120日間にわたり岩井功(太陽コンサルタンツ株式会社)が派遣された。当初、派遣期間は、坂梨良介が1988年8月4日から60日間、岩井功が1988年9月3日から180日間であったが、以下に述べる理由により派遣期間の変更申請を行い承諾を得た。

変更理由

(1) 工事の早期完了

フィジー国における稲作の作付は、雨期初期である10月から12月にかけて実施されている。当計画地区であるナブア、ナウソリ地区においても10月から12月にかけて作付が例年実施されている。このため、地元農民及び関係機関より例年の水稻作付に間に合うよう工事の早期完了、遅

くとも11月中に工事が終了するよう強い要請があった。

(2) 工事着工時期の遅れ

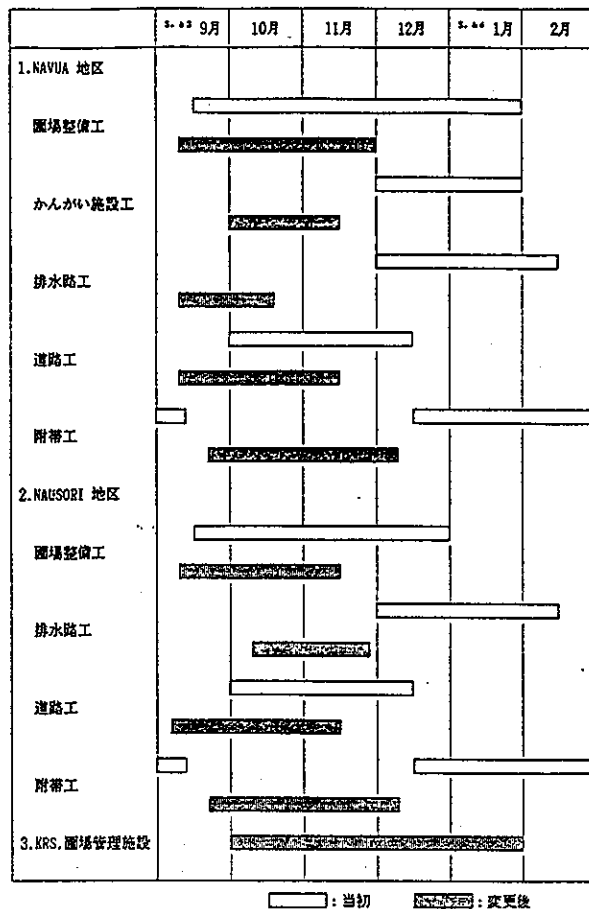
当工事は、当初7月中旬から着工予定であったが、一部地元農家の調整が難航したため現地入りが8月初旬、工事着工時期が9月初旬と予定よりも工事着手時期が遅れている。

(3) 工事期間の短縮

工事着手時期の遅れと工事の早期完了から当初予定していた6ヶ月の工事期間が3ヶ月に短縮せざるを得なくなった。本工事は、面工事が主体であり施工機械の施工能力の向上、あるいは導入機械台数の増加により施工期間の短縮は可能である。選定された施工業者は、フィジー国での施工機械の賃貸業者であり、施工機械の保有台数も多く、ナブア、ナウソリ地区にそれぞれD6スワンプドーザー（15ton級）3台、及び、1台の掘削機械を導入して工期内に工事を完了することとしている。

(4) 変更前後の工事工程

変更前後の工事工程は下表のとおりである。



施工業者との契約は 9月 9日に調印され、施工期間は 3ヶ月である。

(5) 工事工程の変更理由及び変更後の工事实施の見通し

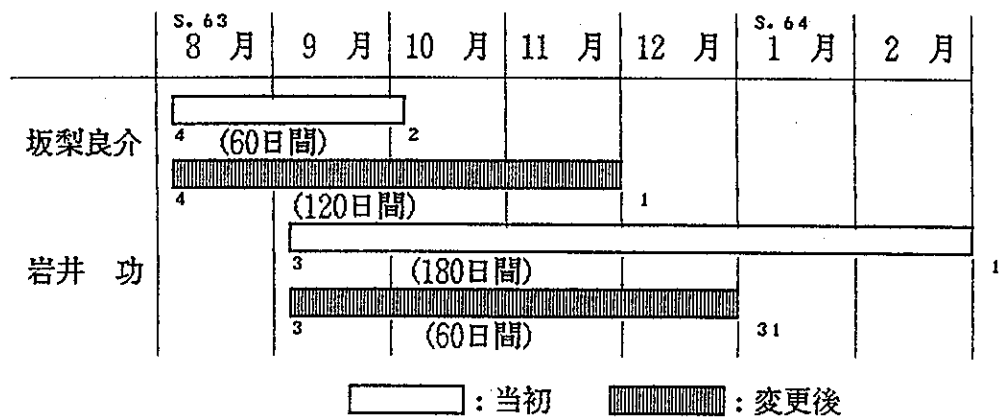
前述の通り工事の早期完了と着工時期の遅れにより工事工程を変更せざるを得なかった。当初工期を6ヶ月と設定したのは、施工機械能力を11ton級ブルを想定し、施工可能日数及び1人での施工監理体制を考慮したためであるが、後述する各地区1名の施工監理体制及び施工業者の施工能力から考えて、工期内に工事完了すると判断する。

(6) 施工監理体制

施工ヶ所が2地区であること、施工期間が短く、かつ、施工機械が、それぞれ4台導入され効率良く稼働させる必要があることより、各地区1名の施工監理体制をとる。坂梨の現地調査期間を当初の60日(2ヶ月)から120日(4ヶ月)に延長し、岩井の期間を当初の180日(6ヶ月)から120日(4ヶ月)に短縮する。但し、両者の格付が同じため契約金額に変更は生じない。

(7) 専門家派遣計画

工事工程変更に伴う専門家派遣計画を図示すると次のとおりである。



尚、岩井の4ヶ月目(S.63年12月)は、後日に別途発注予定の圃場管理施設の施工管理期間に充当する。

2. 業務内容

派遣期間中遂行した主な業務内容は次の通りである。

- i) 工事請負契約締結に関する協力, 補助
 - ・工事費積算の見直し
 - ・契約書, 仕様書, 特別仕様書, 設計図書, 数量調書等の検討
 - ・工事請負業者の選定に係る検討
 - ・現場説明会に関する事項
- ii) 施工監理業務
 - ・工事の工程, 期間の管理
 - ・設計図に基づく工事施工の管理及び指示
 - ・その他工事施工に付随する監督者の協力及び助力
- iii) 工事変更に伴う設計変更等業務の処理
- iv) 検査業務に関する補助
- v) 必要となる工事関係図書の作成

1.3 工事概要

本工事は、1988年9月9日に契約した「圃場造成工事」と1988年10月11日に契約した「圃場管理棟工事」から成り、その工事概要は次の通りである。

(1) 圃場造成工事

A. ナブア地区

- 1) 圃場整備工事 16.4ha
- 2) かんがい施設工事
 - ・用水路工事 1,050m
 - ・用水路横断工 14ヶ所
 - ・流入工 31ヶ所
- 3) 排水施設工事
 - ・排水路工事 1,880m
 - ・排水路横断工 9ヶ所
 - ・流出工 32ヶ所
- 4) 道路工 1,810m

B. ナウソリ地区

- 1) 圃場整備工事 14.3ha
- 2) 排水施設工事
 - ・排水路工事 1,500m
 - ・排水路横断工 8ヶ所
 - ・流出工 27ヶ所
 - ・ストップゲート工 2ヶ所
- 4) 道路工 1,670m

(2) 圃場管理棟工事

- 1) 圃場管理棟 127.4㎡

1.4 資料の提出

当業務の実施期間中に現地にて、フィジーJICA事務所長に提出した資料は次に示す通りである。なお、この資料の一部は、この報告書の第7章に添付した。

- イ) 契約書, 仕様書, 数量書, 設計図面等現場説明会関係資料
- ロ) 工事実施状況報告書
- ハ) 工事打合せ簿
- ニ) 出来高確認書
- ホ) その他

第2章 工事請負契約

2.1 圃場造成工事

1. 工事費積算の見直し

工事費の見直しは、1988年8月時点での単価に基づいて実施した。特に、第一次産業省農業局かんがい排水部(D & I Division)より、現在進行中及び今後予定されている同様工事に対する影響を考え、相応の単価、工事費とする様にとの意見があった。このため、D & I Divisionの契約担当者と共に単価の確認、及び工事費の見直しの結果、以下に示す総工事費が得られた。(圃場管理施設は除く)

…………… 添付資料7-1-1参照

比率

実施設計時(1988年3月) : 総工事費 F \$ 388,700 (1.00)

今回(1988年8月) : 総工事費 F \$ 290,100 (0.75)

2. 入札準備

(1) 入札書類の作成

入札書類のとりまとめの段階で、D & Iの契約担当者からフィジー国内で採用している方式(国際入札方式)とした方が業者の対応もスムーズに行くとの指摘があり、B. Q.(工事積算書)を含めた入札書類の組替、編集を行った。

(2) 工事業者の選定

入札はD & I方式に従い、指名競争入札とした。指名業者の選択に際しては、D & Iの資格審査を経て登録されている業者から特に優秀な次の4社を選定した。

その選定基準としては次の点に重点を置いた。

- イ) 雨期稲作開始以前(11月末頃)に工事を完了できる能力(人員、機械)があること。
- ロ) 同様工事に十分な経験を有すること。
- ハ) フィジー国内でも高い評価を得ていること。
- ニ) 工事地区が2ヶ所あるため、施工監理体制を考え、スバ周辺に本拠を置く会社であること。

指名業者

1. Grayburn Construction Ltd.
2. Construction Equipment Hire Ltd.
3. Burgess (Fiji) Ltd.
4. D Narayan Industries Ltd.

3. 入札と契約

(1) 現説及び入札書類の配布

フィジー事務所長にこれまでの経過を報告し承認を得た後、上記の4社に対し、1988年8月25日JICA事務所において現説及び入札書類の配布を実施した。その方式としては、工事主旨の説明及び業者の実情を確認するため、各社毎にインタビュー方式とした。但し、D Narayan Industries Ltd. は当日来所しなかった為、辞退扱いとした。----- 添付資料7-1-2, 7-1-3参照

(2) 入札の結果

3社の応札書類が9月2日に届き、開封の結果、以下の結果が得られた。
----- 添付資料7-1-4参照

業者名	応札金額	優先順位
Grayburn Construction Ltd.	F\$411,225.76	2
Construction Equipment Hire Ltd.	F\$266,569.00	1
Burgess (Fiji) Ltd.	F\$421,723.00	3
予定工事費	F\$290,100.00	

(3) 契約ネゴ

契約ネゴは各工事、工種に関し、その内容の確認を基に各工事単価の妥当性をチェックした。

この過程において、Const. Equipment Hire Ltd.のB. Q.(応札書)内で、コンクリートパイプをJICA側から供与資材と解釈している事が解った。(原因はB. Q. 表現の解釈の相違による。)パイプの資材費は約F \$10,000であり、これを加えても優先順位に影響を及ぼさない事から、この金額の支払いを認めた。但し、応札書自体の金額は変えず、Variation Order(数量変更書)で処理する方針とした。他の事項については全て合意に達したのでConst. Equipment Hire Ltd. を契約業者と認定した。----- 添付資料7-1-5参照

(4) 契 約

工事着工前に提出すべき所定の書類（銀行保証書、対第三者保険契約書等）が業者より提出されたのを確認した上で、9月9日（金）にJICA事務所において、吉田所長（発注社）とMr. Pillay（受注業者／Const. Equipment Hire Ltd.）の間で契約書の調印が実施され契約が成立した。…………… 添付資料7-1-6参照

契約金額：F \$ 266,569.00

工事期間：1988年9月9日～1988年12月7日

(5) 工事開始手続

契約書に基づき工事業者から提出書類（銀行保証書等）を受領した後、フィジー事務所長名で工事開始許可証を発行した。そして、9月19日（ナウソリ地区）、9月21日（ナブア地区）に現地に重機が到着し、工事が開始された。…………… 添付資料7-1-7参照

(6) 追加工事契約

ナウソリ地区、ナブア地区について以下の追加工事を発注した。

…………… 添付資料7-1-8参照

A) ナウソリ地区

その1. 伐開工事

造成工事に先立ち、ワイダムクリーク寄の1.2haについての伐開工事を追加工事として発注した。

発注金額：F \$ 9,600.00

その2. 表土扱い工事

当初契約では、表土扱い工事は含めていなかったが、表層土10cmの表土扱い工事12haを追加工事として発注した。

発注金額：F \$ 28,200.00

その3. パイプ資材費

パイプ資材をJICA供与資材と認め、これを追加工事として発注した。

発注金額：F \$ 7,432.70

B) ナブア地区

その1. パイプ資材費

パイプ資材をJICA供与資材と認め、これを追加工事として発注した。

発注金額：F \$ 9,250.56

その2. 用水路及び道路用搬入土

当初契約では、用水路、道路用土は、圃場内の心土を流用する予定であったが、軟弱土の為、盛土に使用することができなかつたため、搬入土を利用することとして追加工事として発注した。

発注金額：F \$ 18,725.00

その3. 圃場均平作業

当地区の圃場は、非常に軟弱であり造成工事の作業効率が悪く、土工事割増分として16haの均平作業を追加工事として発注した。

発注金額：F \$ 26,400.00

4. 工事検定と支払い

(1) 中間払い

契約書第60条に従って、工事期間中に2回の出来高中間払いの請求が行われた。これを受けて、出来高の検査をした結果、出来高と金額は次のようになった。ただし、支払い金額は工事完了の6ヶ月後に支払われる保留金(10%)を除いた分が支払われた。----- 添付資料7-1-9, 7-1-10参照

第1回目の中間支払い：支払い金額F \$ 57,052.25

第2回目の中間支払い：支払い金額F \$ 109,388.25

(2) 完了検査

当工事の工期は、1988年12月7日であり、請負業者からの検収申請を受け、12月21日にナブア地区、及び12月23日にナウソリ地区の検収をD & I Divisionの技術者の立合のもとで実施した。その結果、各工事に数点の指摘事項がみられた。これらの指摘事項は、D & I Divisionの技術者が請負業者を監理し実施することとした。----- 添付資料7-1-11, 7-1-12参照

第3回目(工事完了時)支払い：支払い金額F \$ 158,411.01

但し、メンテナンス期間の保留金(5%)は差し引いた金額である。

2.2 圃場管理棟

1. 圃場管理棟施設の再検討

(1) 圃場管理棟施設の建設位置

実施設計時点（1988年3月）では、ナブア地区、ナウソリ地区の各々の圃場内に、各1棟の圃場管理棟を建設することとなっていたが、フィジー側の要望により、建設地点をコロニビア試験場内に変更することとなった。建設場所としては、試験場内のPlant Protection Laboratory House 跡地とした。

----- 添付資料7-2-1参照

(2) 圃場管理棟施設規模

圃場管理棟施設規模は、フィジー側及び日本人専門家との協議に基づき、次の規模とした。

施設規模：15.35m×8.30m 2階建

施設構造：コンクリート柱及びブロック積構造

(3) 圃場管理棟施設の詳細設計

圃場管理棟施設規模の決定後、詳細設計をBegg Construction Ltd.に依頼した。この詳細設計図を基に、予定工事費の積算を行い以下の結果を得た。

----- 添付資料7-2-2参照

比率

実施設計時（1988年3月）：総工事費 F \$ 36,300 (1.00)

今回（1988年9月）：総工事費 F \$ 50,000 (1.38)

2. 入札と契約

(1) 入札と契約

フィジー側に建設申請書類を提出し、10月7日にその許可を得たので、建設業者に指名通知を行った。業者には、本建物の設計等を依頼したBegg Construction Ltd.（コロニビア試験場で建築の実績あり）を指名し、見積り合わせによる入札型式を採用した。

10月11日にBegg Construction Ltd.より応札書が提出され、当方の予定価格と比較したところ妥当と判断されたので、同日JICA所長と業者との間で契約が締結された。----- 添付資料7-2-3, 7-2-4, 7-2-5参照

施工業者 : Begg Construction Ltd.

契約金額 : F \$ 50,000.00

契約期間 : 1988年10月13日～1989年1月13日

建物規模 : 15.35m×8.30m 2階建

建物構造 : コンクリート柱及びブロック積構造

(2) 追加工事契約

日本人専門家及びフィジー側の要望により、窓、ドア等の仕様変更及び玄関工事を追加工事として発注した。----- 添付資料7-2-6 参照

発注金額 : F \$ 10,000.00

工事期間 : 1988年12月20日～1989年1月13日

3. 工事の検定と支払い

(1) 前途金の支払い

契約書第11条に従って、契約金額の20%に相当する前途金 (F \$ 10,000.00) が支払われた。----- 添付資料7-2-7 参照

(2) 中間払い

契約書第11条に従って、工事期間中 (1988年10月11日～1988年12月31日) に2回の出来高中間払いの請求が行われた。----- 添付資料7-2-8, 7-2-9 参照

第1回目の中間払い 支払金額 F \$ 10,000.00

第2回目の中間払い 支払金額 F \$ 15,000.00

(3) 今後の支払い予定

1989年1月以後の支払い予定は以下の通りである。

第3回目の中間払い 支払金額 F \$ 9,000.00

完成時支払い 支払金額 F \$ 10,000.00

メンテナンス期間終了 支払金額 F \$ 6,000.00

2.3 最終支払いの実績

圃場造成工事、圃場管理棟工事及び工事諸費の最終支払い総額は、次の通りとなった。工事費にはメンテナンス期間終了後に支払われる保留金も含まれる。

(A) 圃場造成工事支払い総額	F \$ 341,943.76 (32,252千円)
(内訳) 第1回目支払分	F \$ 57,052.26
第2回目支払分	F \$ 109,383.30
第3回目支払分	F \$ 158,411.01
保 留 金	F \$ 17,097.19
(B) 圃場管理棟工事支払い総額	F \$ 60,000.00 (5,659千円)
(内訳) 前 渡 し 金	F \$ 10,000.00
第1回目支払分	F \$ 10,000.00
第2回目支払分	F \$ 15,000.00
第3回目支払分	F \$ 9,000.00
完成時支払分	F \$ 10,000.00
保 留 金	F \$ 6,000.00
(C) 工事諸費	F \$ 16,266.68 (1,534千円)
総 計 (A + B + C)	F \$ 418,210.44 (39,446千円)

以上から、今工事の総支払い額は、保留金を含めて

F \$ 418,210.44 (39,446千円)

となった。----- 添付資料7-2-10参照

第3章 設計変更・追加工事

3.1 圃場造成工事

1. 設計変更

A) ナウソリ地区

(1)ボックスカルバートをパイプカルバートに変更

排水路横断工のB-1, B-2, B-3は、現場打ボックスカルバートであったが、工期の短縮を計るためにボックスカルバートと同断面積を有する直径1.2mのパイプカルバートに変更した。

(2)小口径パイプの材質変更

流出工に使用する口径150mmのコンクリートパイプは、工期内に入手するのが困難な為、PVC（塩化ビニール管）に材質変更を行った。

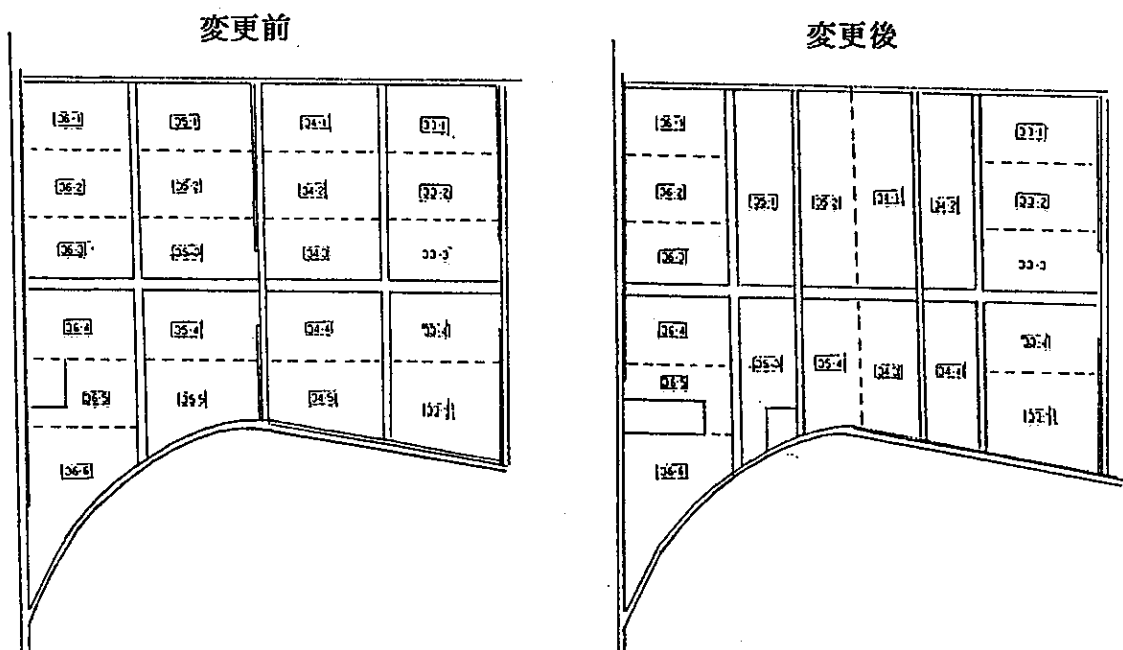
(3)流出工、ストップゲート工構造物

流出工、ストップゲート工の構造物は、フィジー国の標準仕様を使用した。

B) ナブア地区

(1)圃場区画の変更

圃場番号No.34及びNo.35の農家の要望により圃場中央に道路を配置する計画とした。従って圃場区画は南北方向に変更となった。変更前後の区画は下記の通りである。



(2)ボックスカルバートをパイプカルバートに変更

1号排水路横断工のB-1, B-2, B-3は、現場打ボックスカルバートであったが、工期の短縮を計るために、ボックスカルバートと同断面積を有する直径1.2mのパイプカルバートに変更した。

(3)小口径パイプの材質変更

流入工及び流出工に使用する口径 150mm以下のコンクリートパイプは、工期内に入手するのが困難な為、PVC（塩化ビニール管）に材質変更を行った。

(4)流入工、流出工、分土工構造物

流入工、流出工、分土工の構造物は、フィジー国の標準仕様を使用した。

2. 追加工事

A) ナウソリ地区

その1. 伐開工事

造成工事に先立ち、ワイダムクリーク寄の 1.2haについての伐開工事を追加工事として発注した。

発注金額：F \$ 9,600.00

その2. 表土扱い工事

当初契約では、表土扱い工事は含めていなかったが、表層土10cmの表土扱い工事 12haを追加工事として発注した。

発注金額：F \$ 28,200.00

その3. パイプ資材費

パイプ資材をJICA供与資材と認め、これを追加工事として発注した。

発注金額：F \$ 7,432.70

B) ナブア地区

その1. パイプ資材費

パイプ資材をJICA供与資材と認め、これを追加工事として発注した。

発注金額：F \$ 9,250.56

その2. 用水路及び道路用搬入土

当初契約では、用水路、道路用土は、圃場内の心土を流用する予定であったが、軟弱土の為、盛土に使用することができなかつたため、搬入土を利用することとして追加工事として発注した。

発注金額：F \$ 18,725.00

その3. 圃場均平作業

当地区の圃場は、非常に軟弱であり造成工事の作業効率が悪く、土工事割増分として16haの均平作業を追加工事として発注した。

発注金額：F \$ 26,400.00

3.2 圃場管理棟工事

1. 設計変更

(1)窓の仕様変更

当初、窓はフィジー国の標準タイプであるルーバー方式を採用していたが、日本人専門家及びフィジー側の要望によりアルミサッシ枠ガラス窓に仕様を変更した。

(2)ドアの仕様変更

当初、ドアは木製ドアとしていたが、日本人専門家及びフィジー側の要望によりアルミ製ドアに仕様を変更した。

(3)玄関の仕様変更

当初、玄関は木製としていたが、鉄筋コンクリート柱及び鉄筋コンクリートスラブ方式に仕様を変更するとともに、タイル工事も追加工事とした。

第4章 施工監理

4.1 圃場造成工事

1. 工程監理

1988年9月9日の契約後、準備工を経て9月19日にナウソリ地区、及び9月21日ナブア地区にブルドーザーが搬入され、工事が開始された。

工程の管理は、業者から提出された工程表と定期的及び随時の打合せにより厳しく行った。

初期の工事の中心は、圃場造成工事であり、両地区ともD4(11ton級)及びD6(15ton級)湿地ブルドーザー2台によって工事が進められた。ナウソリ地区については、伐開工、表土扱い工、心土レベリング工を実施し、表土もどし、最終均平作業を実施した。当地区は、比較的地盤が良好であったため、工事は順調に進んだ。圃場均平作業と平行して実施した道路盛土工、排水路掘削工、及びそれらに附随する附帯施設構造物工事も順調に進み、予定の工事を消化することが出来た。又ナブア地区について、表土寄工、心土レベリング工の後、表土もどし工、最終均平作業を実施した。当地区は、ナウソリ地区に比較し、軟弱地盤であり、降雨後の作業に非常に苦勞したが、10月末からの好天続きで、どうにか予定の工事を消化することが出来た。

2. 品質管理

一般的に品質管理の認識と技術力が劣ることから、その時々で工事を確認するよう努めた。

(1) 位置と寸法

圃場や道路及び用・排水路等の位置・形状・寸法は工事の進行に従い随時確認を行った。

(2) 圃場造成工事

圃場造成工事は、各耕区間で均平となる様に指示をした。表土扱いについては、あまり深く表土層をはぎ取らないよう指示した。

(3) 道路工事

道路盛土は、表土扱い後の心土を流用することを原則としたが、一部区間では心土を利用できず搬入土を利用する様指示した。

(4) 排水路工事

排水路の掘削には、バックホーを用い所定の形状・寸法が得られる様注意した。特に水路勾配と法面仕上げに重点をおいた。

(5) 用水路工事（ナブア地区）

用水路盛土工は、圃場内心土が盛土用土として不適の為、搬入土を利用した。

(6) その他

コンクリートは、現場でミキサーを使って練ったが、その際には配合割合と材料の品質及び打設後の養生について注意した。

3. 出来高管理

各工種毎に寸法や品質、出来高等について現場で随時確認し、悪いものについてはその場で修正、再工事を指示した。

4. 工事中の打合せ

工事期間中において、次の事項について打合せと計画の修正を行った。

----- 添付資料 7-1-13参照

(1) 伐開工（ナウソリ地区）

地区南側のワイダムクリーク寄りの1.2haについて伐開工（ブルドーザー使用）を追加工事として発注する

(2) 表土扱い工（ナウソリ地区）

表土層が認められる12haについて表土扱い工を追加工事として発注する。

(3) パイプ資材費（ナブア地区、ナウソリ地区）

パイプ資材をJICA供与資材と認め、これを追加工事として発注する。

(4) ボックスカルバートの形状（ナブア地区、ナウソリ地区）

排水路横断工の現場打ボックスカルバート工を同じ通水断面を有する1.2mのパイプカルバートに変更する。

(5) 小口径パイプの材質変更（ナブア地区、ナウソリ地区）

小口径パイプ(150mm以下)の材質をコンクリートパイプよりPVCパイプに変更する。

(6) 流入工、流出工、分水工の形状（ナブア地区）

流入工、流出工、分水工の形状は、フィジーの標準タイプを使用する。

(7) 用水路、道路用土（ナブア地区）

用水路、及び一部の道路用土は、圃場内の心土が軟弱土の為、盛土に使用することができなかつたため、搬入土を利用する。

(8) 圃場均平作業（ナブア地区）

ナブア地区の圃場は、非常に軟弱であり造成工事の作業効率が悪く、土工事割増分として16haの均平作業を追加工事として発注した。

3.2 圃場管理棟工事

1. 工程管理

工事着手までに、MP Iの認可手続き、及び建設予定地点の移転工事に予想以上の時間がとられ、工事着手が大幅に遅れた。工事着工は建設予定地点の移転工事が終了した10月末となった。12月末段階では、基礎工事、1、2階の柱工事、ブロック積工事、屋根工事及び2階の床工事の一部が完了した。これは、当初予定した工程通りであり、残作業としては、2階の床工事の仕上げ及び内装工事があげられる。これらの残作業は、稲作研究チームの日本人専門家に監理、監督を依頼することとした。

2. 品質管理

品質管理は、各工種毎に確認するよう努めた。

基礎工事、及び柱、梁工事のコンクリートは、現場でミキサーを使って練ったが、その際には配合割合と材料の品質及び打設後の養生について注意した。また、ブロック積工事では、ブロックの品質及びモルタル配合に注意した。屋根工事においては、特にハリケーン対策（2階梁部と屋根とのアンカー工事）について注意した。

3. 出来高管理

工事期間中に各工種ごとに、寸法や品質、できばえなどについて随時確認し、悪いものについてはその場でやりなおすものとした。

4. 工事中の打合せ

工事期間中において、フィジー側及び日本人専門家からの要望により、次の事項について打合せと計画の修正を行った。

(1) 窓, ドア等の仕様変更

フィジー側及び日本人専門家の要望により、当初窓, ドアはルーバータイプ窓及び木製ドアとしていたが、窓はアルミサッシに、ドアもアルミ製ドアに仕様変更した。また、玄関工事及びタイル工事も追加工事として発注した。

第5章 工事出来高

5.1 圃場造成工事

1. ナブア地区

ナブア地区の圃場造成工事における実施設計時（1988年 4月）と出来高工事（1988年 12月）との対比は下表の通りである。

工 種	実施設計	出来高	設 計 変 更	追 加 工 事
(1)圃場整備工 ・圃場整備工	16.4ha	16.4ha	No.34, No.35圃場区画の変更をした。	圃場均平作業16ha
・畦畔工	1,280m	1,280m		
(2)かんがい施設工 ・かんがい用水路	1,050m	1,050m	分水工の構造はフィジー国の標準仕様とした。 コンクリートパイプをPVCパイプに材質変更した。	用水路盛土工は搬入土を使用した。
・分水工	6ヶ所	4ヶ所		
・インレット工	33ヶ所	31ヶ所		
・横断工	15ヶ所	14ヶ所		
(3)排水施設工 ・排水路工	1,880m	1,880m	1.0m×1.0m現場打ボックスカルバートを1.2mのパイプカルバートに変更した。 アウトレット工の構造はフィジー国の標準仕様とした。	パイプ資材はJICA供与資材とした。
・パイプカルバート （φ600）	4ヶ所	5ヶ所		
・ボックスカルバート	3ヶ所	4ヶ所		
・アウトレット工	33ヶ所	32ヶ所		
(4)道路工 ・道路工	1,810m	1,810m		

2. ナウソリ地区

ナウソリ地区の圃場造成工事における実施設計時（1988年 4月）と出来高工事（1988年 12月）との対比は下表の通りである。

工 種	実施設計	出来高	設 計 変 更	追 加 工 事
(1)圃場整備工 ・圃場整備工	14.3ha	14.3ha		・代開工 1.2ha ・表土扱工 12ha パイプ資材はJICA供与資材とした。
・畦畔工	2,650m	2,650m		
(2)排水施設工 ・排水路工	1,500m	1,500m	ストップゲートの構造はフィジー国の標準仕様とした。 コンクリートパイプをPVCパイプに材質変更した。	
・ストップゲート工	2ヶ所	2ヶ所		
・アウトレット工	27ヶ所	27ヶ所	1.0m×1.0m現場打ボックスカルバートを1.2mのパイプカルバートに変更した。	
・パイプカルバート (φ600)	3ヶ所	4ヶ所		
・ボックスカルバート	3ヶ所	4ヶ所		
(3)道路工 ・道路工	1,670m	1,670m		

5.2 圃場管理棟工事

圃場管理棟工事における実施設計時（1988年 4月）と出来高工事（1988年12月）との対比は下表の通りである。

工 種	実施設計	出 来 高	備 考
(1)ナブア地区 ・圃場管理棟	22.5㎡ (5m × 4.5m)	コロニア試験場 127.4 ㎡ (15.35m × 8.3m)	
(2)ナウソリ地区 ・圃場管理棟	22.5㎡ (5m × 4.5m)		

第6章 当該工事に関する留意事項等

1. 当該工事に関する留意事項

- (1) 1年が乾期と雨期に分れるフィジー国では、土工事が主体となる圃場整備の施工時期は、乾期に施工できる様な工程計画とすることが重要である。特に土壌が軟弱な地盤に於ては、降雨後、数日経過しなければ重機を導入出来ない事もあり、雨期の施工はさげなければならない。
- (2) 測量、丁張、型枠、コンクリート工事など使用する資材と施工方法について、その国の資材の品質や技術力の実情を十分に把握した上で、工程及び品質の管理を行う必要がある。
- (3) 各工事についても人力で行われる部分が相当あり、このために生ずる工程の遅延や品質管理上の問題に十分注意し、その速やかなる対応が重要である。

2. 施設使用における注意事項

- (1) ナブア、ナウソリ地区におけるかんがい排水施設の維持管理は、地元農家が行うことになることから、各地区で関係農家（ナブア地区の場合は9農家、ナウソリ地区の場合は2つのマタカリ）が管理組合的な組織を作り、今後の維持管理にあたることが重要である。維持管理項目としては、次の事項が考えられる。
 - 1) 用・排水路の雑草防除：1年に1～2回程度、関係農家全員による水路内に繁茂する雑草の防除作業を実施する。
 - 2) 道路の維持管理：1年に1～2回程度、道路肩に繁茂する雑草の防除作業を実施する。
- (2) 圃場管理棟は、コロニビア試験場内に設置されており、電気代等の維持費及び施設の維持管理は KRSにより実施される。

第7章 添付資料

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Saharashi

添付資料 7-1-1 工事費積算の見直し

BILL OF QUANTITIES (NAVUA PROJECT)

- BILL NO.1 EARTHWORKS IN FIELD / CANAL / ROADS
- BILL NO.2 STRUCTURE / CANAL BIFURCATION (TYPE A) : 3 NOS.
CANAL BIFURCATION (TYPE B) : 3 NOS.
- BILL NO.3 STRUCTURE / FARM INLET (TYPE A) : 9 NOS.
FARM INLET (TYPE B) : 24 NOS.
FARM OUTLET (TYPE A) : 33 NOS.
- BILL NO.4 STRUCTURE / ACCESS CULVERT (TYPE A) : 6 NOS.
ACCESS ROAD (TYPE A) : 4 NOS.
ACCESS CULVERT (TYPE B) : 5 NOS.
ACCESS ROAD (TYPE B) : 9 NOS.
ACCESS CULVERT (TYPE C) : 4 NOS.
- BILL NO.5 STRUCTURE / DRAIN ACCESS CULVERT (TYPE A) : 4 NOS.
- BILL NO.6 STRUCTURE / DRAIN ACCESS CULVERT (TYPE B) : 3 NOS.

Navua Project 176,200

Nausori Project 113,900

290,100 -

(予備費とRC 263,800²)

BILL NO.1 EARTHEWORKS IN FIELD/CANAL/ROADS

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Remove 0.10m thick topsoil layer, shift over max. length of 40m, and stockpile. Upon completion of field levelling operations (Item 2 and 3), spread stockpiled topsoil in 0.10m thick layer over the field, and trim and compact (track rolled) as directed by the Engineer.	ha	11	2,500	27,500.00
2	Cut and fill to achieve designed field elevation level in Class A fields where max. cutting depth will be 0.30m and average earth-moving per ha will be 1,500m ³ . Filling operation to be in layers not exceeding 0.10m thickness and track rolled compacted to the satisfaction of the Engineer.	ha	5	2,500	12,500.00
3	Cut and fill to achieve designed field elevation level in Class B fields where max. cutting depth will be 0.15m and average earth-moving will per ha will be 750 m ³ . Filling operation to be in layers not exceeding 0.10m thickness and track rolled compacted to the satisfaction of the Engineer.	ha	11	1,500	16,500.00
4	Push, compact (track rolled) and trim soil, from field levelling operations, or spoils from drainage excavation, to form field bund to specification DR. 6 (Typical Sec. BUND)	m	1,280	2.17	2,777.60
5	Push, compact (track rolled) and trim approved soil from field levelling operation to form canalpad or farm road.	m	4,740	4.65	22,041.00
	cont'd				

BILL NO.1 (CONT'D)

ITEM	DESCRIPTION OF WORK	UNIT	Q' TY	RATE	AMOUNT
6	Excavate to canal profile in pad formed in Item 5, and throw spoils along side canal, including the spreading, compacting, and trimming of these spoils on farm roads or along canal bunds as directed by the Engineer.	m ³	560.0	3.50	1,960.00
7	Supply spread and compact and trim gravel for road pavement to a compacted thickness of 0.15m.	m ³	820.0	16.80	13,776.00
8	Excavate to drainprofile and throw spoils alongside the drain.	m ³	6,000	2.97	17,820.00
BILL NO.1 TOTAL					114,874.6

BILL NO.2 STRUCTURE / CANAL BIFURCATION (TYPE A) : 3 NOS.

CANAL BIFURCATION (TYPE B) : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	150	4.00	600.00
2	Supply, place and compact gravel in position	m ³	4	19.59	78.36
3	Supply and compact 15 MPa concrete on the gravel in position as based concrete, including supplying and fixing formwork.	m ³	1	200.00	200.00
4	Supply, bend and fix 16mm dia. deformed steel reinforced bars in division box.	kg	580	1.50	870.00
5	Supply and fix check gate (steel plate 400mm x 400mm with handle, 3mm thickness).	Unit	6	1,342.00	8,052.00
6	Transport from HUMES (Suva) 0.30m dia x 2.44m long concrete pipes and fix in position.	Nos.	12	85.00	1,020.00
7	Supply, place and compact 25 MPa concrete in division box, including supplying and fixing formwork.	m ³	11	250.00	2,750.00
8	Supply 0.10m nominal size stones and form cement grouted rip rap.	m ²	9	20.00	180.00
9	Supply, spread and compact approved soil backfill in structure.	m ³	80	4.00	320.00
BILL NO.2 TOTAL					14,070.36

BILL NO.3 STRUCTURE / FARM INLET (TYPE A) : 9 NOS.
 FARM INLET (TYPE B) : 24 NOS.
 FARM OUTLET (TYPE B) : 33 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	210	4.00	840.00
2	Supply, place and compact gravel in position	m ³	40	19.59	783.60
3	Supply, bend and fix 16mm dia. deformed steel reinforced bars in division box.	kg	340	1.50	510.00
4	Transport from HUMES (Suva) 0.10m dia x 1.22m long concrete pipes and fix in position.	Unit	234	12.50	2,925.00
5	Supply, place and compact 25 MPa concrete in position including supplying and fixing formwork.	m ³	7	250.00	1,750.00
6	Supply, spread and compact approved soil backfill in structure.	m ³	80	4.00	320.00
BILL NO.3 TOTAL					7,128.60

BILL NO.4 STRUCTURE / ACCESS CULVERT (TYPE A) : 6 NOS.
ACCESS ROAD (TYPE A) : 4 NOS.
ACCESS CULVERT (TYPE B) : 5 NOS.
ACCESS ROAD (TYPE B) : 9 NOS.
ACCESS CULVERT (TYPE C) : 4 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Supply, place and compact gravel in position.	m ³	12	19.59	235.08
2	Supply, place and compact 15 MPa concrete on the gravel in position as based concrete, including supplying and fixing formwork.	m ³	2	200.00	400.00
3	Supply, bend and fix 16mm dia. deformed steel reinforced bars in position.	kg	1,100	1.50	1,650.00
4	Transport from HJMES (Suva) 0.30m dia x 2.44m long concrete pipes and fix in position.	Unit	25	85.00	2,125.00
5	Supply, place and compact 25 MPa concrete in position, including supplying and fixing formwork.	m ³	30	250.00	7,500.00
6	Supply 0.10m nominal size stones and form cement grouted rip rap.	m ²	24	20.00	480.00
7	Supply, spread and compact approved soil backfill in structure.	m ³	60	4.00	240.00
8	Supply, spread and compact approved soil embankment in position	m ³	30	1.46	43.80
BILL NO.4 TOTAL					12,673.88

BILL NO.5 STRUCTURE / DRAIN ACCESS CULVERT : 4 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q' TY	RATE	AMOUNT
1	Excavate for structures and stockpile	m ³	30	4.00	120.00 -
2	Supply, place and compact gravel in position.	m ³	5	19.59	97.95 -
3	Transport from HUMES (Suva) 0.60m dia x 2.44m long concrete pipes and fix in position.	Unit	16	160.00	2,560.00 -
BILL NO.5 TOTAL					2,777.95

BILL NO.6 STRUCTURE / DRAIN ACCESS CULVERT (TYPE B) : 4 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	25	4.00	100.00
2	Supply and install 0.20m dia x 2.00m long wooden pile in position.	Unit	24	9.95	238.8
3	Supply, place and compact gravel in position	m ³	4	19.59	78.36
4	Supply, place and compact 15 MPa concrete in position as based concrete, including supplying and fixing formwork.	m ³	2	200.00	400.00
5	Supply, bend and fix 16mm dia. deformed steel reinforced bars in position.	kg	1120	1.50	1,680.00
6	Supply, place and compact 25 MPa concrete in position, including supplying and fixing formwork.	m ³	20	250.00	5,000.00
7	Supply 0.10m nominal size stones and form cement grouted rip rap.	m ²	60	20.00	1,200.00
BILL NO.6 TOTAL					8,697.16

The Pilot Infrastructure Improvement Works for

The Improvement of Rice Cultivation Technology Project

Bill of Quantities (NAVUA PROJECT)

Summary

BILL NO.1	.....	\$	<u>114,874.⁶⁰</u>	
BILL NO.2	.....	\$	<u>14,070.³⁶</u>	
BILL NO.3	.....	\$	<u>7,128.⁶⁰</u>	
BILL NO.4	.....	\$	<u>12,673.⁸⁸</u>	
BILL NO.5	.....	\$	<u>2,777.⁹⁵</u>	
BILL NO.6	.....	\$	<u>8,697.¹⁶</u>	
Sub Total	\$		<u>160,222.⁵⁵</u>	} 176,244. ⁸
10% Contingency	\$		<u>16,022.²⁵</u>	
Total	\$		<u>176,200.⁰⁰</u>	(Round off)

Dollars _____

Place : _____

Date : _____

Signed

BILL OF QUANTITIES (NAUSORI PROJCT)

BILL NO.1	EARTHWORKS IN FIELD / CANAL / ROADS	
BILL NO.2	STRUCTURE / CHECK STRUCTURE	: 2 NOS.
BILL NO.3	STRUCTURE / FARM OUTLET (TYPE B)	: 26 NOS.
	FARM OUTLET (TYPE A)	: 1 NOS.
BILL NO.4	STRUCTURE / ACCESS ROAD (TYPE A)	: 12 NOS
	ACCESS ROAD (TYPE B)	: 3 NOS.
BILL NO.5	STRUCTURE / DRAIN ACCESS CULVERT (TYPE A)	: 3 NOS.
BILL NO.6	STRUCTURE / DRAIN ACCESS CULVERT (TYPE B)	: 3 NOS.

BILL NO.1 EARTHEWORKS IN FIELD/CANAL/ROADS

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Cut and fill to achieve designed field elevation level, max. cutting depth will be 0.10m and average earth-moving per ha will be 500 m ³ . Filling operation to be in layers not exceeding 0.10m thickness and track rolled compacted to the satisfaction of the Engineer.	ha	13	1,500	19,500
2	Push, compact (track rolled) and trim soil, from field levelling operations, or spoils from drainage excavation, to form field bund to specification DR.23 (Typical Sec. BUND).	m	2,700	2.17	5,859.00
3	Push, compact (track rolled) and trim approved soil from field levelling operation to form canalpad or farm road.	m	3,200	4.65	14,880.00
4	Supply spread and compact and trim gravel for road pavement to a compacted thickness of 0.15m.	m ³	760	16.80	12,768.00
5	Set out and clear in canal areas of all rubbish and bushes in southern area.	m ²	6,400	1.00	6,400.00
6.	Excavate to drain profile and throw spoils alongside the drain.	m ³	4,800	2.97	14,256.00
BILL NO.1 TOTAL					73,663.00

BILL NO.2 STRUCTURE / CHECK STRUCTURE : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	24	3.00	72.00 -
2	Supply, place and compact gravel in position. position.	m ³	3	19.59	58.77 -
3	Supply, place and compact 15 MPa concrete in position as based concrete, including supplying and fixing formwork.	m ³	1	200.0	200.00 -
4	Supply, bend and fix 16mm dia. deformed steel reinforced bars in position.	kg	1,100	1.50	1,650.00 -
5	Supply and fix stop gate-(steel plate 800mm x 800mm, 3mm plate thickness) with spindle and handle in position.	Unit	2	3,434.0	6,868.00 -
6	Supply, place and compact 25 MPa concrete in position, including supplying and fixing formwork.	m ³	20	250.0	5,000.00 -
BILL NO.2 TOTAL					13,848. ²⁷ -

BILL NO.3 STRUCTURE / FARM OUTLET (TYPE B) : 26 NOS.

FARM OUTLET (TYPE C) : 1 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	110	4.0	440.00
2	Supply, place and compact gravel in position.	m ³	14	19.59	274.26
3	Supply, bend and fix 16mm dia. deformed steel reinforced bars in division box.	kg	165	1.50	247.50
4	Transport from HUMES (Suva) 0.15m dia x 1.22m long concrete pipes and fix in position.	Unit	166	20.0	3,320.0
5	Supply, place and compact 25 MPa concrete in pipe portion, including supplying and fixing formwork.	m ³	3	250.0	750.0
6	Supply, spread and compact approved soil backfill in structure.	m ³	35	4.0	140.0
BILL NO.3 TOTAL					5,171.76

BILL NO.4 STRUCTURE / ACCESS ROAD (TYPE A) : 12 NOS.

ACCESS ROAD (TYPE B) : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q' TY	RATE	AMOUNT
1	Supply, spread and compact approved soil embankment in position	m ³	25	4.00	100.00
	BILL NO.4 TOTAL				100.00

BILL NO.5 STRUCTURE / DRAIN ACCESS CULVERT (TYPE A) : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q' TY	RATE	AMOUNT
1	Excavate for structures and stockpile	m ³	25	4.00	100.00 -
2	Supply, place and compact gravel in position.	m ³	4	19.59	78.36 -
3	Transport from HUMES (Suva) 0.60m dia. x 2.44m long concrete pipes and fix in position.	Unit	12	160.0	1,920.0
BILL NO.5 TOTAL					2,098.36 -

BILL NO.6 STRUCTURE / DRAIN ACCESS CULVERT (TYPE B) : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q' TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	25	4.00	100.00
2	Supply and install 0.20m dia x 2.00m long wooden pile in position.	Unit	24	9.95	238.80
3	Supply, place and compact gravel in position.	m ³	4	19.59	78.36
4	Supply, place and compact 15 MPa concrete in position as based concrete, including supplying and fixing formwork.	m ³	2	200.0	400.00
5	Supply, bend and fix 16mm dia. deformed steel reinforced bars in position.	kg	1120	1.50	1,680.0
6	Supply, place and compact 25 MPa concrete in position, including supplying and fixing formwork.	m ³	20	250.0	5,000.0
7	Supply 0.10m nominal size stones and form cement grouted rip rap.	m ³	60	20.0	1,200.0
BILL NO.6 TOTAL					8,697.16

The Pilot Infrastructure Improvement Works for

The Improvement of Rice Cultivation Technology Project

Bill of Quantities (NAUSORI PROJECT)

Summary

BILL NO.1	.....	\$	<u>73,663.⁰⁰</u>
BILL NO.2	.....	\$	<u>13,848.⁷⁷</u>
BILL NO.3	.....	\$	<u>5,171.⁷⁶</u>
BILL NO.4	.....	\$	<u>100.⁰⁰</u>
BILL NO.5	.....	\$	<u>2,098.³⁶</u>
BILL NO.6	.....	\$	<u>8,697.¹⁶</u>

Sub Total	\$	<u>103,579.⁰⁵</u>	
10% Contingency	\$	<u>10,357.⁹⁰</u>	
Total	\$	<u>113,900</u>	(Round off)

Dollars _____

Place : _____

Date : _____

Signed

添付資料 7-1-2 指名通知

業者への指名通知書
(計 4社に通知)

23 August, 1988.

Grayburn Construction Ltd.,
Lot 23 Wailada Sub-Division,
SUVA.
Phone 362666.

Dear Sir,

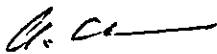
Re : Invitation to Bid for the Pilot Infrastructure
Improvement Works on the Improvement of Rice
Cultivation Technology Project

Japan International Cooperation Agency (JICA) Suva Office hereby invites bids for the above-mentioned project which is situated in Navua and Nausori. The project has a total area of 16.4 ha in Navua and 14.3 ha in Nausori.

Bids document shall be available for JICA, Suva Office on August 25, 1988. at 10 o'clock a.m.

If interested, please make every effort to attend on the above-mentioned date and time.

Thank you.



Mr. Yoshio YOSHIDA
RESIDENT REPRESENTATIVE of JICA
Suva Office

現場説明会(入札書類配布)出席者リスト

添付資料 7-1-3 入札書類取得業者(3社)

DATE: Aug. 25 '88

ATTENDANT SHEET

ATTENDANT	COMPANY	TITLE
AJAY NARAYAN SINGH	GLAYBURN M'CONNELL DOWELL CONSTRUCTION LTD	CONSTRUCTION MANAGER. FIJI.
GOPAL - PILLAY	CONSTRUCTION EQUIPMENT HIRE LTD	DIRECTOR
VISHNU PRASAD VICTOR VISWANATHAN	BURGESS (FIJI) LTD	DIRECTOR MANAGER.
(注) 参加予定であった D. Narayan Industries Ltd. は 辞退した。		

入札金額比較表

Sept. 2 '88

添付資料 7-1-4 入札結果 (応札3社)

COMPARISON OF ESTIMATION COST
(Unit : F\$)

	<u>Grayburn Construction</u>	<u>Construction Equipment</u>	<u>Burgess (Fiji) Ltd.</u>	<u>ENGINEER'S (JICA)</u>
<u>NAVUA PROJECT</u>				
BILL NO.1	149,502. ⁰⁰	101,197. ⁰⁰	181,912. ⁰⁰	114,874.60
BILL NO.2	9,598. ²⁰	7,916. ⁰⁰	7,745. ⁰⁰	14,070.36
BILL NO.3	33,205. ⁹⁰	9,340. ⁰⁰	21,395. ⁰⁰	7,128.60
BILL NO.4	15,079. ²⁰	13,377. ⁵⁰	13,845. ⁰⁰	12,673.88
BILL NO.5	4,287. ⁷⁵	1,040. ⁰⁰	5,475. ⁰⁰	2,777.95
BILL NO.6	9,089. ⁸⁵	10,726. ⁵⁰	9,220. ⁰⁰	8,697.16
SUB TOTAL	220,762. ⁹⁰	143,597. ⁰⁰	239,592. ⁰⁰	160,222.55
CONTINGENCY (10%)	22,076. ²⁹	14,359. ⁷⁰	23,959. ⁰⁰	16,022.25
TOTAL (Round Off)	242,839. ¹⁹	157,956. ⁷⁰	263,551. ⁰⁰	176,200.00
<u>NAUSORI PROJECT</u>				
BILL NO.1	106,498. ⁰⁰	71,660. ⁰⁰	106,385. ⁰⁰	73,663.00
BILL NO.2	9,367. ¹⁵	9,862. ⁰⁰	7,308. ⁰⁰	13,848.77
BILL NO.3	24,834. ⁰⁵	5,437. ⁵⁰	16,687. ⁵⁰	5,171.76
BILL NO.4	65. ⁰⁰	250. ⁰⁰	100. ⁰⁰	100.00
BILL NO.5	3,224. ⁶⁵	802. ⁵⁰	4,130. ⁰⁰	2,098.36
BILL NO.6	9,089. ⁸⁵	10,726. ⁵⁰	9,182. ⁰⁰	8,697.16
SUB TOTAL	153,078. ⁷⁰	98,738. ⁵⁰	143,793. ⁰⁰	103,579.05
CONTINGENCY (10%)	15,307. ⁸⁷	9,873. ⁸⁵	14,379. ⁰⁰	10,357.90
TOTAL (Round Off)	168,386. ⁵⁷	108,612. ³⁵	158,172. ⁰⁰	113,900.00
GRAND TOTAL	411,225. ⁷⁶ (1.42)	266,569. ⁰⁰ (0.92)	421,723. ⁰⁰ (1.45)	290,100.00 (1.00)
PRIORITY	2	1	3	

OTHERS

工期延長 (127A)
希望

契約後3日以内
に着手可

添付資料 7-1-5 契約業者決定通知

Project Engineer F/E

Ref. No : PIIW-1

5 September, 1988

Construction Equipment Hire Ltd.,
4 Lest Street,
Wailada,
LAMI.

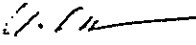
Dear Sir,

RE: THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS FOR THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

I refer to your tender for the above-mentioned in the sum of F\$ 266,569.00 and advise of its acceptance by Japan International Cooperation Agency (JICA).

Please liaise with my Engineer (JICA), LIC1 Building, Butt Street, Suva, for the signing of the formal Agreement and attending to other matters pertaining to this Contract.

Thank you.


Mr. Yoshio YOSHIDA.
Resident Representative of JICA.
Fiji Office.



cc : Project Engineer (JICA)
Acting Principal Engineer (Drainage & Irrigation)

THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

CONTENTS

<u>PAGES</u>	
2-3	Instructions for Tendering
4-5	Description of Works
6-7	Form of Agreement
8-9	Form of Bond
	Conditions of Contract (International) 2nd edition (Part I) (Bound separately)
10-22	Conditions of Contract (Part II) Conditions of Particular Application
23-24	Form of Tender
25-26	Appendix 'A' and 'B'
27-79	Specifications for Engineering Works (Part III)
80-98	Schedule of Quantities

JAPAN INTERNATIONAL COOPERATION AGENCY

Caru



JAPAN INTERNATIONAL COOPERATION AGENCY

INSTRUCTIONS FOR TENDERING

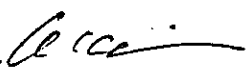
1. The Tenderer is to complete the annexed Tender, the Bill of Quantities and the Schedule appended with the whole of the prices and information called for thereon and is to sign and date each of the Documents in the spaces provided for the purpose. The rates and prices must be shown both in writing and in numerals wherever so required in the Tender Documents. The Bill of Quantities must be priced and totalled in ink with no blank spaces left; every item must be either priced or provided with a reference to the other item or items, thereof under which the cost has been included. No unauthorised alterations or additions are to be made to the Form of Tender, to the Bill of Quantities, or to any other of the Contract Documents. If any such additions or alterations is made, or if the Bill of Quantities is not properly completed, or these instructions are not fully complied with, the tender will be rejected.
2. The rates and prices entered against each item in the Bill of Quantities are to be the full inclusive value of the finished work for that particular item, and are to cover profit and all obligations of every kind borne by the Contractor under the terms of the contract.
3. The quantities set out in the Bill of Quantities are estimates only and their accuracy will in no way affect the validity of the contract based thereon. The rates, prices and totals are required for the comparison of tenders received and will not necessarily represent the sum paid to the Contractor for the execution of the work. The actual sum paid will be determined by measuring the work executed in accordance with the Contract and valuing it at the rates or prices inserted by the Contractor in the Bill of Quantities.
4. The Contractor whose tender is accepted will be required to enter into an Agreement as set out in the appended Form of Agreement.
5. The Contractor whose tender is accepted will also be required to enter into a Bond in the sum specified in the Form of Tender/Appendix A for the due performance of the Contract.



6. If when called upon the Tenderer fails, neglects or refuses to execute Contract Agreement and Bond within fourteen days after being required to do so in writing by the Employer and the Contractor will have no claim against the Employer in respect of such acceptance and withdrawal.
7. The Tenderer should visit the site and obtain for himself on his own responsibility and at his own expense all information which may be necessary for him to complete the Tender Documents and enter into a Contract.
8. The Tender Documents are to be accompanied by a programme showing the Tenderer's proposal for carrying out the works in the time intered in the Appendix A to the Form of Tender.
9. The Employer reserves the right to reject to any tender without disclosing his reasons and does not bind himself to accept the lowest or any tender.
10. Tender should be sent by resistered post, recorded delivery service or delivered by hand in a plain sealed envelope, with no indication of the identity of the Tenderer thereon, clearly marked "Tender for THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS FOR THE IMPROVEMENT OFRICE CULTIVATION TECHNOLOGY PROJECT" and addressed to:

Mr. Yoshio YOSHIDA
Resident Presentative
Fiji Office
Japan Iternational Cooperation Agency
Dominion House
SUVA

to arrive not later than 16:00 on Tuesday, 31 August 1988.



DESCRIPTION OF PROJECT AREA AND WORKS

The job sites are situated in two provinces, one is Navua project in Serva province and another is Nausori project is in Thailevu province.

Both works are construction of the Pilot Rice Field that are land levelling, irrigation/drainage canal, farm roads and relative structures works.

The quantity of main works above mentioned two projects are as follow;

1) Navua project (Irrigated Rice Field)

1. Land Consolidation Works	16.4 ha
2. Irrigation canal Works	1,050m
3. Drainage canal Works	1,500m
4. Farm Roads Works	1,810m
5. Relative Structure	1 L.S.

2) Nausori project (Rainfed Rice Field)

1. Land Consolidation Works	14.3 ha
2. Drainage canal Works	1,880m
3. Farm Roads Works	1,670m
4. Relative Structure	1 L.S.

Acc



LOCATION MAP

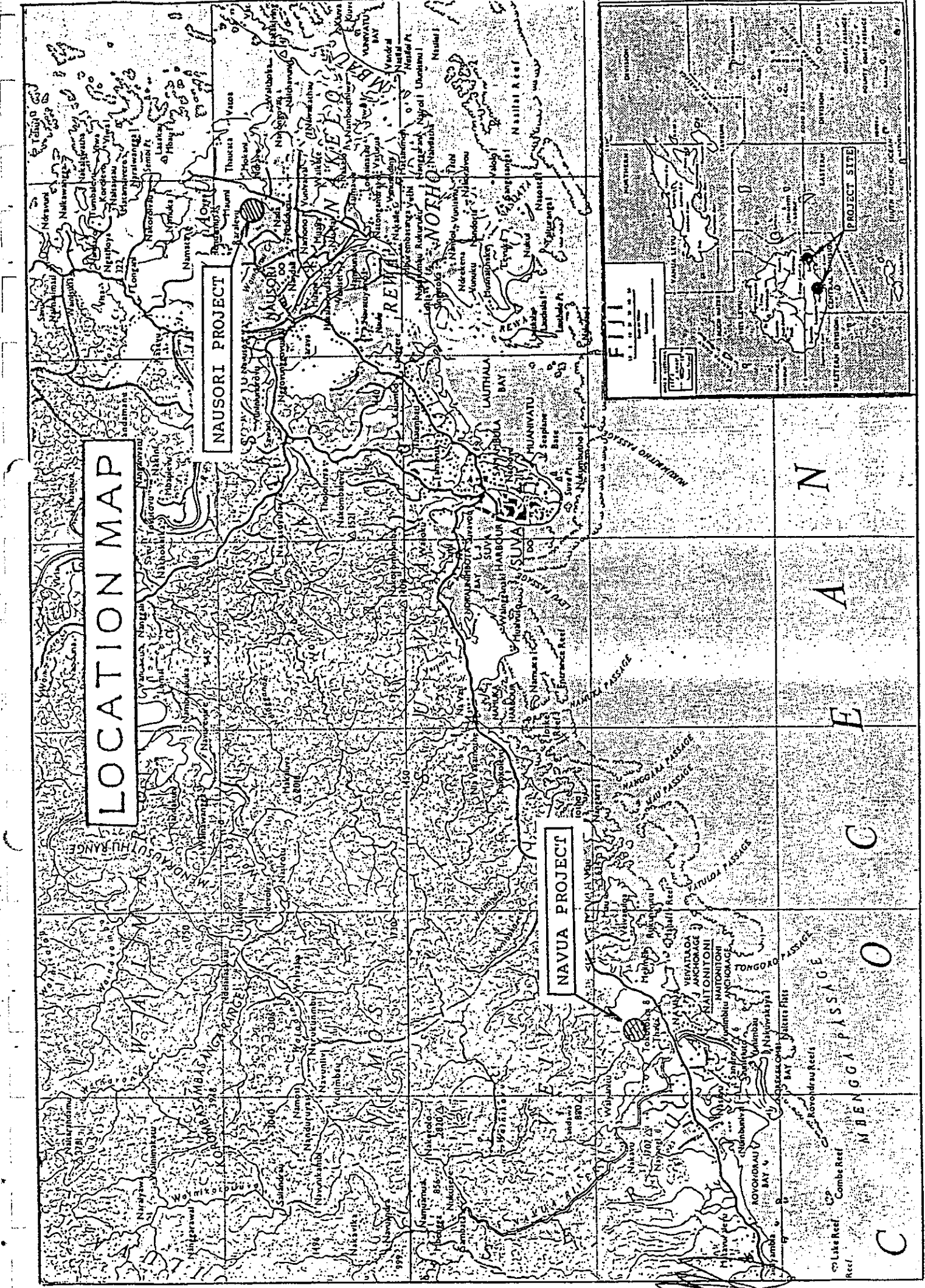
NAUSORI PROJECT

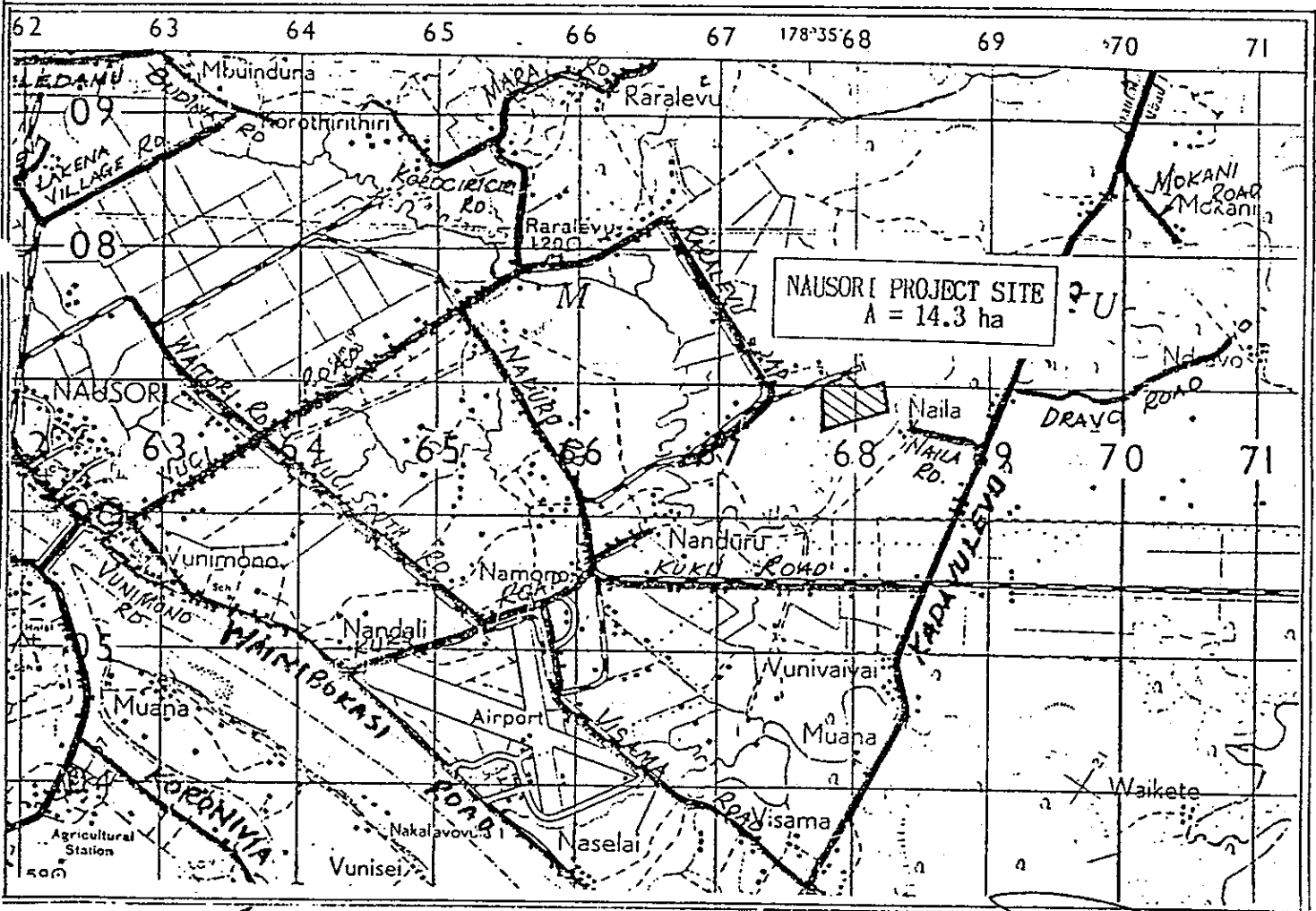
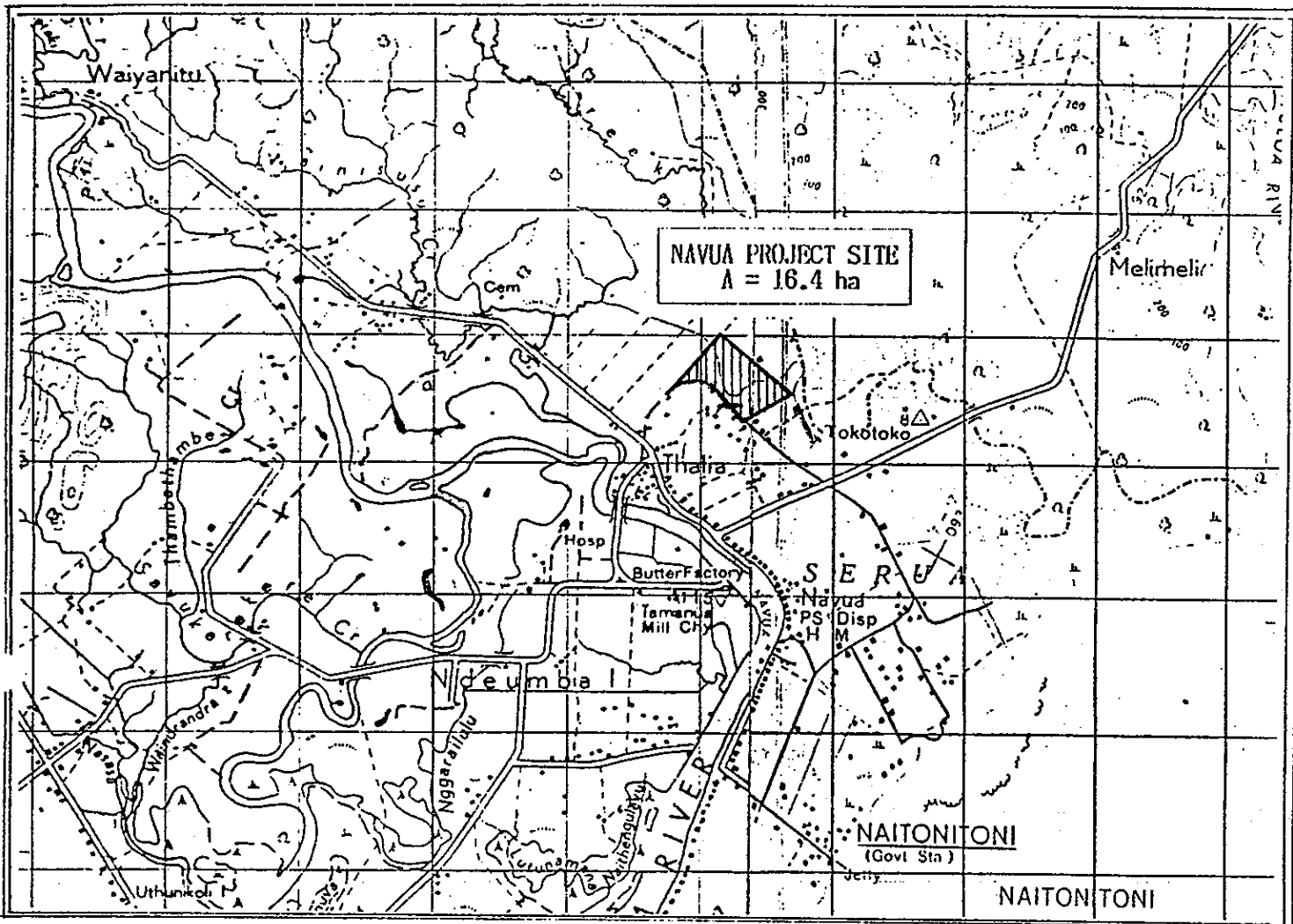
NAVUA PROJECT

Fiji

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FORM OF AGREEMENT

THIS AGREEMENT is made entered into this 9th day of September 1988 at the JICA Suva Office between Japan International Cooperation Agency, Fiji Office by YOSHIO YOSHIDA, Title Resident Representative as its authorized representative of the Fiji Office, hereinafter called "The JICA" of the one part, and CONSTRUCTION EQUIPMENT (HRE LTD) whose office is situated at WAILADA LAMI P.O. BOX 13831 SUVA Represented by GOPAL PILLAY, Title DIRECTOR hereinafter called "The Contractor" of the other part WHEREAS The JICA is desirous that certain Works should be constructed, viz: The Pilot Infrastructure Improvement Works for The Improvement of Rice Cultivation Technology Project and has accepted a Tender by the Contractor for the construction and completion and maintenance of such Works.

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:-

1. In this Agreement words and expressions shall have the same meaning as are assigned to them in the Conditions of Contract hereinafter referred to.
2. The following Documents shall be deemed to form and be read and constructed as part of this Agreement viz:
 - (a) The said Tender
 - (b) The Drawings
 - (c) The Conditions of Contract (International) for Works of Civil Engineering Construction - 2nd Edition, including Part II as appended hereto
 - (d) The Specifications
 - (e) The Bill of Quantities

3. In consideration of the payments to be made by the JICA to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the JICA to construct complete and maintain the works in conformity in all respects with the provisions of the contract.

4. The JICA hereby covenants to pay the Contractor in consideration of the construction, completion and maintenance of the Works, the Contract Price at the times and in the manner prescribed in the Contract.

AS WITNESS the hands of the parties hereto the day and year above written.

Signed by GOPAL-PILLAY



on behalf of the Contractor

CONSTRUCTION EQUIPMENT HIRE LTD

in the capacity of

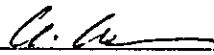
DIRECTOR

in the presence of

(R. SAKANASHI) Sakanaishi

AND

Signed by



on behalf of ~~the~~ JICA

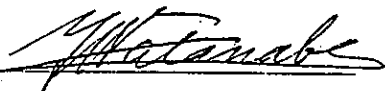
Japan International Cooperation Agency

in the capacity of

The Resident Representative

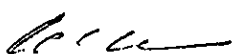
in the presence of

Yutaka WATANABE



Signed by Witness

P. SIVAN Sivran



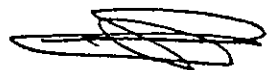
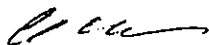
JAPAN INTERNATIONAL COOPERATION AGENCY
CONTRACT FOR THE PILOT INFRASTRUCTURE IMPROVEMENT WORK
ON THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

FORM OF BOND

BY THIS BOND _____ whose registered office is at _____ (hereinafter called "The Contractor") and _____ whose office is at _____ (hereinafter called "The Surety") are held and firmly bound unto _____ Resident Representative of JICA Suva office (hereinafter called "The Employer") in the sum of _____ for the payment of which sum the Contractor and the Surety bind themselves their successors and assigns jointly and severally by these presents.

WHEREAS the Contractor by an agreement made between the Employer of the one part and the Contractor of the other part has entered into a contract (hereinafter called "the said Contract") for the therein mentioned and in conformity with the provisions of the said Contract.

NOW THE CONDITION of the above-written Bond is such that if the Contractor shall duly perform and observe all the terms, provisions, conditions and stipulations of the said Contract on the Contractor's part to be performed and observed according to the true purport and meaning thereof or if on default by the Contractor the Surety shall satisfy and discharge any damages sustained by the Employer up to the amount of the above written Bond then this obligation shall be null and void but otherwise shall be and remain in full force and affect but no alterations in terms of the said Contract made by agreement between the Employer and the Contractor or in the extent or nature of the Works and no allowance of time by the Employer or the Engineer under the said



Contract nor any forbearance of forgiveness in or in respect of any matter or thing concerning the said Contract on the part of the Employer or the Engineer shall in any way release the Surety from any liability under the above-written Bond.

AS WITNESS WHEREOF the hands of the parties hereto this _____ day of _____ 1988.

(Contractor)

By _____

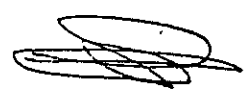

Capacity _____

In the presense of _____

(Surety)

Capacity _____

In the presense of _____



GOVERNMENT OF FIJI
MINISTRY OF PRIMARY INDUSTRIES

GENERAL CONDITIONS OF CONTRACT

The Conditions of Contract shall be the Part I - General Conditions incorporated in the Conditions of Contract (International) for Works of Civil Engineering Construction (Second Edition: July 1969) prepared by the Federation Internationale des Ingenieurs- Conseils (F.I.D.I.C.) jointly with the Federation Internationale Des Entrepreneurs Europeens de Batinent et des Travaux Publics (F.I.E.E.B.T.P.) as modified and supplemented by the Part II - Conditions of Particular Application set out below:-

PART II-CONDITIONS OF PARTICULAR APPLICATION

Variations to Part I - General Conditions

Index of Amended and Additional Clauses

Part I

Clauses No.

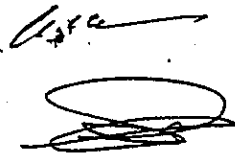
1	Definitions
2	Duties and Powers of Engineers's Representative
4	Assignment and Sub-Letting
6	Language
10	Performance Bond
11	Inspection of Site
15	Contractor's Superintendence
16	Contractor's Employees
21	Insurance of Works etc.
34	Conditions of Employment of Labour
35	Returns of Labour
60	Certificate and Payments
67	Settlement of Disputes - Arbitration
70	Increase or Decrease of Costs

DEFINITIONS AND INTERPRETATIONS

1. Paragraphs (a) and (c) are to read as follows:

Definitions

- a) "Employer" is the ^{Resident Representative of JICA Fiji office} ~~Permanent Secretary for Works and Transport of the Government of Fiji.~~
- c) "Engineer" is the ^{nominated Engineer by JICA.} ~~Principal Engineer of the Drainage and Irrigation Division, Ministry of Primary Industries, of the Government of Fiji~~

Use


ENGINEER'S REPRESENTATIVE

2. The following paragraphs are to be added :-

Duties and Powers of Engineer's Representative

- (a) "The Engineer or the Engineer's Representative may appoint any number of persons to assist the Engineer's Representative in the exercise of his functions as set out in the first paragraph of this Clause. He is to notify the Contractor the names and functions of such persons. The said assistants will have no power to issue any instructions to the Contractor save in so far as such instructions may be necessary to enable them to discharge their functions and to secure their acceptance of materials and workmanship as being in accordance with the Specification and Drawings and any instructions given by them for those purposes will be deemed as having been given by the Engineer's Representative".

ASSIGNMENT AND SUB-LETTING

4. In line 2 after the words "... shall not sub-let any part of the works" the following words are to be added:

Sub-Letting

"without submitting for the Engineer's scrutiny and approval full details of all proposed sub-contractors and"...



U U

CONTRACT DOCUMENTS

Clause 6(1) is to be deleted, and the following substituted Language

- 6(1) "The language in which the Contract Documents shall be drawn shall be in English only."

GENERAL OBLIGATIONS

10. The Clause 10 is deleted and the following substituted Performance Bond

"At the date of commencement of the works the Contractor is to furnish a Performance Bond or Bank Guarantee for the due performance of the Contract in an amount equal to 10 per cent of the total sum and shall be the guarantee of an Insurance Company or Bank, for the due performance of the contract. The terms of the Said Bond or Guarantee are to be approved by the Employer and the obtaining of such Bond or Guarantee, together with all costs thereof, are to be at the expense of the contractor."

11. The Clause 11 is deleted and the following substituted: Inspection of Site

"The Contractor will be deemed to have inspected and examined the site and its surroundings and to have satisfied himself before submitting his tender as to the nature of the ground and subsoil (as far as is practicable and having taken into account any information in connection therewith which may have been provided by or on behalf of the Employer) the general conditions at the site regarding flow of water in drainage channels and natural water-courses possible infiltration of water to the excavations and the possibilities of flooding from natural or other sources the extent and nature of the work and materials necessary for the completion of the Works the means of communication with and access to site the accommodation he may require and in general shall himself obtain all necessary information as to risks contingencies and other circumstances which may influence or affect his tender."

15. In the fourth line after the word:
"...representative" the words "...able to
read and write and speak English fluently and
..." are to be inserted.

Contractor's
Superintendence

16. The following is to be added after paragraph
(b):

Contractor's
Employees

"All supervisory staff down to and including
foreman level shall have a reasonable command
of the English "language".

21. The words "...during the period of
construction of the works..." in lines 4 and
5 are deleted and the following substituted:-

Insurance of
Works etc.

"... from the commencement of the Works until
the Certificate of Completion for the whole of
the works has been issued by the Engineer".

LABOUR

34(9) The following sub-paragraphs are to be
added:-

Conditions of
Employment of
Labour

(a) "The Contractor and every sub-contractor
employed under Clause 4 shall in respect
of all persons employed on the Site and
in every factory, workshop or place used
for the execution of the Contract
(except as provided for in Clause 31)
observe the provisions of the Wages
Regulations (Building and Civil and
Electrical Engineering Trades) Order,
1976 and of every Order amending or
replacing the same whether such Order is
applicable to such persons or not and
shall post notices thereof in accordance
with the provisions of the Wages Councils
Regulations, whether such notices are
required to be posted under the provisions
of Section 13 of the Wages Councils Act,
(Cap.81) or not;

Provided that in the event of any other
Wages Regulations Order being made under
the provisions of the Wages Councils Act
(Cap. 81) or any award being made by a
Tribunal under the provisions of the Trades
Disputes Act. 1973 in respect of any such
person the rate of wages and other
conditions specified in such order or award
shall as regards those persons, be
substituted for the rate of wages and other
conditions specified in the aforesaid
Order.

- (b) No portion of the work to be performed under the contract shall be done at the homes of the work people, except in so far as work is so performed by practice or custom.
- (c) The Contractor, sub-contractor and others employed on the Contract shall recognise the freedom of their work-people to be members of the registered trade unions.
- (d) In the event of default being made, in payment of money in respect of wages of any workman employed on the Contract and if thereafter a claim is filed in the office of the Ministry of Employment and Industrial Relations and proof thereof satisfactory to the Minister of Employment and Industrial Relations is furnished, the said Minister of Employment and Industrial Relations may, failing payment by the Contractor, arrange for the payment of such claim out of the monies at any time payable under the Contract and the amount so paid shall be deemed payment to the Contractor."

35. The present clause is re-designated sub-paragraph (1) and the following sub-paragraph added:

Returns o
Labour

"(2) A return shall be made monthly to the Engineer by the Contractor giving the number of men, rates of wages and hours of labour of the various classes of workmen employed in the execution of the Contract. Separate returns shall be made monthly in respect of each sub-contractor and of each item of work authorised to be sub-let. The Contractor shall also from time to time furnish to the Engineer such further detailed information and evidence as the Engineer may deem necessary in order to satisfy him that the provisions of Clause 36 have been complied with, and the Contractor shall in addition, supply such other information, in respect of labour and materials, construction plant and work carried out as the Engineer may require."

ALTERATIONS, ADDITIONS AND OMISSIONS

Clause 52 (3) is deleted.

CERTIFICATE AND PAYMENTS

Clause 60 is deleted in its entirety and the following substituted :-

- Certificate
and
Payments
- 60 (1) "The Employer will, under the certificate to be issued by the Engineer, cause payment to be made at monthly intervals to the Contractor to the extent of ninety per cent of the estimated value of the permanent works executed. When the work to be executed under the Contract is handed over to the Employer the Contractor shall be paid the approximate amount due under the Contract less fifty per cent of the amount retained. The remainder will be retained for the period of maintenance or until the final claim is agreed if this is not settled within the maintenance period, when the balance remaining due under the Contract will be paid to the Contractor.
- (2) The Contractor shall supply the Engineer with a detailed statement, in quintuplicate of the quantities of work executed, the value of the same and the balance to which he considers he is entitled before the certificate is issued.
- (3) The Engineer may, subject to the accumulation of the retention monies provided for in sub-clause (1) of this Clause, include in the certificate such amounts as he may consider fair and reasonable for any preliminary item, temporary works or construction plant for which separate amounts are provided in the Bill of Quantities.
- (4) The Engineer may also include in the certificates such amounts as he may consider proper on account of basic materials for permanent work supplied by the Contractor and delivered to the site up to but not exceeding fifty per cent in value of the landed or wholesale cost as the case may be :

Provided that no payment shall be made unless adequate and practicable precautions against prospective damage or theft are adopted in respect of the said materials: that the materials so delivered to the site shall not be removed by the contractor or permitted by the Contractor to be removed by others: that the Contractor produce evidence to establish the cost of the materials: that after payment has been so made and before further payment is approved the Contractor satisfied the Engineer that the suppliers account for such materials has been settled:

Provided also that no payment made pursuant to this subclause shall be in anyway construed as an admission that the materials are acceptable for incorporation in the works and not with standing such payments the Engineer and the Employer shall retain intact all their rights of acceptance and rejection under the Contract. Such payments as aforesaid shall be deducted as the Engineer shall see fit from any subsequent certificates.

- (5) The Engineer may also include in the certificates such amounts as he may consider proper on account of articles purchased by the Contractor from nominated suppliers under the provision of Clause 58 (2) and delivered to the site up to but not exceeding ninety per cent in value of the landed or wholesale cost as the case may be subject to the provisos in the preceding sub-clauses and that such articles are stored securely in locked sheds or buildings separately from the other materials.
- (6) For reinforced concrete payment for formwork, reinforcement, and concrete shall be made only after the formwork for a particular bay or section has been struck, the concrete construction approved and the tests have proved satisfactory.
- (7) The Engineer shall have the power to withhold any certificates if the Works or any part thereof are not being carried out to his satisfaction or if any condition of the Contract is not being fulfilled.
- (8) The Engineer may, by any certificate, make correction or modification in any previous certificates which shall have been issued by him.
- (9) Payments upon the Engineer's certificates shall be made within fourteen working days after such certificates have been delivered to the Employer at JICA Fiji Office.
- (10) The Contractor shall not be entitled to payment of monies which would otherwise be payable under the terms of the Contract in respect of the Contract in respect of the work and labour performed in the execution of the Contract unless and until he shall have :-

- (a) submitted the monthly return in accordance with Clause 35(2)
- (b) stated whether any wages of the said work and labour remain in arrears,
- (c) stated that all the labour conditions of the Contract have been complied with,

(11) No certificate other than the final certificate shall be taken as an admission of the due performance of the Contract or any part thereof or of the accuracy of any claim or demand made by the Contractor or of work having been ordered by the Engineer, nor shall any certificates except the final conclude or prejudice any of the powers of the Engineer nor in any way vary or prejudicially affect the Contract.

(12) Notwithstanding any other provision made above, should the sum of all items to be included in any one monthly certificate be less than 5% of the tender sum, then no certificate will be issued for that month. The items contained therein are to be included in the following month's certificate. This sub-clause shall not apply to the final certificate.

(13) No certificate other than the final certificate shall be taken as an admission of the due performance of the Contract and the Bond shall be released only after such certificate has been issued by the Engineer.

SETTLEMENT OF DISPUTES

67. From line 19 to line 22 the words " referred to arbitration as hereinafter provided. All disputes or differences in respect of which the decision (if any) of the Engineer has not become final and binding as aforesaid shall be finally settled under the Rules of Conciliation and Arbitration of the International Chamber of commerce by one or more arbitrators appointed in accordance with the said Rules....." are deleted and the following substituted :-

"referred to the arbitration of a person to be agreed upon between the parties or (if the parties fail to appoint an arbitrator within 30 days of either party serving on the other party a written notice to concur in the appointment of an arbitrator) a person to be appointed on the application of either party by the Court in accordance with the provisions of the Arbitration Act(Cap 30)".

PRICE VARIATIONS

70. (a) The Contract is on a variable basis - Increase
regarding the rates of wages paid to daily paid workmen in Fiji and direct ^{or} Decrease of
"on - costs" attaching thereto only ; Labour costs
such " on costs" to be expressed as a
percentage of wages paid as recorded on
the time sheets and such percentage being
that agreed upon for the time being between
the Fiji Master Builder Association and the
Employer. It is not to be considered so
variable in respect of wages , salaries
and emoluments paid to supervisory and
office staffs and the like wheresoever
employed or to wages of workmen not employed
in Fiji.
- (b) If at any time between ten days before the date
fixed for delivery of the Tender and the date
fixed for completion of the Works:-
- (1) any order is published amending or replacing
the Wages Regulation (Building and Civil and
Electrical Engineering Trades) Order 1976 or
- (11) any other Wages Regulation Order is made
under the provisions of the Wages Council
Act (Cap 81) ;

- (iii) any award is made by a Tribunal under the provisions of the Trade Disputes Act 1973 or
- (iv) any settlement is negotiated in any trade dispute (as defined in the Act) on terms accepted in writing by the employer, resulting in any alteration to the rate of wages applicable to any of the persons, employed on the site or in factory, workshop or place used for the execution of the Contract.

then the Contract Price shall be increased or decreased as the case may be, to cover such alteration:

Provided that:

- i) in the case of an Order or Award that is limited to minimum wage rate, a consequential variation in the wage rates of workmen receiving rates higher than the minimum shall be subject to prior acceptance by the Employer and shall be limited to an amount not exceeding the amount by which the minimum rate is increased or decreased;
 - ii) the basis of any adjustment between the Employer and the Contractor shall be net addition or deduction as the case may be without any increase or decrease of profit by reason of such alteration.
- (c) In the event of an increase or decrease resulting from any of the alterations referred to in the last two preceding paragraphs no adjustment to the Contract Price shall be made until the Contractor shall have:-
- i) certified that the adjustment is a net increase without any addition for profit and that the increased wages have in fact been paid to the workmen employed on the Contract;
 - ii) produced such evidence in support of the adjustment as the Engineer may reasonably require.

- (d) In the event of an increase resulting from any negotiated settlement of a trade dispute no adjustment shall be made until the Contractor has informed the Engineer in writing of the terms of such settlement and they have been accepted by the Employer.
- (e) In the event of a decrease resulting from any of the alterations referred to in paragraph (b) of this Clause the Contractor shall supply the Engineer with such particulars as he may reasonable require for the ascertaining of the amount by which the Contract Price is to be decreased.
- (f) In the event of any alteration in the rates of wages the Contractor shall permit the Engineer's Representative or a public officer to enter the workshops of the Contractor or any factory workshop place where work is carried out for the Contract at all reasonable times for the purpose of checking the number of men working for the Contract and be granted facilities to satisfy himself of the wages being paid.
- (g) If sub-contracts entered into under Clause 59 of these Conditions are not let on a fixed price basis regarding wages then the provisions of this Clause shall apply to such sub-contracts;

Provided that separate statements as required by Clause 35 shall be furnished by the Contractor for each sub-contract.

- (h) No adjustment of the Contract Price resulting from any of the alterations referred to in paragraph (2) of this Clause shall be considered a variation under Clause 52.

70. (2.) (a)

The Contract is on a variable basis regarding Customs Duty and Port and Customs Service Tax on materials and goods required for the permanent incorporation which are not held by the Contractor at the date of his Tender and which are capable of being delivered direct to an fabricated on the site or delivered to the site already fabricated by others. If between ten days before the delivery of the Tender and the date fixed for completion of the Works alterations occur in the said Duty and or Tax affecting the said materials and goods, the Contract Price shall be increased or decreased by the net difference paid by the Contractor between the old and ne Duty and/or Tax.

Customs
Duty and
Port and
Customs
Service
Tax

- (b) In the case of directly imported materials and goods the landed cost on which the said Duty and/or Tax is charged may include buying commission in the country of origin if independent persons or firms are actually employed.
- (c) The Contractor shall inform the Engineer as soon as possible of any alterations in the said Duty and/or Tax, keep such records as are necessary and shall provide the Engineer with such evidence as the Engineer may reasonably require to verify such alterations and the quantities and/or costs of the materials and goods affected. In the case of materials and goods obtained locally, the Contractor shall ensure that the suppliers furnish him with such evidence, quantities and costs.
- (d) Any additions or deductions due to the said alterations shall be met without any addition or deduction for profit. They shall not be considered a variation under Clause 52. The adjustment of the Contract Price due to the said alterations shall be made on completion of the Contract.
- (e) If sub-contracts entered into under Clause 59 are not on a fixed price basis regarding the said Duty and/or Tax, the provisions contained in the proceeding paragraphs of this Clause shall be incorporated in such sub-contracts.

70 (3.) (a) The Contract is on a variable basis regarding Materials certain materials and the Contractor shall attach a list to the Form of Tender of those materials and goods required for permanent incorporation individually constituting in value and important element in the Contract Price (hereinafter referred to as "Basic Materials") which are not held by the Contractor at the date of his Tender but which are capable of being delivered direct to and fabricated on the site, or delivered to the site already fabricated by other and for which he cannot obtain fixed price quotations and to which he wishes this Clause to apply. He shall give the net unit landed costs (if he intends to import the materials direct) or the net competitive wholesale price (if he intends to purchase wholesale through merchants) on which Tender is based; the approximate quantities he will have to purchase for the Contract; the name of the supplying merchant (where applicable) and the countries of origin:

cc

- (b) The items to be included under this Clause and their costs shall be approved by the Engineer before the Contract is signed and detailed proof must be furnished to the Engineer before he approves the inclusion of any item under this Clause that the costs inserted by the Contractor stated in the past preceding paragraph; the cost of directly imported materials may include reasonable buying commission in the country of origin and a reasonably independent agent's fee in the country from which the indent emanates if these are intended to be employed.
- (c) The costs inserted by the Contractor and approved by the Engineer are hereinafter referred as the "basic prices". After receipt of the tender no further items may be added unless variations introduce new materials on a major scale or bring minor materials into the major class when approved items may be added on the basis set out above.
- (d) The final cost of an item shall be ascertained on the same basis as that set out in paragraph (2) of this Clause: buying commissions and agent's fee will only be included in the final cost of directly imported items if independent persons or firms are actually employed. After his Tender has been accepted the method of purchasing basic materials shall not be altered by the Contractor from that on which his Tender was based without the written consent of the Engineer which will not be given if extra expense to the Employer is incurred, unless due to some extraordinary happening outside the control of the Contractor.

FORM OF TENDER

NOTES : The appendices form part of the Tender. Tenderers are required to fill all blank spaces in this Tender Form and Appendix 'A', and complete Appendix 'B'.

To : Resident Presentative, Japan International Cooperation Agency

Dear Sir,

1. Having examined the Drawings, Conditions of Contract, Specification and Bill of Quantities for the construction of The Pilot Infrastructure Improvement Works for The Improvement of Rice Cultivation Technology Project Contract, we, the undersigned, offer to construct, complete and maintain the whole of the works comprised in the said The Pilot Infrastructure Improvement Works for The Improvement of Rice Cultivation Technology Project Contract in conformity with the said Drawings, Conditions of Contract, Specification and Bill of Quantities for the sum of:

TWO HUNDREDS SIXTY SIX THOUSANDS FIVE HUNDREDS
SIXTY NINE DOLLARS. (F\$ 266,569 - 00.)

or such other sum as may be ascertained in accordance with the said Conditions.

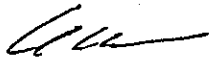
2. We undertake if our Tender is accepted to commence works within fourteen days of receipt of the Engineer's order to commence, and to complete and deliver the whole of the works comprised in the Contract within ninety days calculated from the last day of the aforesaid period in which the Works are to be commenced. The term "days" in this Tender means "calendar days" unless specified otherwise.

3. If our tender is accepted we will obtain either the guarantee of an insurance company or a Bank (to be approved by you) to be jointly and severally bound with us in a sum not exceeding 10 per cent of the above named sum or furnish a Performance Bond in an amount equal to 10 percent of the above named sum for the due performance of the contract.

4. We agree to abide by this Tender for the period of ninety days from the date fixed for receiving the same and it shall remain binding on us and may be accepted at any time before the expiration of that period.

5. Unless and until a formal Agreement is prepared and executed this Tender, together with your written acceptance thereof shall constitute a binding contract between us.

6. We understand that the quantities set out in the Bill of Quantities are ~~only estimates~~ and their accuracy will in no way affect the validity of the Tender of the Contract based thereon. The actual sum paid will be determined by measuring the works executed in accordance with the contract and valuing it at the rates and prices inserted in the Bill of Quantities.
7. We understand that you are not bound to accept the lowest or any tender you may receive, and will not refund any costs incurred by the Tenderer in the preparation and submission of the Tender.
8. If our tender is accepted then in order to prepare a formal Agreement for the execution of this tender, we will provide insurance cover including cyclone cover over the construction and maintenance period for the sum of the contract for the construction period plus the maintenance period and a \$250,000 public liability insurance for the construction period.



Appendix 'A'

Note : Relevant clause numbers are shown in brackets following the descriptions.

Amount of Bond or Guarantee	(10)	<u>10% of total tender sum</u>
Minimum Amount of Third Party Insurance	(23 (2))	<u>F\$ 250,000</u>
Period of Commencement from Engineer's order to commence	(41)	<u>14</u> days
Time for completion in calendar days	(43)	<u>90</u>
Amount of Liquidated Damages	(47 (1))	<u>F\$200</u>
Period of Maintenance	(49)	per day 180 days
Percentage of Adjustment of P C sums	(58 (2))	2.5% (per cent)
Limit of Retention Money	(60 (1))	10% of Tender Sum
Minimum Amount of Interim Certificate	(60(1)&12)	5% of Tender Sum
Time within which payment to be made after acceptance of certificate	(60(9))	<u>14</u> Working Days

Dated this 30th August day of August 1988.

Signature [Signature] in the capacity of Mr. Gopal

Pillar duly authorized to sign tenders for and on behalf of
CONSTRUCTION EQUIPMENT HIRE LIMITED.

(IN BLOCK CAPITALS)

Witness WANA TUPU Address P.O. Box 13831 Suva.

Address P.O. Box 13831 Suva. Construction Equipment Hire Ltd,
P.O. Box 13831
Suva.

Occupation SECRETARY

[Signature]
[Signature]

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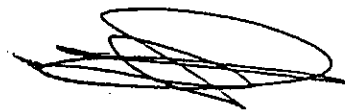
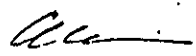
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APPENDIX 'B'

MATERIALS AND GOODS FOR PERMANENT
INCORPORATION OF THE WORKS

(Note : The Contractor's attention is drawn to Clause 70 (3) of the
General Conditions of Contract).

Basic Material	Basic Price	Quantity	Supplier and Country of Origin



SPECIFICATION FOR ENGINEERING WORKS

Chapter 1 GENERAL CONDITION

1.01 DESCRIPTION OF PROJECT AREA AND WORKS

The job sites are situated in two provinces, one is Navua project in Serva province and another is Nausori project is in Thailevu province.

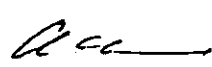
Both works are construction of the Pilot Rice Field that are land levelling, irrigation/drainage canal, farm roads and relative structures works.

(i) The quantity of main works above mentioned two projects are as follow;

- a) Navua project (Irrigated Rice Field)
 - 1. Land Consolidation Works 16.4 ha
 - 2. Irrigation canal Works 1,050m
 - 3. Drainage canal Works 1,500m
 - 4. Farm Roads Works 1,810m
 - 5. Relative Structure 1 L.S.
- b) Nausori project (Rainfed Rice Field)
 - 1. Land Consolidation Works 14.3 ha
 - 2. Drainage canal Works 1,880m
 - 3. Farm Roads Works 1,670m
 - 4. Relative Structure 1 L.S.

(ii) The following drawings pertaining to the project form part of the documents to be issued to the tenderer.

- a) Navua Project
 - DR.No. 1 General Plan
 - DR.No, 2, 3 Drainage Canal No.1, Long and Cross Sections
 - DR.No. 4 Drainage Canal No.2 - No.7 Long Section
 - DR.No. 5 Irrigation Canal No.1 - No.6 Long Section
 - DR.No. 6 Typical Sections of Road, Irrigation and Drainage Canals and Bund
 - DR.No. 7 Access Culvert and Access Roads
 - DR.No. 8 Detail of Farm Inlet/Outlet for Access Culvert and Road
 - DR.No. 9 Farm Inlet/Outlet Works and Drain Access Culvert
 - DR.No.10 Canal Bifurcation Works
 - DR.No.11 Drain Access Culvert
- b) Nausori Project
 - DR.No.17 General Plan
 - DR.No,18 Road No.1 Long Section
 - DR.No.19 Road No.1 and No.2 Long Section
 - DR.No.20,21,22 Drainage Canal No.1 - No.3 Long and Cross Section s
 - DR.No.23 Typical Sections of Road, Drainage Canal and Farm Outlet
 - DR.No.24 Farm Outlet Works and Drain Access Culvert
 - DR.No.25 Drain Access Culvert
 - DR.No.26 Check Structure



1.02 SITE OF WORKS AND WORKING AREAS

- (i) The works are to be constructed on privately owned land. On the basis of understanding reached with the owners, it is proposed to make available to the contractor all lands to be occupied by the permanent works and reasonable working space.
- (ii) The contractor shall make all necessary arrangements and bear the cost for additional land required as working spaces, areas for accesses to the work site borrow areas etc.

1.03 ACCESS TO SITE

Possible road approaches to various parts of the Site are shown on the Drawings. Access roads from the existing roads to suit the Contractor's method of working and programme, together with all diversions necessary to maintain public traffic, shall be provided by the Contractor who shall make all the necessary arrangements and bear all expenses and costs involved therefor.

1.04 Programme for Construction

As per clause 14 of the conditions of contract, the contractor is to provide a programme including the order of procedure and methods proposed. In this regard the following details and requirements may be taken into consideration.

1.05 PUBLIC UTILITY SERVICES

- (i) The contractor shall take reasonable care to prevent any damage to existing water or drain pipes; sewers electric conduits or other installations that may be encountered within or adjacent to the works area. In the event of any damage being caused, the contractor shall report same immediately to the statutory authority responsible for the installations and to the Engineer's Representative and shall bear the penalties and cost of the necessary repairs. The contractor shall also provide a written report to the Engineer including details as to how the damage occurred, the extent and cost of repairs. If in the opinion of the Engineer, the damage was as a result of circumstances beyond the control of the contractor, the Engineer shall arrange for the contractor's costs to be reimbursed.
- (ii) Where it is found necessary to remove, divert or modify any existing installation the contractor shall give adequate notice to the Engineer to enable him to arrange for the work to be carried out. The cost of such works shall be met by the employer.

1.06 DAMAGE TO CROPS

Contractor's attention is drawn to clause 1.02 above, regarding the ownership and arrangements to obtain the land for the construction of the works. It is not unlikely that some areas of the site may have standing crops. There may also be dunes

where some owners or tenants may object to the works or timing of the construction on their land. In such cases the contractor shall give timely notice, (in addition to the programme of works as in clause 14 of the conditions of contract) to the Engineer's representative so as to enable him to make necessary arrangements to facilitate the execution of the works and shall not enter such land or cause damage to crops without the written authority of the Engineer.

1.07 NOTICE OF OPERATIONS

In addition to the requirements in the conditions of contract clause 38(i), the Engineer or his representative may require the contractor to give notice of the expected dates and time when certain critical stages of work will be reached or operations are to be performed (e.g. prior to concreting) so that he may make arrangements for inspection and/or monitoring of the quality of the work.

Such inspections or monitoring of the quality of the work shall not relieve the contractor of his responsibility in this regard.

1.08 CONTRACTOR'S OFFICE AND TEMPORARY BUILDINGS

The contractor shall provide and erect and on completion of the works dismantle and remove all offices, stores and sheds necessary for the execution of the works and is to make his own arrangements, subject to the approval of the Engineer, for the use of any land required.

1.09 SANITARY ACCOMMODATION

The contractor shall provide and maintain to the approval of the Engineer's representative and the appropriate Statutory Authority all sanitary accommodation, drainage and water supply facilities required for the use of his staff, the Engineer's Representative and his staff, and all personnel employed in or about the works.

The Contractor shall be responsible for providing sanitary facilities for his workers and, when the services provided are no longer required remove all wastes and combustible material, thoroughly disinfect and fill in all pits, sumps and trenches and restore the site to the approval of the Engineer's Representative.

1.10 PRECAUTIONS AGAINST FIRE AND PROVISION FOR FIRST AID

The contractor shall take reasonable precautions to prevent outbreaks of fire in the project area and for providing first aid facilities for his staff, the Engineer's Representative and his staff and all personnel employed in and about the work site.

1.11

TEMPORARY WORKS

The contractor is to provide all temporary works as are required for the construction of the works envisaged under the contract. Such temporary works shall be properly designed and constructed to carry such loads as may be imposed on them and shall be suitable in all respects for the provision of access, carrying plant, other functions for which they are designed.

The Contractor shall submit before the commencement of any part of the permanent works drawings and calculations relating to the strength, stability and anticipated deflections of temporary works necessary for the execution of that portion of the works programme, showing the methods proposed for the construction and operation of such works.

Any modification that the Engineer may require either before, during, or after construction of the temporary works shall be made by the Contractor at his own expenses.

No approval or alterations made on the instructions of the Engineer of any submitted design for any of the temporary works shall relieve the Contractor of any liability or obligation under the Conditions of Contract in respect of such temporary works. The Contractor shall be responsible for all negotiations with public or private bodies concerned relative to temporary works. All proposals for temporary works shall be sent to the Engineer for approval before submission to such bodies.

1.12

SITE TO BE KEPT CLEAN

At all times the Contractor shall keep the site free from rubbish and offensive matter, which shall be disposed of in a manner approved by the Engineer.

1.13

GRAVES AND GRAVEYARDS

Where the Works are in close proximity to graveyards or isolated graves, the Contractor shall take all necessary measures to ensure that the areas concerned are not damaged or interfered with in any way.

Where directed by the Engineer the Contractor shall erect and maintain fences to protect such areas.

1.14

PAYMENT OF MOBILISATION COSTS

This item shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of all offices, buildings, and other facilities necessary for work on the project and all other work and operations which must be performed or costs incurred prior to beginning work on the various items on the project site.

Partial payment will be made as follows:

- (i) When 5% of the original contract amount is earned, 25% of the amount for mobilisation may be paid.
- (ii) When 10% of the original contract amount is earned a further 15% of the amount for mobilisation may be paid.
- (iii) When 25% of the original contract amount is earned, a further 10% of the amount for mobilisation may be paid.
- (iv) When 65% of the original contract amount is earned, a further 30% of the amount for mobilisation may be paid.
- (v) When 80% of the original contract amount is earned, remainder of the amount for mobilisation may be paid.

1.15 MATERIALS SUPPLIED BY THE EMPLOYER

Unless otherwise provided, the Contractor shall take delivery of materials supplied by the Employer from the Controller of Government Supplies, Suva, and shall make all his own arrangements for their handling and transport to the site of the works and proper storage at the site.

Before taking delivery, the Contractor shall inspect the materials and report any damage to the Engineer. The Contractor shall issue a receipt in duplicate for the materials and forward one copy to the Engineer.

After taking delivery, the Contractor shall take full responsibility for the materials and any missing or damaged materials shall be replaced at the Contractor's own expenses.



DEPARTMENT OF AGRICULTURE
DRAINAGE & IRRIGATION DIVISION

SPECIFICATION

FOR

ENGINEERING WORKS

CHAPTER 2. SITE CLEARANCE

2.01 SITE CLEARANCE

The contractor shall allow in the relevant item in the bill of quantities for clearance of site of all rubbish, hedges, fences, bushes, trees and tree stumps up to 300mm, in girth to ground level or lower and dispose of the arisings in a manner approved by the Engineer. The girth of trees and stumps shall be as measured 600mm above ground surface or at top of stumps, if less than 600mm.

Trees and stumps greater than 300mm in girth are not to be removed unless the removal is required for the proper construction of the works and specifically approved by the Engineer.

The area to be cleared shall be the area to be occupied by the permanent works together with a margin not greater than 2 metres around the periphery of the permanent works.

Site clearance for temporary works, movements of Machinery borrow and dump areas will not be paid for separately and such costs are to be included in the rates for the respective works.

2.02 REMOVAL OF TOP SOIL

The top soil is to be removed all along the route of the canal, where canal excavation and, bund formation are to be carried out, to a width sufficient to accommodate the permanent earthwork and provide a working margin of up to 1 metre, to a depth as specified in the bill of quantities. The top soil shall be stockpiled for use or disposed of in a manner approved by the Engineer.

The removal of top soil is not required along the area for excavation of the hill slope drain or the area where the spoil from this drain is to be disposed of.

Removal of top soil in areas to be occupied by other permanent works shall be carried out according to the instruction of the Engineer.

Removal of top soil in borrow areas will not be paid for separately and the cost for this, is to be included in the rate for the material to be procured from the borrow area.

DEPARTMENT OF AGRICULTURE
DRAINAGE & IRRIGATION DIVISION

SPECIFICATION
FOR
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CHAPTER 3

EARTHWORKS IN IRRIGATION CANALS AND BUNDS

3.01

DEFINITIONS

The following definitions are to apply for material and work covered by those specifications.

- (i) The term "rock" means solid hard material larger than 0.2m³ in volume, which cannot be loosened and excavated by appropriate mechanical means such as rippers, dozers, face shovels and back hoes, without prior blasting, loosening or breaking by pneumatic tools, metal wedges sledge hammers etc.
- (ii) "Suitable material" means all materials from excavations, borrow pits and quarries which is acceptable for use in the works and which is capable of being spread and compacted to form reasonably impervious and stable fill to slopes and dimensions shown in drawings and meet the requirements of this specification.
- (iii) "Unsuitable material" means other than suitable and material/includes, but is not restricted to:-
 - (a) Material from swamps, marshes and bogs.
 - (b) Peat, roots, logs, stumps and perishable material.

3.02

CANAL TYPES AND METHODOLOGY FOR CONSTRUCTION

3.02.1

The types and methodology for construction of irrigation canals envisaged in these specifications, vary with the site conditions. Details of the basic types and methods of construction are given in para below. In stretches when drainage channels are to be constructed alongside the irrigation canals, it may be advantageousⁱⁿ some cases to carry out both works together.

- (i) Canals along steep hill slopes - Depth of excavation mostly around 2 to 3 metres. Levelling or benching - a strip of land along the canal route, to a width adequate to accommodate the canal, adjoining bund road and if specified drains and margins, is to be levelled by dozing or otherwise moving the material in the transverse direction and up to a distance of 50 metres in the longitudinal direction.

Drain on the levelled pad - If a drainage channel is shown on the hill side of the levelled pad, this is to be excavated and the spoil from the excavation, spread on the bund - road.

The irrigation canal is now excavated and the material spread to form the bund-road. Unless otherwise specified surplus material from the excavation is to be spread on top of and along the outer slope of the bund.

It is not expected to compact the bund road, as construction proceeds. Once the bund formation is completed to the final level, it is to be levelled and compacted in an approved manner.

- (ii) Canals along mildly sloping and level cross sections - Depths of excavation mostly around 2 to 3 metres.

In this case no levelling or benching is envisaged. The canal is to be excavated straight from the existing ground surface and the material spread to form bund - road. Surplus material is to be disposed of as for (i) above.

- (iii) Canals in filling - stretches where the design depth of the canal (design water depth plus free board) is greater than the depth for canal excavation or the canal bed level is above the existing ground level. Along these stretches the canal may require bunds on both sides.

A canal pad or embankment with sufficient top width and to top level of the canal bunds is to be formed with suitable imported material, spread in layers and compacted. The material is to be obtained from stretches of canal with surplus excavation or from borrow areas as may be appropriate. The canal is then excavated in the pad thus formed and the material spread on the bund-road.

- (iv) Canals in deep excavations - Depth of excavation over 6 metres.

(a) The canal excavation is similar to that at (ii) above, except for the increased depth. However, because of the high depth of excavation, bunds are not needed except as a means of disposal of the excavated material. Even then, the amount of excavation may be such that part or all of the material may need to be transported for use elsewhere or dumped in suitable areas.

(b) Along certain stretches where very high depth of excavation is envisaged the canal may be taken in a closed conduit or culvert. The conduit is to be constructed in a trench to be excavated from the bottom of an open cut which will form part of the permanent works. Because of the resemblance of the open cut to a deep canal and the close link with the channel the open cut is treated in the same way and billed together with canal excavation. The material from these excavation is to be transported for use elsewhere or dumped in suitable areas.

3.02.2 CANAL EXCAVATION

The various operations as mentioned above, are to be carried out and the final canal and bund sections formed, as far as practicable, to lines and levels shown on the drawings. Wherever berms are shown, they are to be formed concurrently with general earthworks.

3.02.3 EXCAVATIONS IN ROCK

The canals are to be excavated in all materials other than rock, as defined in para 3.01 (i).

Wherever rock is encountered, the contractor shall remove all the material above the rock surface and dispose of as specified. The rock shall be blasted by the department or through other suitable arrangements and the contractor will be required to remove the blasted rock, dispose of same as directed and trim the sections to design profiles.

3.02.4 DISPOSAL OF EXCAVATED MATERIAL

All material excavated from the canals, other than rock and unsuitable material (see clause 3.01 (iii)), shall be used to form the adjoining bunds within a specified distance, transported and used elsewhere or disposed of as directed.

Unsuitable material are to be disposed of in selected dump areas or as directed by the Engineer. The contractor shall be responsible for forming access roads, clearing the dump areas and leaving the site in tidy condition.

3.02.5 ADDITIONAL FILL

Additional fill material for canal pads and bund formation shall be obtained from areas of surplus excavation or from borrow areas.

The fill material shall be cohesive soils, free from organic matter and meeting the approval of the Engineer.

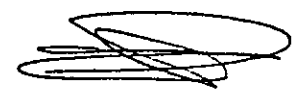
3.02.6 BORROW AREAS

The contractor shall be responsible for locating suitable borrow areas, obtaining and submitting adequate samples of earth as specified by the Engineer and getting his approval for the material.

The contractor shall also make necessary arrangements with the land owners, including payment of royalty etc, provide all access roads and other works required to obtain the fill material.

The borrow area shall be cleared of all vegetation and top soil removed, prior to obtaining fill material. When the required borrow materials have been taken the site shall be reinstated and adequate drainage facilities ensured, to the satisfaction of the Engineer.

Ude



3.02.7 CANAL PAD EMBANKMENTS

The canal pads shall be formed from additional fill material as specified in para 3.02.5 above.

(i) Delivery of Material to Site.

The material shall, as far as possible, be obtained at or below the optimum moisture content for compaction and transported to site in such a manner so as to avoid loss of materials and prevent segregation.

(ii) Construction of Canal Pad Embankments

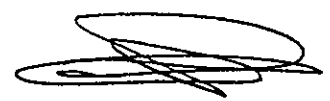
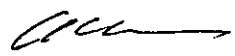
The material shall be spread in layers not exceeding 200mm in loose state. If the material is too wet, it shall be allowed to dry. If it is too dry, additional water shall be added uniformly so as to reach the optimum moisture content. The layer of the material shall then be compacted using a suitable roller and number of passes. The moisture content, the type of roller and the number of passes, shall be as approved by the Engineer.

Each layer should be properly treated and compacted and if any part of the compacted surface is smooth and glossy, such areas shall be scarified by light raking, before the next layer of material is spread.

3.02.8 ROAD BUND - LEVELLING AND COMPACTION

On completion of the earthwork in canal and road bund to the full length or if approved by the Engineer, on completion of a substantial stretch of the canal and the road bund and subject to the bund top being in a reasonably dry condition, same shall be levelled using a motor grader or other similar, approved machinery. The bund top shall not be levelled if the surface is wet.

After the surface is levelled if it is dry, water shall be sprinkled uniformly to bring the soil to be optimum moisture content and compacted, using an approved roller and adequate number of passes, as specified by the Engineer.



DEPARTMENT OF AGRICULTURE
DRAINAGE & IRRIGATION DIVISION

SPECIFICATION

FOR

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CHAPTER 4. EARTHWORKS IN DRAINAGE CHANNELS

4.01 The types of drainage channels and work to be performed under this contract are given below

(i) Vee Or Collector Drains

These are Vee shaped drains with sideslopes 1:1 to collect and convey hillside run off to link drains and thence to the main drainage system. The bed elevations of channels are to be determined by the Engineer to suit site conditions, but the depth of excavation is normally not expected to exceed 1m. The drains may be located on hill slopes above irrigation canals or on the canal bench or up slope of other structures.

(ii) Link Drains

These are drains to link Vee drains to the main drains, and where required existing drains into the new drains. These are expected to be of Vee or trapezoidal sections whose dimensions and elevations will be determined to suit the site conditions.

(iii) Inlet And Outlet Drains

These are to be constructed at the upstream and downstream ends of cross drainage structures, to facilitate the drainage flow through the structures. As for link drains the shapes, dimensions and elevations are to be determined to suit the site conditions.

(iv) Branch And Main Drains

These are major drains forming part of the drainage system for the area. Work required may be excavation of new drains or removal of debris and vegetation, de-silting, or re-excavation of existing drains. The work required to be done are to be determined to suit the site conditions

4.02 SITE CLEARANCE

Wherever appropriate, the site shall be cleared of all shrubs bushes, trees and other obstructions prior to excavation of the drainage channels. Unless otherwise directed the top soil shall be removed and disposed of as part of the excavation.

4.03 MAINTENANCE OF EXISTING DRAINS

The contractor shall ensure that the operation of the existing drainage system is not interrupted. When such interruption is unavoidable, he shall obtain the prior permission of the Engineer.

4.04 EXCAVATION AND DISPOSAL OF EXCAVATED MATERIAL

It is envisaged that the excavation will be in material other than rock as defined in clause 4.05 below. The channels are to be excavated and the material is to be disposed of by spreading in suitable locations nearby.

The material shall not be spread or otherwise disposed of so as to block existing drainage channels or prevent drainage of adjoining land. Where the material is to be spread alongside the drains, sufficient berm space and reasonable side slopes should be maintained so as to ensure that the material will not slip or flow back during rains, into the channel. Sufficient gaps at reasonable intervals should be allowed between the spoil heaps so as not to unduly obstruct natural drainage flow from adjoining land.

4.05 EXCAVATION IN ROCK

- (i) The term rock shall be taken to mean solid hard material larger than 0.2m³ in volume, which cannot be loosened or excavated by appropriate mechanical means such as rippers, dozers, face shovels and the like, without prior blasting, loosening or breaking by pneumatic tools, metal wedges, sledge hammers etc.
- (ii) Wherever rock is encountered, effort will be made to divert the drainage channel so as to avoid rock excavation. Where such diversion is not possible the rock shall be blasted by the department or through other suitable arrangements. The contractor shall be responsible for the removal of all the overlying material prior to blasting and for removal of the blasted rock, disposal of the rock as directed and if required, to trim the sections to design profiles.

DEPARTMENT OF AGRICULTURE
DRAINAGE AND IRRIGATION DIVISION

SPECIFICATION
FOR
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CHAPTER 6. GRAVEL ROAD PAVEMENT

6.01 DESCRIPTION

The gravel pavement shall consist of approved natural gravel or crushed rock, which shall be spread evenly on the subgrade in uniform layers to provide a total compacted thickness of 150 mm.

6.02 MATERIALS

a) General

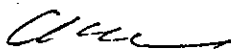
i) Natural Gravel

Gravel shall be derived from the natural disintegration of rock, and shall be sufficiently free from vegetable matter and other organic constituents to meet the requirements given below. Gravels from different deposits may be combined to provide material which will comply with this Specification.

ii) Crushed Rock

Crushed rock material for use in gravel pavement shall consist of particles crushed from tough, durable rock, and, when the run of the crusher is deficient in fine particles, shall include such added material to meet the requirements given below. The added fine material, if required, shall be uniformly mixed by blending with the crushed rock at the crushing plant.

Unless otherwise directed, the Contractor may construct the pavement either from naturally occurring gravel or from crushed rock.



iii)

Material Requirements

In addition to conforming to the Specifications above, the material shall be free from organic and soluble material and comply with the following grading requirements:

<u>Sieve Size</u>	<u>Percentage by weight</u> <u>Passing</u>
75mm	100
37.5 mm	55 - 85
19 mm	40 - 70
9.5 mm	30 - 60
5 mm	25 - 50
2.8 mm	20 - 40
710 um	12 - 30
300 um	8 - 20
75 um	5 - 10

In addition the actual grading of the material is to be such that the shape of the particle size analysis curve determined in accordance with B.S. 1377 will compare favourably in shape with the curves of the upper and lower limits of grading respectively as specified above.

Not less than 10 per cent of the material by weight is to be retained between each pair of successive sieve as listed above excepting the largest pair.

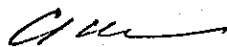
The liquid and plasticity indices of the fine fraction of the material when determined in accordance with BS 1377 are not to exceed 30 per cent and 7 per cent respectively.

6.03

SOURCE OF MATERIALS

The Contractor shall be responsible for investigating the source of supply of materials, and for submitting samples (15 kilogrammes) to the Engineer for testing.

No material shall be delivered until the Engineer has approved the source of supply, and the plant and methods to be used in winning the material and constructing the pavement. Such approval shall not relieve the Contractor from his responsibility for so arranging the excavation, placing and compaction and that the materials in the pavement conform with this Specification. Any approval given to the source of supply of materials may be withdrawn if a significant number of the samples taken from the pavement after compaction fail to comply with this Specification.



6.04 TRANSPORT

The material shall be transported from the source of supply to the site in vehicles which are so constructed that loss of material does not occur.

6.05 SPREADING

Pavement material shall be spread in uniform layers which will provide the compacted thickness shown in Clause 6.01. Spreading shall be undertaken by a method which will ensure that segregation does not occur.

Where required for compaction purposes, water shall be added and mixed uniformly with the pavement material by approved mechanical means. If there is existing excess moisture in the material it shall be dried to the required moisture content by loosening and aerating.

Pavement material shall not be spread upon a water-logged base.

If at any time the sub-grade material should become rutted, or mixed with the pavement material, the Contractor shall at his own expense remove the material, reshape and compact the sub-grade material, and replace the pavement material removed with fresh material.

6.06 COMPACTING AND TRIMMING

After the mixture has been brought to the required moisture content, the Contractor shall compact it immediately with approved equipment. In all cases compaction shall continue until the pavement shows no further movement under the compacting equipment and the density of the pavement is as specified below.

The top of the pavement shall be graded and trimmed, and materials shall be added where necessary to produce an even surface as shown on the drawings.

Variations in the compacted thickness of the layer shall not exceed plus 25mm or minus 12mm from the designed level at any point. Any irregularities in excess of the tolerance stated below shall be corrected by loosening the surface, removing or adding material as required, and compacting the area to a uniform surface conforming to the designed cross section and grade.

The gravel pavement shall be compacted to not less than ninety eight (98) percent of the maximum dry density obtained using Test: "Determination of the dry density/moisture content relation of a soil using modified compaction - Standard Method" of Australian Standard AS 1289. E2.1 1977. "Methods of Testing Soil for Engineering Purpose" on its latest revised equivalent.

07

INSPECTION, SAMPLING AND TESTING

Inspection, sampling and testing of the pavement may be undertaken by the Engineer or his representative while construction of the pavement is in progress. Field density tests to determine the degree of compaction may be carried out by the Engineer or his representative.

Field density of gravel pavement may be tested by the sand replacement method or its equipment, by Radio active isotope devices or by such other methods as the engineer may deem fit.

08

DEFECTIVE MATERIAL

If at any time during the progress of the work, any material supplied is found to be not in accordance with this Specification, the Engineer will direct the Contractor to remove the unsuitable material and replace it with satisfactory material. Previous acceptance of the whole or part of the material by the Engineer shall not restrict his right to direct removal and replacement of material subsequently found to be unsatisfactory. The Contractor shall carry out such remedial work immediately at his own expense.

09

MAINTENANCE

Until the maintenance period is completed the pavement shall be maintained by the Contractor in a smooth and sound condition by watering and light blading by a motor grader to the satisfaction of the Engineer. Should any defect appear in the pavement during this maintenance period, such defect shall be made good by the Contractor at his own expense. Such areas shall be loosened, approved material shall be added and the areas shall be re-compacted and trimmed to produce a pavement which conforms with this Specification.

6.I0

ROYALTIES AND PROPERTY DAMAGE

The Contractor shall make his own arrangement for the payment of any royalties on pavement materials, and shall reinstate at his own expense any access roads, tracks, gates fences or other property damaged during his operations. Before final payment is made the Contractor shall supply to the Engineer written certificates from the land owners concerned, stating that all claims for damages and/or royalties have been paid.

6.II

PAYMENT

Unless shown otherwise in the Bill, payment will be made on the basis of the areas of pavement in square metres completed or the designed area to the specified depth, width and length whichever is less. Rates for pavement shall provide for all costs associated therewith including investigation of pits and deposits, excavating, loading, hauling, spreading, trimming, compaction, watering, grading, testing (by the Contractor) royalties and any other expenditure incurred in producing the pavement.

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CHAPTER 7 RIPRAP

7.01 GENERAL

This work shall consist of stone riprap for bank and bed protection furnished and constructed in accordance with these specifications and in reasonably close conformity with the lines, grades, and dimensions and at the locations shown on the plans or established by the Engineer.

7.02 MATERIALS

Stones shall be hard, angular, quarry stones of such quality that they will not disintegrate on exposure to water or weathering. Unless otherwise shown on the plans or in the special provisions, not more than 10 per cent of the total volume of riprap shall consist of stones having a volume less than 0.016 m^3 and at least 50 percent of the total riprap volume consisting of stones having a volume of 0.05 m^3 or more determined visually by the Engineer or by physical measurement.

7.03 PREPARATION OF FOUNDATIONS

Foundation trenches and other necessary excavation shall be excavated by the Contractor to the depths shown on the plans and approved by the Engineer before the placing of rock is begun. Before placing the riprap the Contractor shall provide a bedding of 80 mm of approved sand.

7.04 LOOSE RIPRAP

The stones shall be handled or dumped into place so as to form the cross sections shown on the plan. The face shall be reasonably uniform, free from bumps or depressions and with no excessively large cavities below, or individual stones projecting above, the general surface.

7.05 GROUTED RIPRAP

The stones shall be bedded in the foundation with flat faces up and their longest dimensions at right angles to the centreline of the water way. Joints shall be broken and shall not exceed 25mm in width.

The stones shall be rammed until the surface is firm and reasonably true to the finished surface in grade, alignment, and cross section. Any stones having an irregular or uneven surface shall be taken up and satisfactorily relaid.

After the stones have been rammed into place and the surface is satisfactory the spaces or voids between and around the stones shall be filled with sand to within 100mm of the surface, after which cement grout shall be poured and broomed into spaces between the stones, this operation being continued until the grout remains about 25mm below the tops of the stones. The grout shall be of such consistency that it will flow readily into the spaces between the stones, but will not be so wet that the solid matter separates from the water.

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CHAPTER 9. EXCAVATIONS FOR STRUCTURES

9.01 GENERAL

This specification provides for the excavation for bridges, culverts and other structures, the back-filling of completed structures and the disposal of excavated material.

This work shall include necessary bailing, pumping, draining, sheeting, bracing and the necessary construction of cribs and cofferdams, and furnishing the materials required thereof and the subsequent removal of cribs and cofferdams; the above cost of which shall be included in the rate for excavation. No allowance will be made for dealing with different types of material encountered.

9.02 CLEARING AND GRUBBING

Prior to starting excavation operations in any area, all necessary clearing and grubbing in that area shall be performed in accordance with the Specification for Site Clearance & Removal of Top Soil (Clauses 2.01 & 2.02)

9.03 EXCAVATION

The natural ground adjacent to the structure shall not be disturbed without permission of the Engineer.

Trenches or foundation pits for structure or structures footings shall be excavated to the lines and grades or elevations shown on the plans or as directed by the Engineer. They shall be of sufficient size to permit the placing of structures or structure footings of the full width and length shown. The elevations of the bottom of footings as shown on the plans, shall be considered as approximate only and the Engineer may order, in writing, such changes in dimensions or elevations of footings as may be deemed necessary to secure a satisfactory foundation.

Boulders, logs and any other objectionable material encountered in excavation shall be removed.

After each excavation is completed, the Contractor shall notify the Engineer to that effect, and no footing, bedding material or pipe culvert shall be placed until the Engineer has approved the depth of excavation and the character of the foundation material. All rock or other hard foundation materials shall be cleaned of all loose material and cut to a firm surface, either level, stepped, or serrated as directed by the Engineer. All seams or crevices shall be cleaned and grouted. All loose and disintegrated rock and thin strata shall be removed. When the footing is to rest on material other than rock, excavation to final grade shall not be made until just before the footing is to be constructed. When the foundation material is unsuitable as determined by the Engineer, the Contractor shall remove the unsuitable material and backfill with class 15 concrete.

In the event of deterioration in the foundation due to inadequate drainage or pumping, or because of the surface being excessively disturbed by the Contractor, the Contractor shall at his own expense remove and make good to the Engineer's satisfaction the formation including the supply and laying of Class 15 concrete.

9.04 COFFERDAMS

Suitable and practically watertight cofferdams shall be used wherever water-bearing strata are encountered above the elevation of the bottom of the excavation. The Contractor shall submit drawings showing his proposed method of cofferdams construction as provided in the General Specification for Engineering Works.

9.05 DEWATERING OF EXCAVATION

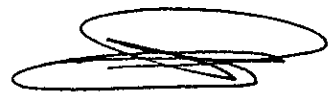
The Contractor should ensure that he has sufficient pumping capacity at all times to cater for any need that may arise.

9.06 DISPOSAL OF EXCAVATED MATERIAL

Excavated material from the other structures, where suitable, shall be utilized as backfill. The surplus material shall be disposed by the Contractor and paid for inclusively in the rate of excavation.

Cofferdams or cribs for foundation construction shall in general be carried well below the bottom of the footings and shall be well braced and as nearly watertight as practicable. In general, the dimensions of cofferdams shall be such as to give sufficient clearance for the construction of forms and the inspection of their exteriors and to permit pumping outside of the forms. Cofferdams or cribs which are tilted or moved laterally during the process of sinking shall be righted or enlarged so as to provide the necessary clearance.

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Cofferdams shall be constructed so as to protect green concrete against damage from sudden rises of water level and to prevent damage to the foundation by erosion. Any pumping that may be permitted from the interior of any foundation enclosures shall be done in such a manner as to preclude the possibility of any portion of the concrete materials being carried away. Any pumping required during the placing of concrete, or for a period of at least 24 hours thereafter, shall be done from a suitable sump located outside the concrete forms.

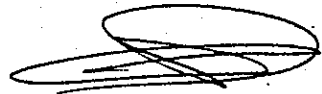
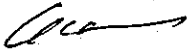
Unless otherwise provided, cofferdams or cribs, with all sheeting and bracing involved therewith, shall be removed by the Contractor after the completion of the structure. Removal shall be effected in such a manner as not to disturb or mark the finished concrete.

9.07

BACKFILL

Excavated areas around structures shall be backfilled with approved materials in horizontal layers not over 150mm in depth upto the required finished level or as directed by the Engineer. Each layer shall be moistened or dried as required and thoroughly compacted with mechanical tampers to the satisfaction of the Engineer.

Backfill shall not be placed behind concrete walls until the concrete is at least fourteen (14) days old.



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CHAPTER 10 CONCRETE

SECTION I DESCRIPTION OF CONCRETE

10.01.1 DESCRIPTION

Concrete shall consist of a mixture of cement, water, fine aggregate and coarse aggregate, and may, if approved, include special additives. In the finished work, concrete shall be sound, dense and durable and shall have the strength and other properties specified.

The proportion of fine, coarse aggregate will depend on the grading and other properties of the materials, but the amount of fine aggregate shall always be the minimum which combined with cement, will produce only sufficient mortar to fill the voids between the coarse aggregate and leave a slight excess for finishing.

In order to assure the optimum strength and durability of the finished concrete, the quantity of water to be used in mixing the concrete shall be the minimum which will give satisfactory workability and consistency having regard to the mix as a whole and to the conditions and manner of placing the concrete in the work.

10.01.2 CLASSES OF CONCRETE

This Specification covers concrete graded in "Classes" having minimum compressive strengths at twenty-eight (28) days after placing, when determined by tests on 150 mm cylinders as specified in (Section 2) Clause 10.02.1.1 as follows:

<u>Class of Concrete</u>	<u>Strength MPa</u>
35	35 MPa
30	30 "
25	25 "
20	20 "
15	15 "
10	10 "

10.01.3 CONCRETE TO BE USED IN WORK

Concrete to be used in the works shall be of the classes shown on the drawings or specified, and shall be made and placed in accordance with this specification as and where shown on the drawings, or ordered by the Engineer.

10.01.4 CONCRETE PROPERTIES

Concrete used in the separate sections of the works shall be of the following classes and shall have the following properties :

Section of Work	Class of Concrete	Max Water cement ratio (by weight)	Nominal size of aggregate (mm)	Max slump (mm)
Blinding layer to outfall structure	15	-	40	75
Outfall structure	35	0.45	20	75
Head stocks for crossings	25	-	40	75

10.01.5 STIFF CEMENT MORTAR

Stiff cement mortar shall be composed of one part of Portland Cement to one part of sand by volume, or such other proportion of cement and sand, as shall be directed by the Engineer, but not exceeding one part of cement to two and half ($2\frac{1}{2}$) parts of sand, mixed with water so that the water-cement ratio does not exceed 0.35 by weight.

SECTION 2 : CONTROL AND ACCEPTANCE OF CONCRETE

10.02.1 TEST CYLINDERS

10.02.1 GENERAL

Specimens for compressive tests shall be 150 mm cylinders. Sampling, moulding, curing, transport and testing shall be carried out in compliance with the requirements of BS 1881.

Every sample shall consist of a pair of duplicate cylinders moulded in the presence of the Engineer or his representative and such that they are as nearly identical as possible.

Cylinders shall be moulded from concrete actually being placed in the work and selected by the Engineer to truly represent the whole of the concrete of a particular class or quality placed on the day of moulding.

Prior to the commencement of concreting, the Contractor shall submit for approval of the Engineer details of his proposed arrangements for carrying out tests. The results of all tests shall be forwarded to the Engineer, in duplicate not later than 24 hours after the tests are carried out. The Engineer may require his representative to be present at any test and the Contractor shall make all arrangements for his attendance. All costs for sampling and testing shall be borne by the Contractor.

10.02.1.2 FREQUENCY OF MOULDING OF TEST CYLINDERS


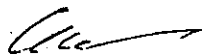
One pair of test cylinders, unless a contrary direction is given by the Engineer, shall be moulded from each ton (10) cubic metres of concrete, or less, placed at any one time.

10.02.2 DESIGN AND CONTROL OF CONCRETE MIX

10.02.2.1 GENERAL

The Contractor shall submit, for approval of the Engineer, details of the concrete mix he proposes to use for each particular Class of Concrete at least six (6) weeks in advance of pouring that particular Class of Concrete in the work so as to permit strength tests from trial mixes to be made.

In order to ensure that the strength of the concrete in the work will not fall below that specified in Section 1 Clause 10.01.2 it will be necessary to design a concrete mix for a target (average) strength appreciably higher than the specified strength. The target strength shall be selected having regard to the degree of control the Contractor can expect over materials and handling of concrete in the field.



Unless the Engineer directs otherwise, the quantity of cement proposed for a particular mix shall not be less than the following:

<u>Class of Concrete</u>	<u>Minimum quantity of cement per cubic metre of concrete</u> <u>50 Kg Bags</u>
35	10
25	3.5
20	7.5
15	7
10	6

The design of a mix shall take into account the slump requirements of Section 6 Clause IO.06.3 "Consistency" and the grading and maximum size of aggregate requirements of Section 3 Clause IO.03.4 "Aggregate"

In the case of concrete mix for tidal outfall structures the water-cement ratio shall not exceed 0.45 by weight.

Once the Engineer has approved a certain mix for a particular Class of Concrete, this mix shall be used for that work and no departure shall be made from it either in properties or materials or in their relative proportions unless authorized by the Engineer.

IO.02.2.2 CHECK OF MIX BY TEST CYLINDERS FROM TRIAL MIXES

Prior to approval being given to a mix proposed by the Contractor, its compressive strength at twenty-eight (28) days shall be checked by test cylinders moulded from the materials and in the relative proportions proposed by the Contractor.

If at any time during the progress of the work it becomes necessary to use materials differing from those approved originally, the Contractor shall submit further mix designs which shall, in general, be checked by compressive tests at twenty-eight (28) days, prior to approval being given for their use.

Trial mixes for the moulding of test cylinders shall be prepared by the Contractor in the presence of the Engineer or his representative. The Contractor shall give at least two (2) working days notice, to the Engineer, of his intention to prepare trial mixes.

In assessing whether the strength obtained from a trial mix is satisfactory, the average strength of all cylinders tested at 28 days will be compared with the target strength considered desirable, due allowance being made for conditions under which the concrete was prepared.

10.02.2.3 CHECK OF MIX BY STATISTICAL ANALYSIS OF TEST CYLINDERS MOULDED FROM CONCRETE PLACED IN THE WORK

Throughout the progress of the work a statistical check will in general, be made of the compressive strength of each Class of Concrete, using all twenty-eight (28) days test results of samples, moulded from concrete placed so far in the work.

Test results will be analysed on the basis of groups of six(6) consecutive samples, the strength of each sample being the average strength of the pair of duplicate cylinders.

The mix will be considered satisfactory for strength should the following requirements be met:

- i) Average of six(6) samples shall not be less than 1.2 times, the specified strength.
- ii) Average of any two (2) samples in the group shall not be less than the specified strength.
- iii) The strength of a single sample shall not be less than 0.75 times the specified strength.

Should any one of the above strength conditions not be met the Engineer may request the Contractor to modify the mix and/or improve the production of the concrete to obtain higher strength concrete.

10.02.3 DETERMINATION OF 28 DAYS COMPRESSIVE STRENGTH

10.02.3.01 GENERAL

The twenty-eight (28) days strength of the concrete used in the works will be determined from the test cylinders in accordance with Section 2 Clause 10.02.1

Where more than one pair of Cylinders are moulded to represent a continuous section of the work poured on the one day, the average strength of all such cylinders shall be taken as the twenty-eight(28) days strength of the concrete.

Should a specimen be cut from the work in accordance with Section 2 Clause 10.02.3.03 the actual strength of the specimen shall be adjusted to obtain the equivalent strength of a 150 mm cylinder in accordance with BS 1881.

10.02.3.02 ADJUSTMENT OF TEST STRENGTH FOR AGE OF SPECIMEN

(a) Concrete containing ordinary Portland Cement normally cured

Should any cylinder or specimen cut from the finished work as described in Section 2 Clause 10.02.3.03. be tested at an age (i.e. number of days after pouring) greater than twenty-eight (28) days its strength shall be adjusted to the equivalent 28 days strength by dividing the actual 28 days strength by the factor given in the following tables:

<u>Age of test specimen in days at date testing</u>	<u>Factor</u>
28	1.00
33	1.02
42	1.04
49	1.06
56	1.08
70	1.10
84	1.12
112	1.14
140	1.16
168	1.18
196	1.20
224	1.22
318	1.24
365 and greater	1.25

*Notes: (i) For intermediate age the factors shall be determined on a pro-rata basis.

(ii) If specimens are tested at seven (7) days for the purpose of preliminary information and control, the approximate equivalent strength of twenty-eight (28) days may be obtained by dividing the actual strength at seven (7) days by the factor 0.70

Seven days tests are not to be regarded as acceptance tests.

Adjustments for age shall be as set out above for ordinary Portland cement unless determined otherwise by the Engineer.

10.02.3.03 FAILURE TO OBTAIN REQUIRED STRENGTH OF CYLINDERS

a) Reinforced concrete specimens cut from work

Should the strength of a sample representing reinforced concrete work fail to reach the specified twenty-eight (28) days strength, the Contractor may elect to submit for testing a specimen cut from the completed work. The form and dimensions of the specimen and the location in the work from which it is to be cut and the manner of restoring the cut portion of the work shall be subject to the approval of the Engineer. The specimen shall preferably be taken by means of a core drill.

The whole cost of cutting specimen(s) from the work and of restoring the work from which any specimen(s) have been cut shall be borne by the Contractor.

b) Determination of Strength for Acceptance of Concrete

After tests of concrete specimen(s) cut from the work have been made the Engineer will consider the test results and other information and may at his absolute direction determine the strength of the concrete to be taken for acceptance (necessary adjustments for form and age specimens being made as herein specified) as one of the following:

- i) The average strength of the pair(s) of cylinders moulded at the time of pouring (i.e. rejecting the specimen(s) cut from the work on the ground of being unsatisfactory in some respect), or
- ii) The mean of the average strength of the pair(s) of cylinders moulded at the time of pouring and the equivalent strength of the specimen(s) cut from the work, or

iii) The equivalent strength of the specimen(s) cut from the work (i.e. rejecting tests on cylinders moulded at the time of pouring on the ground that such cylinders do not truly represent the concrete as placed).

10.02.3.04 ACCEPTANCE OF CONCRETE : BASIS OF ACCEPTANCE

The basis of acceptance of concrete in the works will be the twenty-eight (28) day strength determined by the Engineer in accordance with Section 2 Clause 10.02.3.03 (b) above where appropriate. Concrete having a deficiency in strength will be treated as indicated below. Notwithstanding the above, any concrete used in the works not of the classes shown on the drawings or specified, and/or not made and placed in accordance with this specification as and where shown on the drawings or directed by the Engineer, may be rejected. Also, hardened concrete which is porous, segregated, honey-combed or in which the placing was so interrupted as to require a construction joint which was not specified, or where concrete or embedded steel has been disturbed by vibration or movement of forms after initial set has taken place, or which in the opinion of the Engineer is otherwise defective may be rejected.

Concrete rejected for any reasons shall be removed in accordance with Clause 39 of the General Conditions of Contract.

Should the strength of the concrete as determined from test cylinders or by the Engineer in accordance with Section 2 Clause 10.02.3.03 (b) fail to reach the specified value by more than ten (10) per cent, the Engineer may reject the whole or part of the concrete represented by the test specimens.

Alternatively, he may give consideration to the acceptance of the whole or part of such concrete, subject to a deduction of two (2) per cent of the schedule rate for each one (1) per cent, or fraction thereof, deficiency in strength up to a maximum deficiency in strength of ten (10) per cent.

SECTION 3 : MATERIALS FOR CONCRETE

10.03.1 CEMENT

All cement shall be Portland cement of approved brand and shall comply with the BS 12 for Ordinary and Rapid Hardening Portland cement, or BS 4027 for Sulphate Resisting Portland Cement, with the exception that the proportion of Magnesia (MgO) contained in the cement may be increased to a maximum of 5 per cent for Ordinary Portland Cement produced in Fiji.

The total alkali content of any cement expressed in terms of Na_2O shall not exceed 0.65 per cent.

Unless approval is given for the handling of cement in bulk, all cement shall be delivered in sound, properly secured bags direct from the manufacturer, each bag bearing the manufacturer's name or recognised trademark. The contractor shall furnish, as required by the Engineer, test certificates indicating that samples have been tested and analysed by an approved firm and comply with every respect with the appropriate specification for the particular type of cement.

All cement shall be stored in a dry water-proof shed with a raised wooden floor not less than 150 mm above ground level, or other building approved by the Engineer. The store shall be of adequate capacity to store sufficient cement to ensure proper continuity of the work and to enable each consignment to be stacked separately with easy access for inspection.

If the contractor proposes to use cement which has been stored for a period in excess of three (3) months from the date of testing, the Engineer may require a re-test at the Contractor's expense before such cement is used in the contract work.

Any cement affected by damp or other causes shall not be used in the work and shall be removed from the site at the Contractor's expense.

10.03.2 WATER

Water shall be free from matter harmful to concrete and its reinforcement and neither salty nor brackish. Water which is not potable for human being shall not be used for concrete. The Engineer may require the Contractor to produce test certificates for water to be used.

10.03.3 ADDITIVES

Special additives or combinations of additives may only be used if approved by the Engineer and then in such quantities and manner as he may direct. Such additives shall not reduce the strength of the concrete below that specified or have an injurious effect on the properties of the concrete.

Samples of additives shall be tested if required by the Engineer. The use of calcium chloride will not be permitted in any concrete.

10.03.4 AGGREGATE FOR CONCRETE

10.03.4.01 FINE AGGREGATE

(a) Description

Fine aggregate shall consist of clean, hard, tough durable uncoated grains, uniform in quality, and shall conform to the requirements of AS 1465 relating to the presence of harmful materials.

(b) Grading

Unless otherwise approved by the Engineer, the grading proposed for the fine aggregate shall be selected within the following limits:

<u>Standard Sieve</u>	<u>Quantity Passing (percent of weight of samples)</u>
9.50 mm	100
4.75 mm	90-100
2.36 mm	60-100
1.18 mm	30-100
600 mm	15-100
300 mm	5-50
150 mm	0-15

Unless the Engineer directs otherwise the grading of aggregate shall not exceed the absolute limits set out above, and shall not differ from the proposed gradings by more than the following amounts :

<u>Standard Sieve</u>	<u>Deviation from Proposed Grading</u>
9.5 mm	-
4.75 mm	± 5%
2.36 mm	± 5%
1.18 mm	± 10%
600 mm	± 12%
300 mm	± 5%
150 mm	± 3%

10.03.4.02 Coarse Aggregate

a) Description

Coarse aggregate shall consist of clean, hard, durable, crushed rock or gravel and shall conform to the requirements of BS 882 relating to the presence of harmful materials. If required, aggregate shall be washed to satisfy these requirements.

b) Grading

The grading proposed for the coarse aggregate shall be selected within the limits given in the following table.

However, where required, coarse aggregate shall be obtained in narrower grading ranges than those tabulated, and shall be combined as required for use to provide the approved grading.

Percentage of aggregate passing, by mass of sample

Sieve aperture	Nominal size of graded aggregate mm	
	40	20
75.0 mm	100	-
53.0 mm	-	-
37.5 mm	90-100	-
26.5 mm	-	100
19.0 mm	30-70	90-100
13.2 mm	-	-
9.50 mm	10-35	25-55
6.70 mm	-	-
4.75 mm	0-5	0-10
2.36 mm	0-2	0-5

The grading of aggregate supplied shall in no case exceed the absolute limits set out above and shall not differ from the adopted grading by more than the following amounts:

Deviation from proposed Grading

Limits on percentage of aggregate passing, by mass of sample

Sieve aperture	Nominal size of graded aggregate, mm	
	40	20
75.0 mm	-	-
53.0 mm	-	-
37.5 mm	+10	-
26.5 mm	+15	-
19.0 mm	+15	+10
13.2 mm	+10	+15
9.50 mm	+10	+15
6.70 mm	+5	+10
4.75 mm	-	-5
2.36 mm	-	-

(c) Resistance to Abrasion (Los Angeles Test)

The percentage of wear of the coarse aggregate shall be determined as set out in BS 882 and the loss shall not exceed 35%.

(d) Additional Tests

When required by the Engineer coarse aggregate shall be tested for any or all of the properties set out below, and shall conform to the requirements specified for these tests. Methods of test shall be in accordance with the procedures set out in BS 882.

(i) Crushing Value

The aggregate crushing value shall not exceed 35%.

(ii) Soundness

The loss of weight shall not exceed the following percentages. When tested with sodium sulphate 12%. When tested with Magnesium Sulphate 13%.

(iii) Particle Shape

The flakiness index shall not exceed 30%
The elongation index shall not exceed 30%.

10.03.4.03 SAMPLING

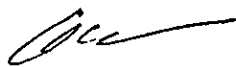
Sampling procedures and minimum quantities of aggregate supplied for above series of tests shall be as set out in BS 882.

All aggregate for the work shall be delivered to the site at least six (6) weeks in advance of use to enable samples to be taken by the Engineer and tested. The Contractor shall assist the Engineer in the taking of samples and shall provide every facility and all labour required at his own expense.

03.4.04 ACCEPTANCE AND USE

Aggregate shall not be used until the approval of the Engineer has been obtained and then only so long as the quality of this materials remain equal to that of the test samples.

If at any times during the progress of the work, it is found necessary to use aggregate differing from these



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on which the initial tests were made, samples of the new aggregate shall not be used until their use has been approved by the Engineer.

10.03.4.05 STORAGE

Storage facilities shall be such as to prevent the aggregate becoming intermixed or mixed with foreign materials, and to prevent segregation from occurring. At most sites this will necessitate separating the aggregate from the underlying material and, if approved by the Engineer this may be done by means of layers of heavy-grade building paper.

SECTION 4 : FALSEWORK FOR CONCRETE CONSTRUCTION

10.04.1 GENERAL

Falsework shall be built on firm and secure foundations safe from scour, and shall be of sufficient strength to carry the loads.

The Contractor shall make allowances for the deflection accompanying loading and shall be fully responsible for determining the allowance required. Falsework shall be constructed so that on completion of the structure, the ~~lines & levels~~ ^{lines and} levels of the concrete will be as shown on the drawings.

10.04.2 SETTLEMENT - MOVEMENT/DEFLECTIONS

If falsework settles to an extent which appreciably alters concrete ^{lines and} levels from those shown on the drawings, the Engineer may stop work and require removal of concrete and a thorough remodeling of the falsework to ensure a first class product, which work shall be carried out as directed at the cost of the contractor.

SECTION 5 : FORMWORK FOR CONCRETE

10.05.1 GENERAL

The Contractor shall submit to the Engineer, for his approval, detailed drawings of his formwork design at least fourteen (14) days before any formwork is erected for the works.

No concrete shall be placed until forms have been passed by the Engineer. Any form not conforming to the requirements of the Engineer shall not be used and shall be removed without delay.

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In the case of concrete placed in earth excavation, forms shall be provided for all vertical surfaces unless otherwise shown on the drawings or ordered by the Engineer.

In the case of columns, walls or other thin section, forms shall be designed and constructed so that no concrete shall be allowed to fall by more than 2.5 metres.

In the case of slabs, beams and similar members, forms shall be constructed so that the side forms may be removed without interference with the remaining forms.

Forms shall be capable of withstanding vibration during placing of the concrete and shall be designed for the full hydrostatic pressure of a liquid weighing 2500 kg/m^3 . Deflection of forms between joints and/or studs shall not exceed one three hundredth ($1/300$) of the joints or stud spacing.

10.05.2 CONSTRUCTION

10.05.2.1 MATERIALS

a) Timber

Timber for formwork shall be well seasoned and free from loose knots and other defects. Timber which becomes warped or unsuitable for re-use in the opinion of the Engineer shall be replaced.

The class of timber selected for different portions of the structure shall be appropriate to the quality of line and surface required in the work, and shall be approved in advance by the Engineer. The formwork used for exposed surfaces shall have in contact with concrete, either dressed timber, or undressed timber lined with an approved water-proof lining, not liable to warp, so as to give on stripping, a smooth and even concrete surface true to dimensions shown on the drawings. For surfaces not exposed, timber need not be dressed or lined.

Where plywood is approved for formwork it shall be of marine grade with a minimum thickness of 17 millimetres.

b) Mild Steel

Formwork for the faces on which the tidal doors close shall be constructed of mild steel. The design of the mild steel forms shall be submitted for the approval of the Engineer before work on the construction of the forms is commenced. All bolt and rivet heads shall be countersunk and all welds ground back to the correct dimensions. The forms shall be so constructed that on stripping the surface will form a watertight joint with the tidal door when installed.

c) Proprietary formwork: shall be used with the approval of the Engineer and if approved shall be used strictly in accordance with the manufacturer's instructions.

10.05.2.02 HANDLING AND TREATMENT

Forms shall be so designed and constructed that they may be removed without injury to the concrete or to the forms. The forms shall be built true to line and braced in a substantial and unyielding manner to maintain position and shape. Joints in forms shall be either horizontal or vertical. Timber forms shall be thoroughly soaked with water before oiling etc. unless they are lined.

Provision shall be made for the accurate location of all fittings, e.g. reinforcement, anchorage devices, holding down bolts, tubes and holes for the formation of holes.

The use of wires and/or bolts extending to the surface of the concrete will not be permitted except where shown on the drawings or approved by the Engineer.

Forms for re-entrant angles shall be chamfered and forms for corners shall be pilleted, the bevel in each case having a width as shown on the drawings, or if not shown, of 25 mm on each side with equal angles in all cases.

Alternately re-entrant angles and corners shall be rounded to a radius equivalent to the width of the fillet or chamfer they replace.

10.05.3 ERECTION

Dimensions of forms, especially those affecting the construction of subsequent portions of the work, shall be carefully checked before and after the forms are erected. Forms shall be aligned accurately and the location of all fittings, hole formers etc. checked prior to placing concrete.

The interior surface of the forms shall be oiled to ensure non-adhesion of the mortar, but oil etc. used on forms against surfaces to be exposed shall not stain or discolour the concrete surface. The coating shall be uniformly spread in a thin film and any surplus shall be removed prior to placing concrete. Forms shall be treated in advance of placing reinforcement to ensure that the protective coating will not soil the surface of the steel.

Bolts and pipes and bars, if used, to form the holes in the members, shall be well greased and so arranged that they may be removed from the concrete before removal of forms without excessive jarring or hammering.

SECTION 6 : HANDLING AND TREATMENT OF CONCRETE

10.06.1 MEASURING

All materials shall be measured by weight, except that

- i) Water may be measured by an approved adjustable water-measuring and discharging device, and
- ii) Cement may be measured by bags as packed by the manufacturer in which case batches shall be proportional on the basis of one or more unbroken bags of cement.

Weighing hoppers and scales shall be capable of weighing individual materials to within one (1) per cent accuracy.

The moisture content of the fine and coarse aggregate shall be determined frequently as requested by the Engineer either by a moisture meter or by other approved method. Corresponding corrections shall be made to the quantities of all aggregates as well as to the quantities of water used.

10.06.2 MIXING

10.06.2.01 AIR TEMPERATURE

No concrete shall be mixed or placed while the air temperature is, or is likely to be (in the opinion of the Engineer) within 24 hours, below 50°C or while the shade temperature exceeds 38°C without the approval of the Engineer.

10.06.2.02 CONCRETE TEMPERATURE

The temperature of the concrete placed in the work shall not be less than 10°C nor more than 32°C.

10.06.2.03 EQUIPMENT

Concrete shall be mixed with mechanically operated mixers except in an emergency.

Concrete shall either be mixed at site or at a central mixing plant in which case the concrete should be transported to the site in agitation vehicles or the concrete shall be truck mixed during delivery.

A metal plate shall be attached to all mixing equipment, including agitators, on which is plainly marked (for the various uses for which the equipment is designed) the capacity in terms of volume of mixed concrete, and the manufacturer's recommended speed of rotation for mixing and/or agitation.

All equipment shall be in sound mechanical condition and the interior of the drum or pan and mixing blades shall be kept thoroughly clean and free of hardened concrete or mortar by cleaning at frequent intervals as directed by the Engineer, and in any case before the commencement of, or after a break in, mixing operation.

10.06.2.04 MIXING AT SITE OR AT CENTRAL MIXING PLANT

The mixing of concrete shall be done in batch mixers of approved type which will ensure a uniform distribution of the materials throughout the mass.

The mixer shall be of such capacity that one or more whole bags of cement may be used per batch of concrete. The volume of the mixed material shall not exceed the manufacturer's rated capacity of the mixer.

Charging of the mixer shall be so arranged that all ingredients including the water, will enter the mixer in proportional amounts, and not any of them separately. During the charging of the mixer the inlet valve to the water supply tank (if any) shall be closed.

The mixing time for each batch shall not be less than one and one half (1½) minutes after ingredients are in the mixer, and prior to any portion of the batch being removed. For mixers of capacity greater than one cubic yard the mixing times shall be increased as required by the Engineer, or as specified by the manufacturers.

The mixer shall rotate during the whole period of mixing at its designed speed, which is to be indicated on the mixer.

The first batch shall contain an excess of cement, sand and water, sufficient to coat the inside of the mixer without reducing the required mortar content of the mix.

The entire contents of a batch shall be discharged from the mixer before any materials are placed therein for the succeeding batch.

10.06.2.05

MIXING IN TRANSIT

Truck mixers shall comply with the requirements of the proceeding clause, where applicable, and shall be of the revolving drum type, water tight, and so constructed that the concrete can be mixed to ensure a uniform distribution of materials throughout the mass. All solid materials for the concrete shall be accurately measured in accordance with this Specification and charged into the drum at the proportioning plant. The mixing water may be added directly to the batch or alternatively the truck mixer shall be equipped with a tank for carrying water. Only the prescribed amount of water shall be placed in the tank, unless the tank is equipped with a device by which the quantity of water added can be reliably measured. Truck mixers may be required to be provided with means by which the mixing time can be readily verified by the Engineer.

The size of the batch in truck mixers shall not exceed the manufacturer's specified capacity nor the following percentage of the gross volume of the drum:

- i) Top-door loading - 50 per cent
- ii) End-door loading - 60 per cent

Mixing in transit shall be continued for not less than fifty revolutions after all ingredients, including the water are in the drum. The speed shall not be less than four (4) r.p.m. nor more than a speed resulting in a peripheral velocity of the drum of seventy metres per minute. In any case not more than one hundred and fifty (150) revolutions of mixing shall be at a speed in excess of six (6) r.p.m.

10.06.2.06

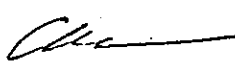
DELIVERY BY ROAD VEHICLE OF AGITATOR OR TRUCK MIXER TYPE

Concrete shall be transported either in an approved water-tight agitator in which segregation will not take place and which the concrete can be discharged freely, or in a truck mixer operating at agitator speed. Agitation shall be maintained from the time the concrete is placed in the agitator until delivered to the Works. In the case of truck mixed concrete, the mixer on completion of mixing shall continue to operate at agitating speed until the concrete is delivered to the Works. In either case the concrete shall be agitated at the rate specified by the machinery manufacturer at agitating speed.

The size of the batch in a agitator vehicle shall not exceed the manufacturer's rated capacity nor shall it exceed eighty (80) per cent of the gross volume of the drum of the mixer.

Concrete shall be discharged at the Works, from the truck mixer or agitator within one and one half ($1\frac{1}{2}$) hours from the addition of cement to the aggregates and shall be placed in the forms within twenty (20) minutes after discharge. Satisfactory means for verification of the time of haulage shall be provided. These times may be reduced by the Engineer if the weather conditions prevailing and the materials being used are, in his opinion, such that damage may be done to the concrete.

On arrival at the site the slump of each batch of concrete shall be determined as set out in BS 1881. The slump shall not exceed the relevant value specified in Section 6 Clause 10.06.3 "Consistency", nor shall it be less than fifty (50) per cent of this value.



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In the event of the failure of the agitating equipment during transport, concrete may be accepted, provided the Engineer considers it has not partially hardened and provided the above requirements for haulage times and slump are complied with. Before being placed in the forms it shall be thoroughly re-mixed either by hand or other approved means. The addition of water will not be permitted.

10.06.2.07 MIXING IN AN EMERGENCY

(a) General

A stand-by mixer may be provided on the site capable of being operated immediately in the case of a breakdown.

Re-mixing of concrete which has become partially hardened will not be permitted. Such concrete shall not be used in the work.

Where for reasons of delay, it is desired to hold a batch in the mixer, mixing may be continued for a maximum of ten (10) minutes. For periods up to a maximum of one and one half ($1\frac{1}{2}$) hours the batch may be held in the mixer and turned over at intervals provided it is agitated as directed by the Engineer.

(b) Hand Mixing

In the case of breakdown of the mechanical equipment, the Engineer may give approval to hand mixing, in small quantities so as to reach/support on a suitable location for a construction joint.

When mixing by hand is permitted, the following procedures shall be adopted.

Hand mixing shall be done on an approved water-tight platform of sufficient size to allow the mixing of at least two (2) batches simultaneously.

The amount of cement used shall be 10% more than the amount specified for machine mixed concrete of the same class.

The fine aggregate and cement shall first be mixed until a uniform colour, ^{is obtained and then spread on the} mixing platform in a thin layer. The coarse aggregate, which shall have been previously drenched with water, shall then be spread over the fine aggregate and cement in a uniform layer, and the whole mass turned as further water is added with a rose sprinkler. After the water is added, the mass shall be turned at least three (3) times, not including shovelling into barrows or forms, and until the mixture is uniform in colour and even in appearance. Hand mixed batches shall not exceed 0.12m³ per batch.

At least two test cylinders shall be moulded for 28 days test whenever hand-mixing is resorted to.

10.06.3 CONSISTENCY

The concrete to be used in the work shall be of such consistency that it can be placed, compacted and worked readily into all corners, angles and narrow sections of the forms and around reinforcement, but without permitting the ingredients to segregate, or excess free water to collect on the surface,

The consistency of the concrete shall be checked by use of a slump cone in accordance with BS1881. The contractor shall provide at his own cost all materials and facilities for the taking of slump test by the Engineer or his representative during the mixing and placing of concrete.

The maximum slump in all concrete shall not exceed 75mm. This value may be reduced by the Engineer as to ensure that no segregation occurs in the concrete and that no surplus water is in evidence after completion of vibration.

10.06.4 CONSTRUCTION JOINTS

No construction joint shall be formed without the prior approval of the Engineer.

Where the location and/or shape of construction joints are shown on the drawings they shall be constructed in accordance with such details.

However, should the contractor desire additional joints to those shown on the drawings, or joints at other locations, detailed drawings of his proposal shall be submitted four (4) weeks in advance for the approval of the Engineer and if approved, the work shall be carried out strictly in conformity therewith.

Whenever the work of placing concrete is delayed until the concrete has taken its initial set, the point of stopping shall be deemed a construction joint. Should such a construction joint become necessary e.g. in the case of unforeseen circumstances such as plant breakdown, a head shall be provided generally perpendicular to the major axis of the member. However, if the stoppage occurs at a place considered by the Engineer to be unsuitable for a construction joint, hand mixing shall be resorted to until a suitable location for a joint is reached.

Unless the Engineer directs otherwise, construction joints shall be perpendicular to the major axis of the member. Joints on exposed faces shall be truly horizontal or vertical unless otherwise directed by the Engineer and if necessary, heading shall be affixed inside wallforms on exposed faces to ensure regularity of joints.

In order to provide for bond at a construction joint, surfaces shall be keyed, doweled or roughened as directed by the Engineer, Keys shall be formed by the insertion and subsequent removal, without injury to the concrete, of bevelled wood strips, which shall be thoroughly saturated with water prior to insertion.

Before depositing fresh concrete on or against set concrete, the forms shall be re-tightened and the surface of the concrete shall be thoroughly cleaned of loose and foreign matter and laitance.

The surface of the concrete shall then be saturated with water not more than fifteen (15) minutes prior to the placing of the fresh concrete. After removing any excess water, the surface of the joints shall be coated thinly with neat cement grout.

10.06.5 PLACING

All concrete shall be placed in the dry.

No concrete shall be placed while rain falls at the site. However, the Engineer may permit concrete to be placed during wet weather provided the entire area of the pour is covered or other protective measures are taken to the satisfaction of the Engineer. In addition, the Engineer may direct that placing of concrete shall not commence if, in his opinion, there is likely to be rain which would adversely affect the concrete.

All concrete shall be placed in daylight and no work shall be started unless it can be finished in daylight.

Unless additives to delay the initial set are used in accordance with the Engineer's prior approval, concrete shall be placed so that no face is left for more than 15 minutes before fresh concrete is deposited against it. Any concrete which has developed its initial set or which is not placed in the form and compacted within 20 minutes after discharge from the mixer agitator, shall not be used.

Concrete shall be placed in one continuous operation between ends of members and/or construction joints, irrespective of any meal hours, thereby forming one unit of construction.

Before commencement of placing concrete, forms shall be checked to ensure that the work is true to line and shape, and any bulging, sagging or warping shall be corrected. All hardened concrete and foreign materials shall be removed from the inner surfaces of the conveying equipment and all debris and water shall be removed from the space to be occupied by the concrete.

The method of handling and placing concrete shall be such as will prevent the segregation or loss of ingredients and avoid re-handling as far as possible. However, if so requested by the Engineer, concrete shall be placed on a spreading platform after transport from the mixer and turned over to ensure uniform consistency before being shovelled into place. Under no circumstances shall concrete be thrown from the shovels.

Dropping the concrete freely from a greater height than 2.5 metres depositing large quantities at any point; and moving and working it along the forms will not be permitted. Conveying equipment, including open troughs and chutes where used, shall be made of metal or metal lined. When used on steep slopes, troughs and chutes shall be equipped with baffles, or be placed in short lengths in such a way that the direction of movement of the concrete is changed. Troughs and chutes shall be thoroughly washed out before each run of concrete, waste matter being discharged outside the forms.

If at any stage during reinforced concrete work, the forms show any sign of bulging, sagging or warping, that portion of the concrete shall be immediately removed and the form reconstructed rigidly to the satisfaction of the Engineer.

Concrete forms or projecting reinforcement shall not be disturbed in any manner after placing, until removal of forms is authorized by the Engineer.

Concrete walls shall be built up in continuous horizontal layers the thickness of which shall generally not exceed 300 mm. No layer shall be tapered off, but shall be stopped against tight forms to produce square ends, and shall be so moulded by inset formwork that the construction joint will finish approximately square to all exterior surfaces.

10.06.6 COMPACTION

10.06.6.01 GENERAL

During and immediately after placing the concrete shall be compacted by means of external and/or internal vibration, tamping, spading and slicing. Care shall be taken to fill every part of the forms to force the concrete under and around the reinforcement without displacing it, to work back coarse aggregate from the face to expel air bubbles and to fill all voids. Care shall be taken to ensure that concrete is not vibrated excessively resulting in segregation.

The men employed in compacting shall have had experience in concrete work, including vibration and the whole of the compacting shall be executed to the satisfaction of the Engineer.

10.06.6.02 EXTERNAL VIBRATION

When required, the concrete shall be vibrated by the application to the formwork of approved mechanical or pneumatic vibrators of the piston or percussion type capable of striking not less than five thousand (5,000) blows per minute with a weight of approximately 200 grammes.

External vibrations shall be mounted in such a manner as to transmit vibration in the plane of the section. If more than one vibrator is attached to the forms, the distance between the vibrators shall be large enough to prevent the possibility of one vibrator cancelling at the effect of the other(s). Vibrators of different frequencies shall not operate at the same time.

10.06.6.03 INTERNAL VIBRATION

When external vibration is not used, the concrete shall be vibrated by inserting an approved mechanical or pneumatically operated vibrator in the freshly placed mass. The vibration shall be capable of pulsating at least five thousand (5,000) times per minute when placed in concrete having a 25

slump, and the influence of the vibrator in such material shall be visible over a radius at least 400mm.

Vibrators shall be pushed down into the concrete in a vertical direction until the whole of the concrete in their immediate vicinity has been vibrated to its full depth, then withdrawn slowly and re-inserted at the next position. Vibrators shall not be left stationary in one position for more than 30 seconds, and shall be inserted at intervals of not more than 40mm. They shall not be used to move the concrete sideways along the forms, and shall not be allowed to rest on the reinforcing steel.

10.06.6.04

NUMBER OF VIBRATORS

The number and position of external vibrators for each 6 cubic metres in use at one time shall be as approved by the Engineer.

Two internal vibrators shall be used for each 6 cubic metres per hour rate of pour, or part thereof, with a minimum of two vibrators at each head of pour.

For each group of four units (or part) in operation, one additional vibrator shall be provided and kept in readiness for immediate use should a breakdown occur.

10.06.

FINISHING OF UNFORMED SURFACE

Unformed surfaces shall be compacted and tamped so as to flush mortar to the surface, screeded and finally dressed with a steel float to an even surface. All future contact surfaces shall be left rough with the coarse aggregate at a surface firmly embedded but not forced below the surface.

10.06.8

CURING

Freshly finished surfaces shall be effectively protected from rain, or injury from other causes until hard set has occurred. All exposed surfaces shall be protected from the sun immediately after the concrete has taken its initial set. All concrete shall be covered with an approved material (used cement bags are not acceptable) on a layer of sand at least 50mm thick and kept damp for a period of at least seven (7) days, or such alternative curing arrangement as the Engineer approve.

10.06.9. REMOVAL OF FORMS AND FALSEWORK

All forms and falsework shall remain in place until their removal is authorised by the Engineer and in any case for minimum periods specified hereinafter.

Care shall be taken in removing forms so that the concrete will not be cracked, chipped or otherwise damaged. The use of crow bars or other levering devices exerting pressure on the fresh concrete to loosen the forms will not be permitted.

For all types of continuous structures the falsework supports shall not be removed from any span until the required periods have elapsed after the placing of the last concrete in the next succeeding span or as shown on the drawings.

Columns shall always be stripped to determine whether they are satisfactory before stripping any members which they support.

No superimposed load shall be allowed on any part of a structure until after the period specified for falsework and formwork to remain in place has expired and then only when authorised by the Engineer.

After the completion of the structure all forms and falsework and supports for falsework shall be completely removed.

Forms shall remain in position for the following minimum period after placing the last concrete therein (provided the air shade temperature is not less than 10°C).

Vertical and non load bearing surfaces 24 hours
Horizontal, inclined, and load bearing surfaces 7 days

10.06.10 TREATMENT OF FORMED SURFACES

10.06.10.01 GENERAL

All concrete surfaces shall be true and even, free from air pockets, depressions, or projections beyond the surface. All arrises shall be sharp and true and mouldings shall be evenly mitred or rounded. Care shall be exercised in removing forms to ensure this result.

As soon as the forms are removed from the concrete work and after inspection by the Engineer, all

rough places, holes, and porous spots shall be repaired by removing defective work and filling with stiff cement mortar having the same proportions of cement and sand as used in the concrete, and shall be brought to an even surface with wooden float.

Any tie wires extending with the permission of the Engineer shall be cut back after removal of forms to a depth of at least 40 mm with sharp chisels or cutters. All cavities caused by removal of bolts or ties shall be wetted and carefully packed with cement mortar as above.

Any honey-combing or other defect accepted by the Engineer shall be repaired as directed by the Engineer and to his satisfaction.

If required by the Engineer, the surfaces of both cavities, the wire holes, and all defects in concrete shall be coated prior to the placing of mortar, grout, or fresh concrete, with an approved bonding agent in lieu of wetting with water. The method of application of such agent and the conditions in which it is used shall generally be as laid down by the manufacturer and shall be approved by the Engineer.

I .06.I0.02 SURFACE FINISH

When repaired sections if any are set hard, each surface exposed to view shall be brought to the class of finish stated below. Surfaces shall not be plastered or cement washed.

Mortar fins shall be removed and the surface thoroughly wetted. It shall then be rubbed with a No. 16 carborundum stone or similar abrasive until all form marks are removed and the surface is uniform in texture and arrises are true. The paste formed in the process shall be uniformly distributed over the surface while it is still wet and allowed to set. It shall then be rubbed off with dry hessian or canvas.

Surfaces not exposed to view shall have mortar fins removed until the surface is flush with the surrounding concrete.

10.06.11 CONCRETE PLACED UNDER WATER

10.06.11.01 GENERAL

If the contractor considers it necessary to place concrete under water he shall make written application to the Engineer, giving details of his proposed method.

Concrete will not be placed under water without the written consent of the Engineer.

10.06.11.02 PLACEMENT

Any concrete deposited under water shall have the cement content increased by 15% or as approved by the Engineer. Great care is to be exercised to ensure that no cement is washed out, and all such concrete is to be placed by means of a tremie tube.

SECTION V: STEEL REINFORCEMENT FOR CONCRETE

10.07.1 MATERIAL

Unless shown otherwise on the drawings, reinforcement for concrete shall consist of round structural steel bars complying with the requirements of Australian Standard AS 1302 "Steel Reinforcing Bars for Concrete".

Where the use of other steel is required by the drawings, such steel shall comply with the requirements of the appropriate following specifications:

Australian Standard AS 1303
"Hard Drawn Steel Reinforcing Wire"
Australian Standard AS 1304 "Hard
Drawn Steel Wire Reinforcing
Fabric for Concrete".

Steel reinforcement shall be free from loose or thick rust, grease, tar, paint, oil, mud, mill scale, mortar or any other coating, but shall not be brought to a smooth polished condition.

The contractor shall supply test certificates for steel to be used in the works.

iron wire of diameter not less than No.18 gauge. Steel shall not be supported on metal supports which extend to surface of concrete, or wooden supports nor on pieces of coarse aggregate.

Placing and fastening of reinforcement in each section of the work shall be approved by the Engineer or his representative before any concrete is deposited in the section and ample notice shall be given to allow time for inspection.

10.07.7 COVER

The clear concrete cover of any bar, including stirrups shall be as shown on the drawings, where not so indicated the cover shall be 50mm.



10.07.2 BENDING

Reinforcement shall be carefully formed to the dimensions and shapes shown on the drawings. Reinforcement shall not be bent or straightened in a manner that will injure the material, and bars with kinks or bends not shown on the drawings will not be accepted. Heating of reinforcement will not be permitted except for the purpose of forming hooks in bars greater than 25 mm diameter in which case it shall be done under the supervision of the Engineer, the steel being heated to as small an extent as possible, and to no greater heat than a dullcherry red.

10.07.3 SPlicing

All reinforcement shall be furnished in the lengths indicated on the drawings. Except where shown on the drawings, splicing of bars will only be permitted with the approval of the Engineer.

No extra payment will be made for any splice not shown on the drawings.

Laps in reinforcing bars shall be as shown on the drawings; or if not so shown shall be forty-eight (48) diameters long if bars are not hooked, and thirty (30) diameters between centres of hooks, if hooked. If practicable, all bars above 12 mm diameter shall be hooked.

10.07.4 MARKING

Bars of identical shape shall be made up in bundles of convenient sizes and securely tied together by soft iron wire. Each bundle shall have a stout metal label of not less than 40 mm diameter attached to it. Each metal label shall be punched with the appropriate marking in accordance with the steel list shown on the drawing.

10.07.5 STORAGE

Reinforcement shall be stored under a waterproof shelter and supported above the surface of the ground, and shall be protected from injury and from deterioration due to exposure.

10.07.6 PLACING

Reinforcement shall be accurately placed as shown on the drawings and shall be securely held by blocking from the forms, by supporting on concrete chairs, or metalhangers, as may be required, and by wiring together at intersections, using annealed

DEPARTMENT OF AGRICULTURE
DRAINAGE & IRRIGATION DIVISION

SPECIFICATION

FOR

ENGINEERING WORKS

CHAPTER 18 ENGINEER'S SITE OFFICE AND TRANSPORT

18.01 TYPE AND SIZE

The Contractor shall supply and erect a wooden office bearing a neatly painted sign "Department of Agriculture, Site Engineer" for the sole use of the Engineer or his representative. Such office shall be not less than 3 metres square by 2.4 metres high, inside measurement, with weather-board sides, galvanised iron or other approved type of roofing, boarded floor, moveable glazed windows and a door with lock and two (2) keys. It shall be ventilated, weatherproof, and shall be painted on the outside. An approved separate lavatory of either the earth or water closet type shall be provided.

The office shall be erected and fully furnished and equipped as at clause 18.04 ready for use at the commencement of the Contractor's operations on site.

18.02 LOCATION

The office shall be erected on a site within the Project boundaries and approved by the Engineer. All weather access to the office shall be provided by the Contractor and maintained throughout the period of the Contract.

18.03 SERVICES

Where electricity is available that service shall be connected to the office and one light point and one power point provided. The Contractor shall be responsible for all payments, including tariff charges, in connection with the installation and maintenance of this service.

The Contractor shall arrange for the installation of radio telephone in the site office with an additional to be installed one at the Engineer's permanent station for the exclusive use of the Engineer or his representative. The Contractor shall be responsible for all payments including the rent of the radio telephone.

18.04 FURNISHINGS

The office shall be furnished with a drawing table, not less than 1.5m x 1m, an office stool with padded seat, an office table 1.2m wide with not less than two drawers, two chairs with padded seats, a lock-up cupboard 900mm x 400mm x 750mm high with two shelves, a washbasin and jug.

18.05

MAINTENANCE

The Contractor shall have the office kept clean and in good order, supplied with fresh water, and shall also arrange regular sanitary clearances, if the lavatory is not connected to a sewer.

18.06

REMOVAL

The Contractor shall make all necessary arrangements for the use of the land required and upon completion of the contract the office and fittings, other than furnishings provided by the Department, shall remain the property of the Contractor and shall be removed by him at his own expense from the site of the works and the area restored to its original condition.

18.B

ENGINEER'S SITE TRANSPORT

The Contractor will make available at all times suitable transport for the exclusive use of the Engineer and his representative for access to all parts of the work.

Transport for the Engineer has to be a 4 - wheel drive open back utility in good condition, not older than 2 years, not less than 1500 cc engine.

The vehicle will be assigned to and driven by the Engineer for supervision of the contract and other duties, not necessarily related to this contract. Fuel for the vehicles to be supplied by the Contractor for such use which is not expected to exceed 3000km per month and all running costs to be at the Contractors expense.

The Contractor shall check the vehicle daily or whenever required, keep it clean, serviced and ensure that the vehicle is in road worthy condition at all times. All maintenance and repairs to be carried out by the Contractor at his own cost.

On days the vehicle is unserviceable or not available for use, the Engineer will make other arrangements and recover the full cost from Contractor.

The Contractor to fully insure the vehicle at his own cost, in keeping with the Road Transport Department regulations and hand over the relevant documents to the Engineer.

DEPARTMENT OF AGRICULTURE
DRAINAGE & IRRIGATION DIVISION

SPECIFICATION
FOR
ENGINEERING WORKS

SCHEDULE OF QUANTITIES

PREAMBLE

1. GENERAL

The contract documents are the tender, the conditions of contract, the specifications, the drawings and these bills of quantities, all of which the contractor shall be deemed to have read and examined before making his tender.

In making his tender and in pricing the bills of quantities the contractor shall cover himself for (a) all services and materials which according to the true intent and meaning of the contract documents may be reasonably inferred as necessary for carrying out in a good and workmanlike manner of the works shown upon the drawings and described in the specification, whether expressly mentioned therein or not, (b) all duties, obligations, liabilities and responsibilities which the contract documents place upon the contractor, in connection with this contract.

The contractor shall include in the bills such amounts as he may deem necessary to cover the requirements in the contract documents. Items shall not be bracketed together and where no price is inserted against any item in the bills, the cost thereof shall be deemed to have been included elsewhere.

All items will be measured net in accordance with the drawings, with appropriate adjustment for authorized changes, variations due to ground levels and similar causes. No extra payments will be made for increased dimensions in excavations to provide working spaces or for any other cause.

Excavations in canals as well as fill on the road bunds and other embankments shall be measured by pre and post work surveys of the site and no allowance is to be made for variations due to compaction, bulking and similar causes. Where excavated material is used to form bunds and payment is to be made once only for the combined work, such payment will be based on the volume of excavation.

Acc



The quantities inserted in the schedule of quantities are approximate only and are furnished for the guidance of the tenderers and to enable a comparison of the tenders.

Provisional quantities have been included for items of work, the need for which is not clearly established at the stage.

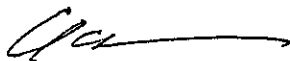
Provisional sums where provided are to be expended for unforeseen or additional works which shall be measured and valued at rates given in the schedule of quantities or where such rates are not applicable, as provided for in the conditions of contract.

Prime costs are included in the schedule of quantities for items and services which may be provided by sub-contractors. The tenderers are to provide their percentage of the cost to cover the outlays required from them and their overhead charges, etc.



BILL OF QUANTITIES (NAVUA PROJECT)

- BILL NO.1 EARTHWORKS IN FIELD / CANAL / ROADS
- BILL NO.2 STRUCTURE / CANAL BIFURCATION (TYPE A) : 3 NOS.
CANAL BIFURCATION (TYPE B) : 3 NOS.
- BILL NO.3 STRUCTURE / FARM INLET (TYPE A) : 9 NOS.
FARM INLET (TYPE B) : 24 NOS.
FARM OUTLET (TYPE A) : 33 NOS.
- BILL NO.4 STRUCTURE / ACCESS CULVERT (TYPE A) : 6 NOS.
ACCESS ROAD (TYPE A) : 4 NOS.
ACCESS CULVERT (TYPE B) : 5 NOS.
ACCESS ROAD (TYPE B) : 9 NOS.
ACCESS CULVERT (TYPE C) : 4 NOS.
- BILL NO.5 STRUCTURE / DRAIN ACCESS CULVERT (TYPE A) : 4 NOS.
- BILL NO.6 STRUCTURE / DRAIN ACCESS CULVERT (TYPE B) : 3 NOS.



BILL NO.1 EARTHWORKS IN FIELD/CANAL/ROADS

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Remove 0.10m thick topsoil layer, shift over max. length of 40m, and stockpile. Upon completion of field levelling operations (Item 2 and 3), spread stockpiled topsoil in .0.10m thick layer over the field, and trim and compact (track rolled) as directed by the Engineer.	ha	11	2,350	25,850.00
2	Cut and fill to achieve designed field elevation level in Class A fields where max. cutting depth will be 0.30m and average earth-moving per ha will be 1,500m ³ . Filling operation to be in layers not exceeding 0.10m thickness and track rolled compacted to the satisfaction of the Engineer.	ha	5	2,350	11,750.00
3	Cut and fill to achieve designed field elevation level in Class B fields where max. cutting depth will be 0.15m and average earth-moving will per ha will be 750 m ³ . Filling operation to be in layers not exceeding 0.10m thickness and track rolled compacted to the satisfaction of the Engineer.	ha	11	1,500	16,500.00
4	Push, compact (track rolled) and trim soil, from field levelling operations, or spoils from drainage excavation, to form field bund to specification DR. 6 (Typical Sec. BUND)	m	1,280	.95	1,216.00
5	Push, compact (track rolled) and trim approved soil from field levelling operation to form canalpad or farm road.	m	4,740	3.65	17,301.00
	cont'd				

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BILL NO.1 (CONT'D)

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
6	Excavate to canal profile in pad formed in Item 5, and throw spoils along side canal, including the spreading, compacting, and trimming of these spoils on farm roads or along canal bunds as directed by the Engineer.	m ³	560.0	3.25	1,820.00
7	Supply spread and compact and trim gravel for road pavement to a compacted thickness of 0.15m.	m ³	820.0	18.00	14,760.00
8	Excavate to drainprofile and throw spoils alongside the drain.	m ³	6,000	2.00	12,000.00
BILL NO.1 TOTAL					\$ 101,197.00

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BILL NO.2 STRUCTURE / CANAL BIFURCATION (TYPE A) : 3 NOS.

CANAL BIFURCATION (TYPE B) : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	150	7.00	1,050.00
2	Supply, place and compact gravel in position	m ³	4	19.00	76.00
3	Supply and compact 15 MPa concrete on the gravel in position as based concrete, including supplying and fixing formwork.	m ³	1	200.00	200.00
4	Supply, bend and fix 16mm dia. deformed steel reinforced bars in division box.	kg	580	2.50	1,450.00
5	Supply and fix check gate (steel plate 400mm x 400mm with handle, 3mm thickness).	Unit	6	180.00	1,080.00
6	Transport from HUMES (Suva) 0.30m dia x 2.44m long concrete pipes and fix in position.	Nos.	12	27.50	330.00
7	Supply, place and compact 25 MPa concrete in division box, including supplying and fixing formwork.	m ³	11	260.00	2,860.00
8	Supply 0.10m nominal size stones and form cement grouted rip rap.	m ²	9	30.00	270.00
9	Supply, spread and compact approved soil backfill in structure.	m ³	80	7.50	600.00
BILL NO.2 TOTAL					\$ 7,916.00

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BILL NO.3 STRUCTURE / FARM INLET (TYPE A) : 9 NOS.
 FARM INLET (TYPE B) : 21 NOS. } 66
 FARM OUTLET (TYPE B) : 33 NOS. }

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	210	8.50	1,785.00
2	Supply, place and compact gravel in position	m ³	40	22.00	880.00
3	Supply, bend and fix 16mm dia. deformed steel reinforced bars in division box.	kg	340	2.50	850.00
4	Transport from HUMES (Suva) 0.10m dia x 1.22m long concrete pipes and fix in position.	Unit	234	12.50	2,925.00
5	Supply, place and compact 25 MPa concrete in position including supplying and fixing formwork.	m ³	7	300.00	2,100.00
6	Supply, spread and compact approved soil backfill in structure.	m ³	80	10.00	800.00
BILL NO.3 TOTAL					\$ 9,340.00

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BILL NO.4 STRUCTURE / ACCESS CULVERT (TYPE A) : 6 NOS.
ACCESS ROAD (TYPE A) : 4 NOS.
ACCESS CULVERT (TYPE B) : 5 NOS. 12.00
ACCESS ROAD (TYPE B) : 9 NOS.
ACCESS CULVERT (TYPE C) : 4 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Supply, place and compact gravel in position.	m ³	12	25.00	300.00
2	Supply, place and compact 15 MPa concrete on the gravel in position as based concrete, including supplying and fixing formwork.	m ³	2	200.00	400.00
3	Supply, bend and fix 16mm dia. deformed steel reinforced bars in position.	kg	1,100	2.20	2,420.00
4	Transport from HUMES (Suva) 0.30m dia x 2.44m long concrete pipes and fix in position.	Unit	25	27.50	687.50
5	Supply, place and compact 25 MPa concrete in position, including supplying and fixing formwork.	m ³	30	270.00	8,100.00
6	Supply 0.10m nominal size stones and form cement grouted rip rap.	m ²	24	30.00	720.00
7	Supply, spread and compact approved soil backfill in structure.	m ³	60	7.50	450.00
8	Supply, spread and compact approved soil embankment in position	m ³	30	10.00	300.00
BILL NO.4 TOTAL				\$	13,377.50

BILL NO.5 STRUCTURE / DRAIN ACCESS CONVECT : 4 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile	m ³	30	6.50	195.00
2	Supply, place and compact gravel in position.	m ³	5	25.00	125.00
3	Transport from HUMES (Suva) 0.60m dia x 2.44m long concrete pipes and fix in position.	Unit	16	45.00	720.00
BILL NO.5 TOTAL					\$ 1,040.00

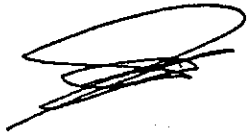
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BILL NO.6 STRUCTURE / DRAIN ACCESS CULVERT (TYPE B) : 4 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	25	6.50	162.50
2	Supply and install 0.20m dia x 2.00m long wooden pile in position.	Unit	24	25.00	600.00
3	Supply, place and compact gravel in position	m ³	4	25.00	100.00
4	Supply, place and compact 15 MPa concrete in position as based concrete, including supplying and fixing formwork.	m ³	2	200.00	400.00
5	Supply, bend and fix 16mm dia. deformed steel reinforced bars in position.	kg	1120	2.20	2,464.00
6	Supply, place and compact 25 MPa concrete in position, including supplying and fixing formwork.	m ³	20	260.00	5,200.00
7	Supply 0.10m nominal size stones and form cement grouted rip rap.	m ²	60	30.00	1,800.00
BILL NO.6 TOTAL					\$ 10,726.50

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The Pilot Infrastructure Improvement Works for

The Improvement of Rice Cultivation Technology Project

Bill of Quantities (NAVUA PROJECT)


Summary

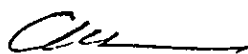
BILL NO.1	.....	\$	<u>101,197.00</u>	
BILL NO.2	.....	\$	<u>7,916.00</u>	
BILL NO.3	.....	\$	<u>9,340.00</u>	
BILL NO.4	.....	\$	<u>13,377.50</u>	
BILL NO.5	.....	\$	<u>1,040.00</u>	
BILL NO.6	.....	\$	<u>10,726.50</u>	
Sub Total		\$	<u>143,597.00</u>	
10% Contingency		\$	<u>14,359.70</u>	
Total		\$	<u>157,956.70</u>	(Round off)

Dollars ONE HUNDRED FIFTY SEVEN THOUSAND NINE HUNDRED FIFTY SIX
DOLLARS & SEVENTY CENTS.

Place : SOVA.

Date : 30th August, 1988

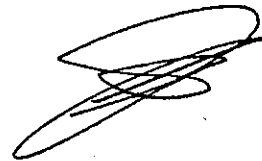
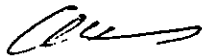

Signed Construction Equipment Hire Ltd.
P.O. Box 13331
SOVA.





BILL OF QUANTITIES (NAUSORI PROJCT)

BILL NO.1	EARTHWORKS IN FIELD / CANAL / ROADS	
BILL NO.2	STRUCTURE / CHECK STRUCTURE	: 2 NOS.
BILL NO.3	STRUCTURE / FARM OUTLET (TYPE B)	: 26 NOS.
	FARM OUTLET (TYPE A)	: 1 NOS.
BILL NO.4	STRUCTURE / ACCESS ROAD (TYPE A)	: 12 NOS
	ACCESS ROAD (TYPE B)	: 3 NOS.
BILL NO.5	STRUCTURE / DRAIN ACCESS CULVERT (TYPE A)	: 3 NOS.
BILL NO.6	STRUCTURE / DRAIN ACCESS CULVERT (TYPE B)	: 3 NOS.



BILL NO.1 EARTHEWORKS IN FIELD/CANAL/ROADS

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Cut and fill to achieve designed field elevation level, max. cutting depth will be 0.10m and average earth-moving per ha will be 500 m ³ . Filling operation to be in layers not exceeding 0.10m thickness and track rolled compacted to the satisfaction of the Engineer.	ha	13	1500	19,500.00
2	Push, compact (track rolled) and trim soil, from field levelling operations, or spoils from drainage excavation, to form field bund to specification DR.23 (Typical Sec. BUND).	m	2,700	1.20	3,240.00
3	Push, compact (track rolled) and trim approved soil from field levelling operation to form canalpad or farm road.	m	3,200	4.00	12,800.00
4	Supply spread and compact and trim gravel for road pavement to a compacted thickness of 0.15m.	m ³	760	25.00	19,000.00
5	Set out and clear in canal areas of all rubbish and bushes in southern area.	m ²	6,400	.80	5,120.00
6.	Excavate to drain profile and throw spoils alongside the drain.	m ³	4,800	2.50	12,000.00
	BILL NO.1 TOTAL				\$ 71,660.00

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BILL NO.2 STRUCTURE / CHECK STRUCTURE : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavete for structures and stockpile.	m ³	24	6.50	156.00
2	Supply, place and compact gravel in position. position.	m ³	3	22.00	66.00
3	Supply, place and compact 15 MPa concrete in position as based concrete, including supplying and fixing formwork.	m ³	1	180.00	180.00
4	Supply, bend and fix 16mm dia. deformed steel reinforced bars in position.	kg	1,100	2.20	2,420.00
5	Supply and fix stop gate (steel plate 800mm x 800mm, 3mm plate thickness) with spindle and handle in position.	Unit	2	920.00	1,840.00
6	Supply, place and compact 25 MPa concrete in position, including supplying and fixing formwork.	m ³	20	260.00	5,200.00
BILL NO.2 TOTAL				\$	9,862.00

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BILL NO.3 STRUCTURE / FARM OUTLET (TYPE B) : 26 NOS.

FARM OUTLET (TYPE C) : 1 NOS.

ITEM	DISCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	110	8.50	935.00
2	Supply, place and compact gravel in position.	m ³	14	25.00	350.00
3	Supply, bend and fix 16mm dia. deformed steel reinfoeced bars in division box.	kg	165	2.50	412.50
4	Transport from HUMES (Suva) 0.15m dia x 1.22m long concrete pipes and fix in position.	Unit	166	15.00	2,490.00
5	Supply, place and compact 25 MPa concrete in pipe portion, including supplying and fixing formwork.	m ³	3	300.00	900.00
6	Supply, spread and compact approved soil backfill in structure.	m ³	35	10.00	350.00
BILL NO.3 TOTAL				\$	5,437.50

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BILL NO.4 STRUCTURE / ACCESS ROAD (TYPE A) : 12 NOS.

ACCESS ROAD (TYPE B) : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Supply, spread and compact approved soil embankment in position	m ³	25	10.00	250.00
BILL NO.4 TOTAL				\$	250.00

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BILL NO.5 STRUCTURE / DRAIN ACCESS CULVERT (TYPE A) : 3 NOS.

ITEM :	DESCRIPTION OF WORK	UNIT	Q' TY	RATE	AMOUNT
1	Excavate for structures and stockpile	m ³	25	6.50	162.50
2	Supply, place and compact gravel in position.	m ³	4	25.00	100.00
3	Transport from HUMES (Suva) 0.60m dia. x 2.44m long concrete pipes and fix in position.	Unit	12	45.00	540.00
BILL NO.5 TOTAL				\$	802.50

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BILL NO.6 STRUCTURE / DRAIN ACCESS CULVERT (TYPE B) : 3 NOS.

ITEM	DESCRIPTION OF WORK	UNIT	Q'TY	RATE	AMOUNT
1	Excavate for structures and stockpile.	m ³	25	6.50	162.50
2	Supply and install 0.20m dia x 2.00m long wooden pile in position.	Unit	24	25.00	600.00
3	Supply, place and compact gravel in position.	m ³	4	25.00	100.00
4	Supply, place and compact 15 MPa concrete in position as based concrete, including supplying and fixing formwork.	m ³	2	200.00	400.00
5	Supply, bend and fix 16mm dia. deformed steel reinforced bars in position.	kg	1120	2.20	2,464.00
6	Supply, place and compact 25 MPa concrete in position, including supplying and fixing formwork.	m ³	20	260.00	5,200.00
7	Supply 0.10m nominal size stones and form cement grouted rip rap.	m ³	60	30.00	1,800.00
BILL NO.6 TOTAL				\$	10,726.50

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The Pilot Infrastructure Improvement Works for

The Improvement of Rice Cultivation Technology Project

Bill of Quantities (NAUSORI PROJECT)

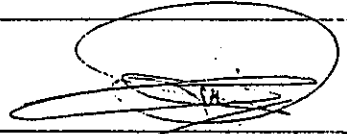
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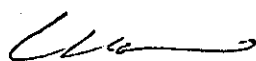
BILL NO.1	\$	<u>71,660.00</u>	
BILL NO.2	\$	<u>9,862.00</u>	
BILL NO.3	\$	<u>5,437.50</u>	
BILL NO.4	\$	<u>250.00</u>	
BILL NO.5	\$	<u>802.50</u>	
BILL NO.6	.....	\$	<u>10,726.50</u>	
Sub Total	\$		<u>98,738.50</u>	
10% Contingency	\$		<u>9,873.85</u>	
Total	\$		<u>108,612.35</u>	(Round off)

Dollars ONE HUNDRED EIGHT THOUSAND SIX HUNDRED TWELVE DOLLARS
& THIRTY FIVE CENTS.

Place : SUVA.

Date : 30th August, 1988.


Consignment Equipment Hi-S Ltd.
P.O. Box 13831
Suva





DRAWINGS

Navua Project

- DR.No. 1 General Plan
- DR.No, 2 Drainage Canal No.1 Long and Cross Section (1/2)
- DR.No. 3 Drainage Canal No.1 Long and Cross Section (2/2)
- DR.No. 4 Drainage Canal No.2 - No.7 Long Section
- DR.No. 5 Irrigation Canal No.1 - No.6 Long Section
- DR.No. 6 Typical Sections of Road, Irrigation and Drainage Canals and Bund
- DR.No. 7 Access Culvert and Access Roads
- DR.No. 8 Detail of Farm Inlet/Outlet for Access Culvert and Road
- DR.No. 9 Farm Inlet/Outlet Works and Drain Access Culvert
- LR.No.10 Canal Bifurcation Works
- DR.No.11 Drain Access Culvert

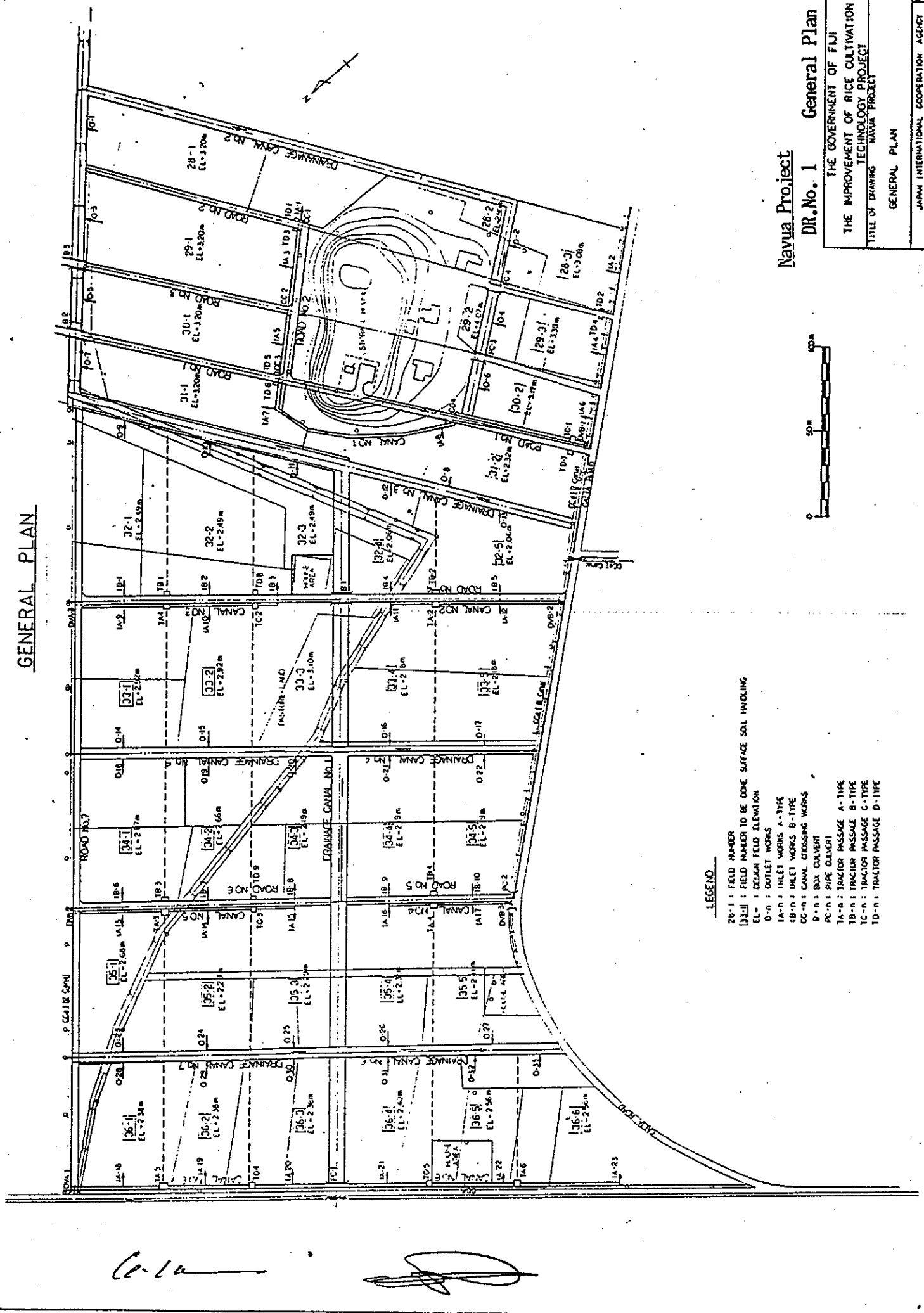
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- DR.No.17 General Plan
- DR.No,18 Road No.1 Long Section
- DR.No.19 Road No.1 and No.2 Long Section
- DR.No.20 Drainage Canal No.1 Long and Cross Section
- DR.No.21 Drainage Canal No.2 Long and Cross Section
- DR.No.22 Drainage Canal No.3 Long and Cross Section
- DR.No.23 Typical Sections of Road, Drainage Canal and Farm Outlet
- DR.No.24 Farm Outlet Works and Drain Access Culvert
- DR.No.25 Drain Access Culvert
- DR.No.26 Check Structure

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GENERAL PLAN



- LEGEND**
- 28-1 : FIELD NUMBER
 - [33-1] : FIELD NUMBER TO BE CODE SURFACE SOIL HANDLING
 - EL- : DESIGN FIELD ELEVATION
 - 0-n : OUTLET WORKS
 - IA-n : INLET WORKS A-TYPE
 - IB-n : INLET WORKS B-TYPE
 - CC-n : CANAL CROSSING WORKS
 - B-n : BOX CULVERT
 - PC-n : PIPE CULVERT
 - TA-n : TRACTOR PASSAGE A-TYPE
 - TB-n : TRACTOR PASSAGE B-TYPE
 - TC-n : TRACTOR PASSAGE C-TYPE
 - TD-n : TRACTOR PASSAGE D-TYPE

Navua Project

DR.No. 1 General Plan

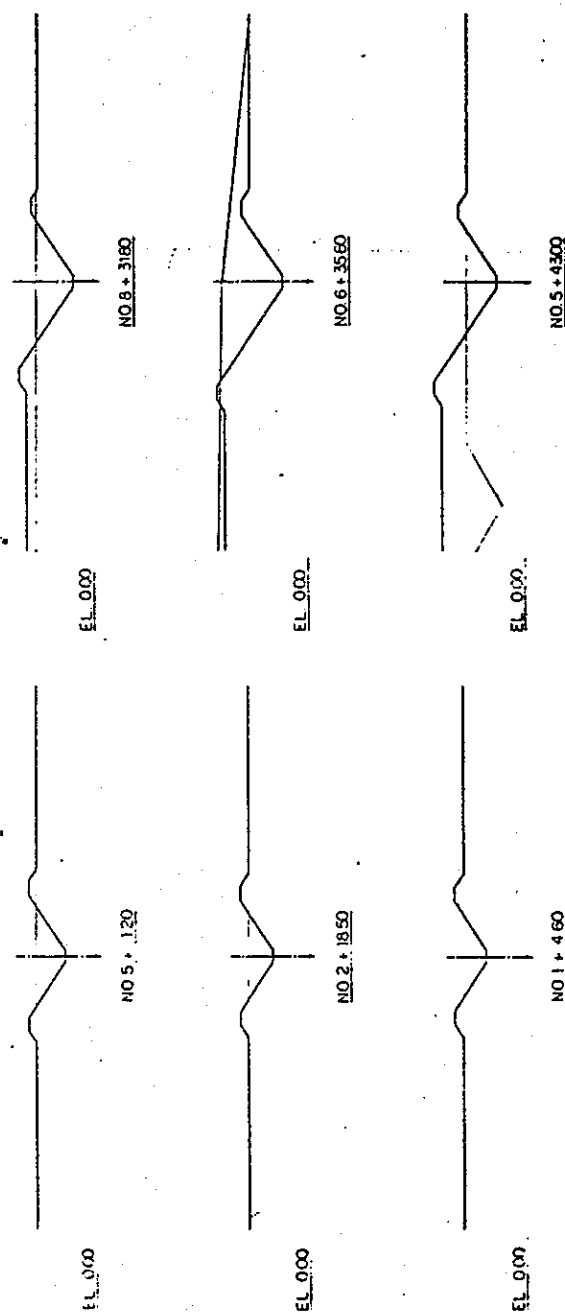
THE GOVERNMENT OF FIJI
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 TITLE OF DRAWING : NAVUA PROJECT
 GENERAL PLAN
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN
 DWG. No. 1

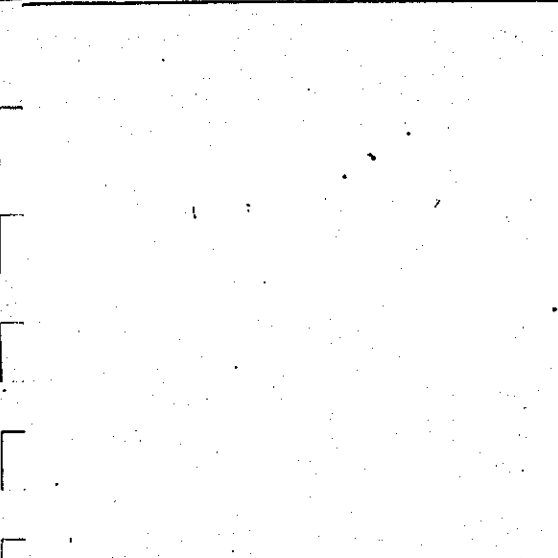
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DR.No. 2 Drainage Canal No.1 Long and Cross Section (1/2)

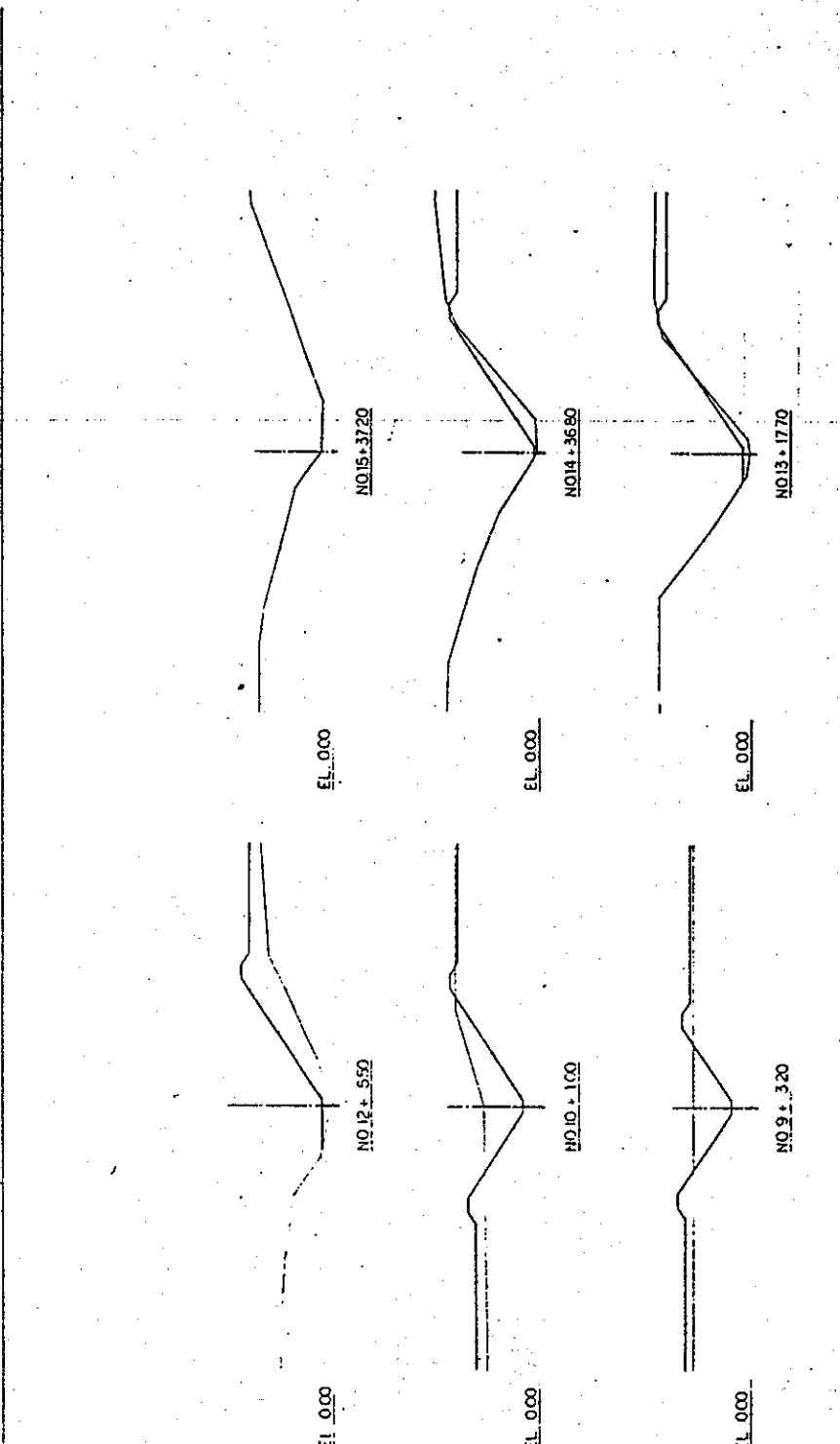
THE GOVERNMENT OF FIJI THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT
TITLE OF DRAWING: NAUSA PROJECT DRAINAGE CANAL No.1 LONGITUDINAL AND CROSS SECTION (1/2)
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN

STATION	RUNNING DISTANCE	FIELD ELEVATION	DESIGN FIELD EL. LHS	DESIGN BED LEVEL	DESIGN FIELD EL. RHS	SLOPE
200	0.78	206	0.87	206	0.78	
201	2.79	206	2.49	206	2.79	
202	5.3	206	5.1	206	5.3	
203	8.0	206	8.0	206	8.0	
204	11.0	206	11.0	206	11.0	
205	14.0	206	14.0	206	14.0	
206	17.0	206	17.0	206	17.0	
207	20.0	206	20.0	206	20.0	
208	23.0	206	23.0	206	23.0	
209	26.0	206	26.0	206	26.0	
210	29.0	206	29.0	206	29.0	
211	32.0	206	32.0	206	32.0	
212	35.0	206	35.0	206	35.0	
213	38.0	206	38.0	206	38.0	
214	41.0	206	41.0	206	41.0	
215	44.0	206	44.0	206	44.0	
216	47.0	206	47.0	206	47.0	
217	50.0	206	50.0	206	50.0	
218	53.0	206	53.0	206	53.0	
219	56.0	206	56.0	206	56.0	
220	59.0	206	59.0	206	59.0	
221	62.0	206	62.0	206	62.0	
222	65.0	206	65.0	206	65.0	
223	68.0	206	68.0	206	68.0	
224	71.0	206	71.0	206	71.0	
225	74.0	206	74.0	206	74.0	
226	77.0	206	77.0	206	77.0	
227	80.0	206	80.0	206	80.0	
228	83.0	206	83.0	206	83.0	
229	86.0	206	86.0	206	86.0	
230	89.0	206	89.0	206	89.0	
231	92.0	206	92.0	206	92.0	
232	95.0	206	95.0	206	95.0	
233	98.0	206	98.0	206	98.0	
234	101.0	206	101.0	206	101.0	
235	104.0	206	104.0	206	104.0	
236	107.0	206	107.0	206	107.0	
237	110.0	206	110.0	206	110.0	
238	113.0	206	113.0	206	113.0	
239	116.0	206	116.0	206	116.0	
240	119.0	206	119.0	206	119.0	
241	122.0	206	122.0	206	122.0	
242	125.0	206	125.0	206	125.0	
243	128.0	206	128.0	206	128.0	
244	131.0	206	131.0	206	131.0	
245	134.0	206	134.0	206	134.0	
246	137.0	206	137.0	206	137.0	
247	140.0	206	140.0	206	140.0	
248	143.0	206	143.0	206	143.0	
249	146.0	206	146.0	206	146.0	
250	149.0	206	149.0	206	149.0	



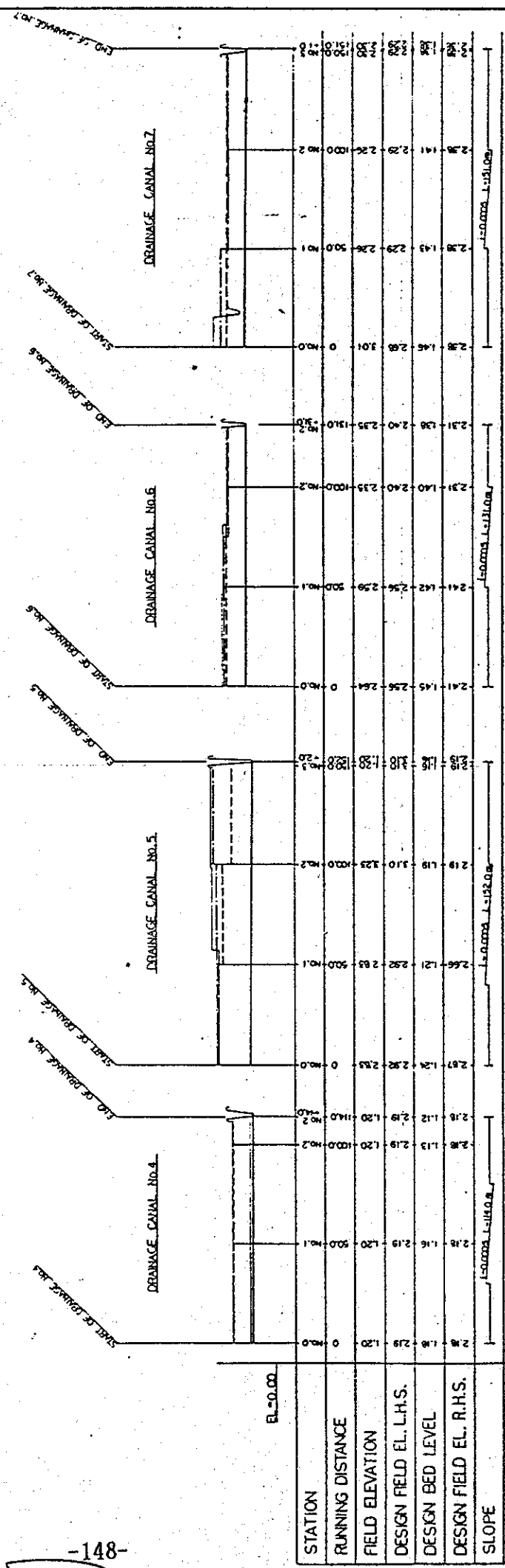
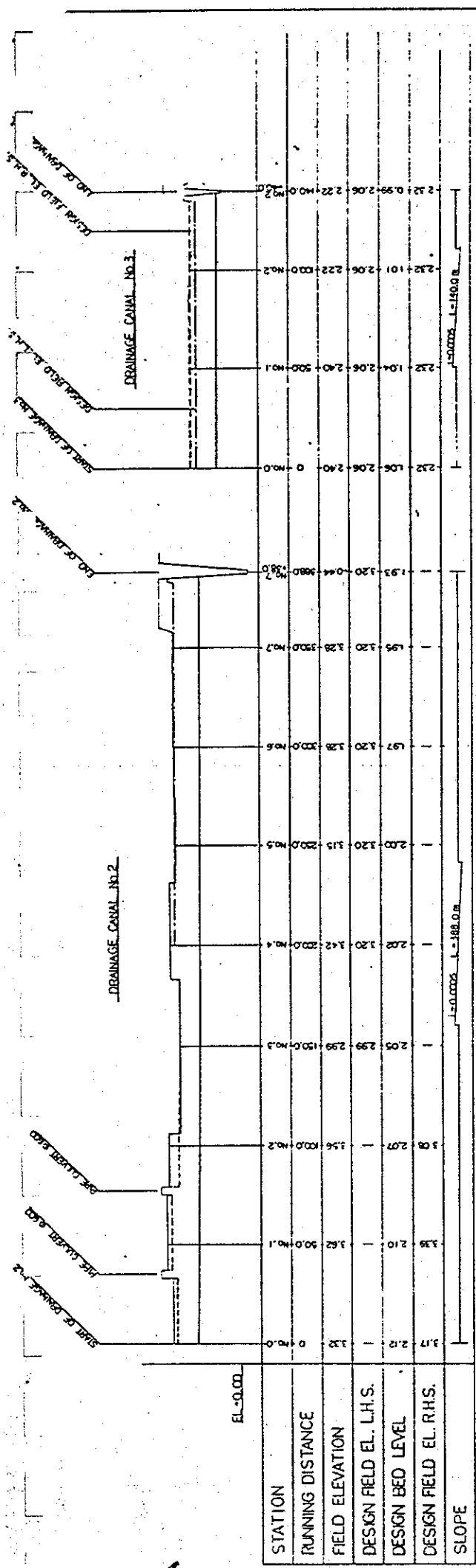


STATION	EL. 100	0+00	0+10	0+20	0+30	0+40	0+50	0+60	0+70	0+80	0+90	1+00
RUNNING DISTANCE		0+00	0+10	0+20	0+30	0+40	0+50	0+60	0+70	0+80	0+90	1+00
FIELD ELEVATION		2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1
DESIGN FIELD EL. LHS.		2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2
DESIGN BED LEVEL		2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
DESIGN FIELD EL. RHS.		2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
SLOPE		1:000 (R.L. 200.00)										



DR.No. 3 Drainage Canal No.1
Long and Cross Section (2/2)

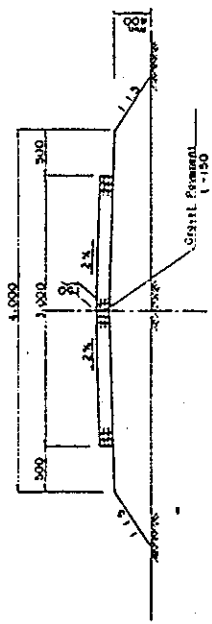
THE GOVERNMENT OF FIJI
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT
TITLE OF DRAWING NAWA PROJECT
DRAINAGE CANAL NO.1
LONGITUDINAL AND CROSS SECTION(2/2)
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN
PAGE NO. 3



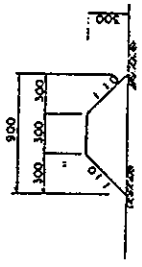
THE GOVERNMENT OF FIJI
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 TITLE OF TRAINING INRADA PROJECT
 DRAINAGE CANAL No.2 - No.7
 LONGITUDINAL SECTION
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DR.No. 4 Drainage Canal No.2 - No.7 Long Section

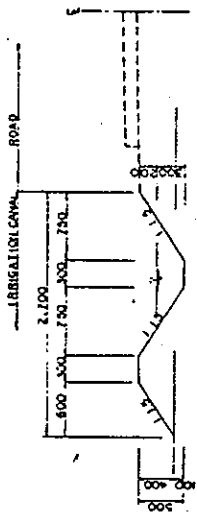
ROAD
§-17/30



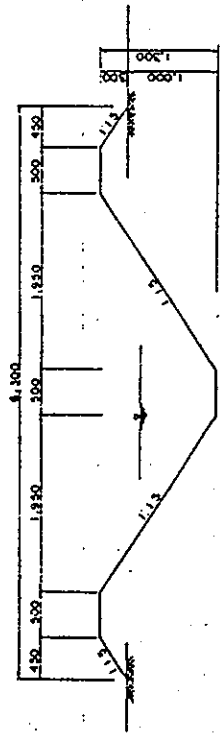
BLIND
§-17/26



IRRIGATION CANAL
§-17/30



DRAINAGE CANAL
§-17/30



DR. No. 6 Typical Sections of Road, Irrigation and Drainage Canals and Bund

THE GOVERNMENT OF FIJI
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT

TITLE OF DRAWING: RURAL PROJECT
TYPICAL SECTIONS OF ROAD, IRRIGATION CANAL,
DRAINAGE CANAL AND BUND

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN

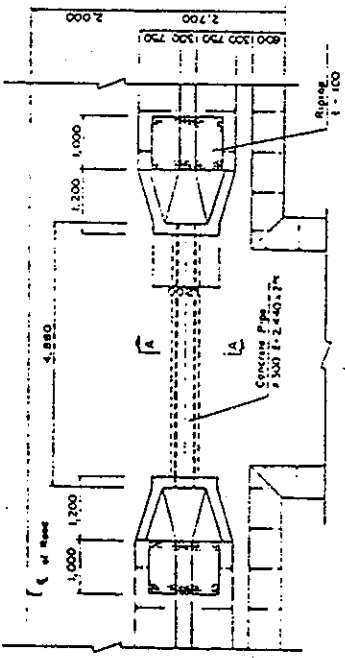
DWG NO
6

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Handwritten signature or initials

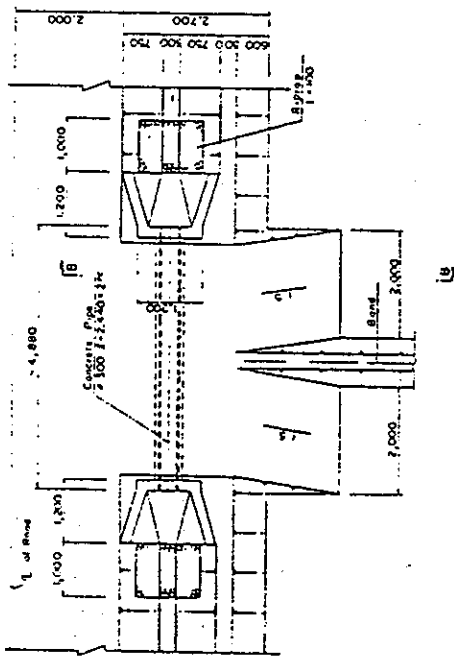
Access Culvert (Type C)
CANAL CROSSING
§ 1/750

PLAN



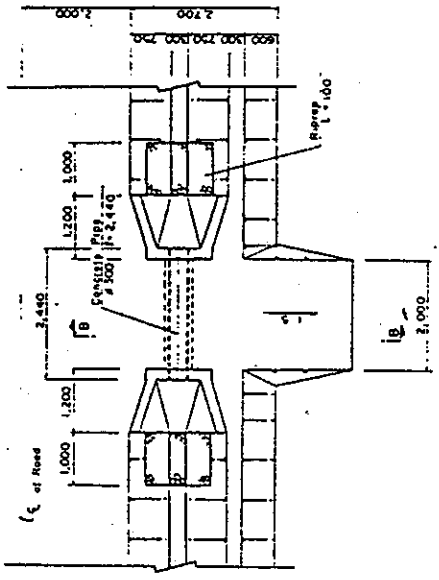
Access Culvert (Type A)
TRACTOR PASSAGE A-TYPE
§ 1/750

PLAN



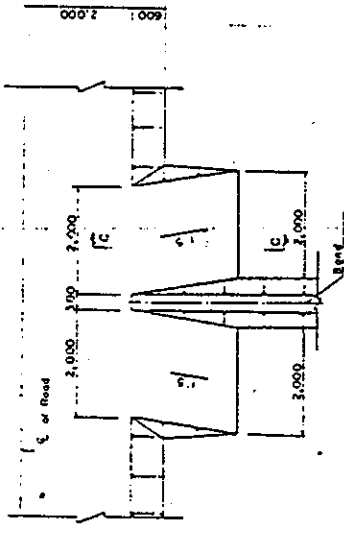
Access Culvert (Type B)
TRACTOR PASSAGE C-TYPE
§ 1/750

PLAN



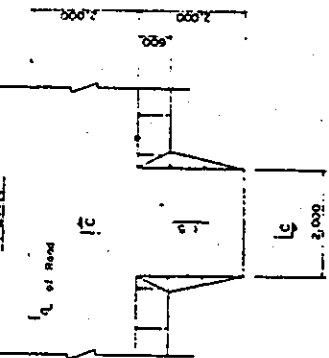
Access Road (Type 1)
TRACTOR PASSAGE B-TYPE
§ 1/750

PLAN

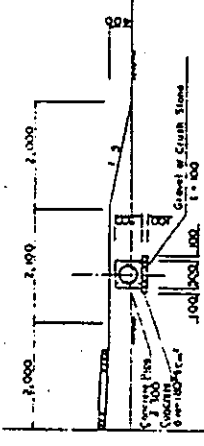


Access Road (Type 2)
TRACTOR PASSAGE D-TYPE
§ 1/750

PLAN



-B-B-SECTION
§ 1/50



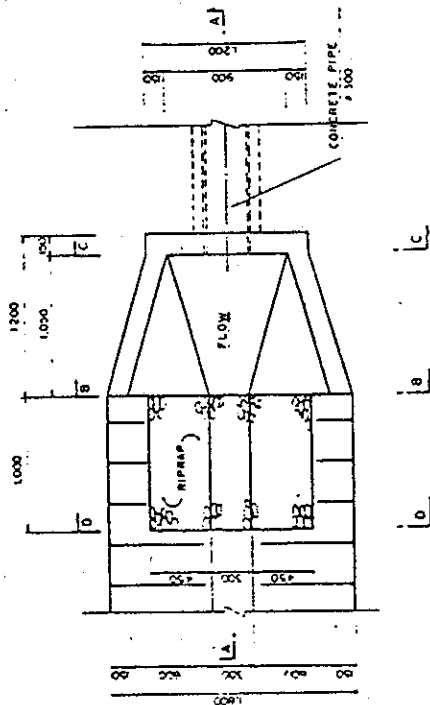
-C-C-SECTION
§ 1/750



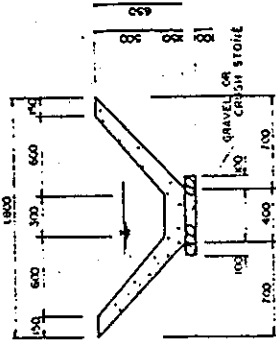
THE GOVERNMENT OF FIJI
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT
TITLE OF DRAWING: CANAL PROJECT
CANAL CROSSING AND TRACTOR PASSAGE
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN
SHEET NO. 7

DR. No. 7 Access Culvert and Access Roads

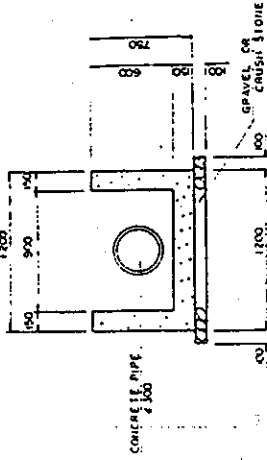
PLAN 5-17/20



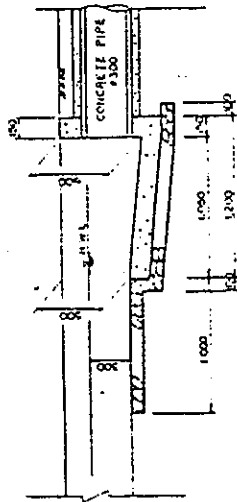
B-B SECTION 5-17/20



C-C SECTION 5-17/20

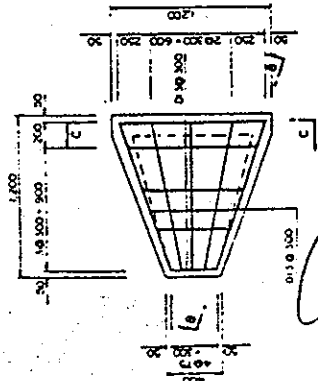


A-A SECTION

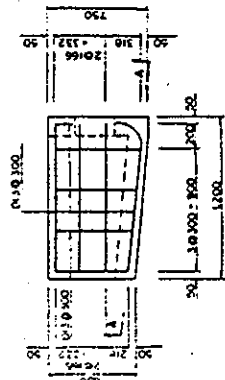


REINFORCEMENT ARRANGEMENT 5-17/20

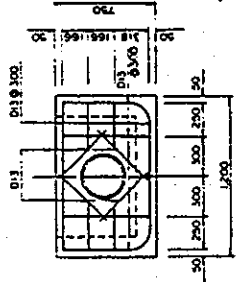
A-A SECTION



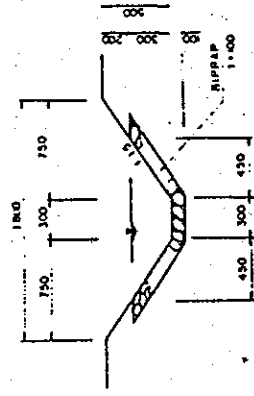
B-B SECTION



C-C SECTION



D-O SECTION 5-17/20



(A)?

DR.No. 8 Detail of Farm Inlet/Outlet for Access Culvert and Road

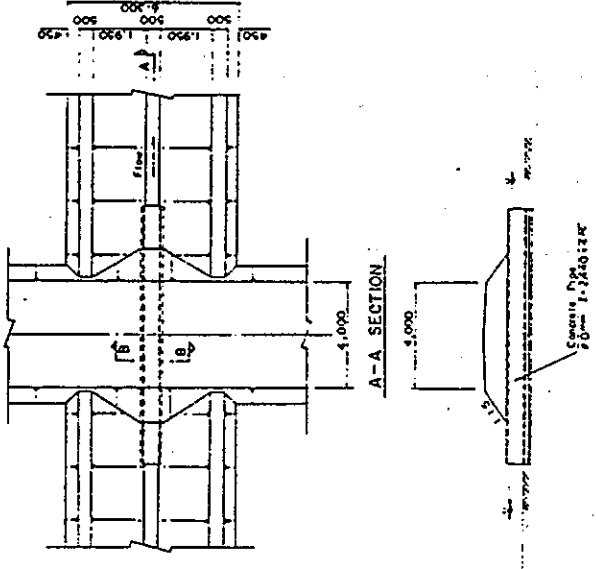
THE GOVERNMENT OF FIJI
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 TITLE OF DRAWING: FARM PROJECT
 DETAIL OF INLET AND OUTLET FOR CANAL
 CROSSING AND TRACTOR PASSAGE
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

8

Drain Access Culvert (Type A)

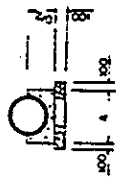
PIPE-CULVERT
3-17/100

PLAN



A-A SECTION

B-B SECTION



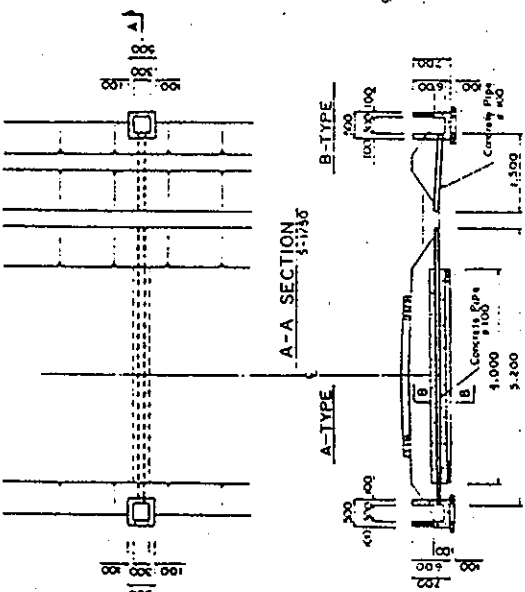
DIMENSION TABLE

Pipe Dia	Allow
A-TYPE 400	1,500
B-TYPE 400	800

THE GOVERNMENT OF FIJI
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT
TITLE OF DRAWING: DRAINAGE
DRAWING PROJECT:
INLET WORKS, OUTLETWORKS AND PIPE CULVERT
SCALE: INTERNATIONAL COORDINATION AGENCY
DATE: 1974

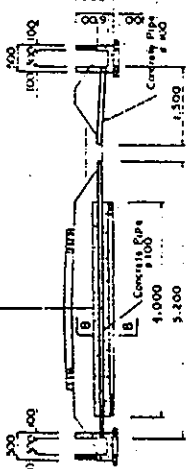
Farm Inlet Works (B)

PLAN



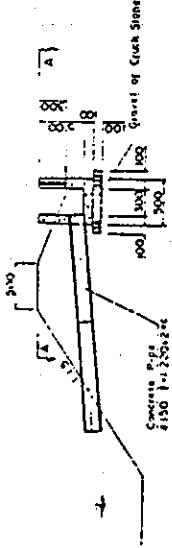
A-A SECTION

B-TYPE



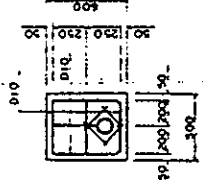
Farm Outlet Works (B)

CROSS SECTION

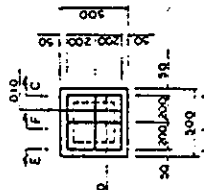


REINFORCEMENT ARRANGEMENT

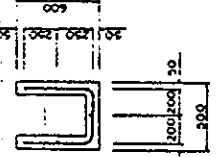
E-E SECTION



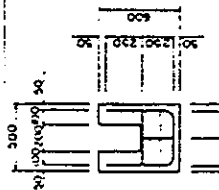
D-D SECTION



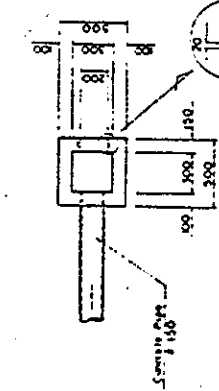
F-F SECTION



G-G SECTION



A-A SECTION

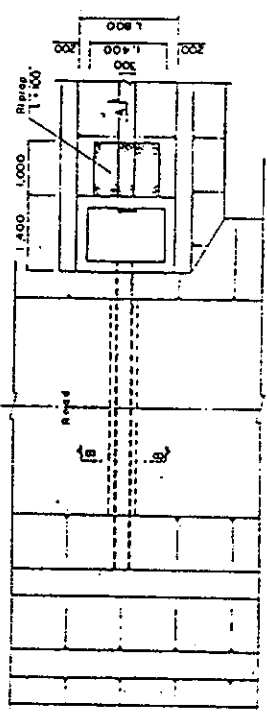


DR. No. 9 Farm Inlet/Outlet Works and Drain Access Culvert

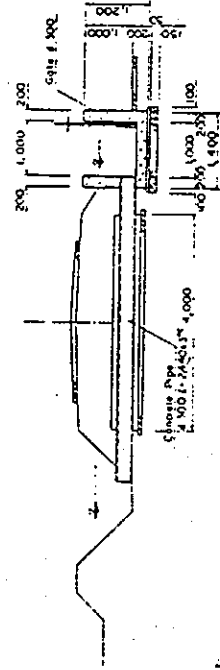
Canal Bifurcation (Type A)

DIVISION WORKS A-TYPE
3-17-50

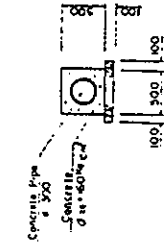
PLAN



A-A SECTION



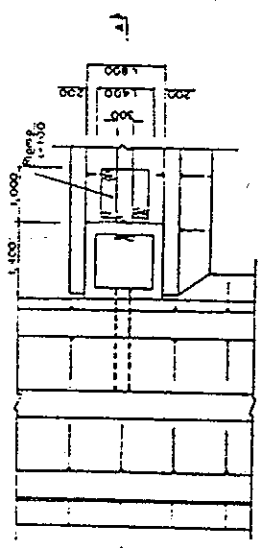
B-B SECTION



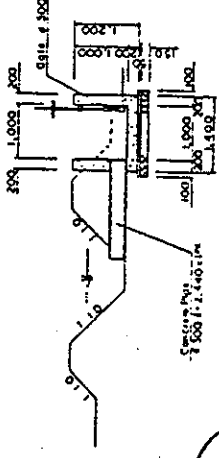
Canal Bifurcation (Type B)

DIVISION WORKS B-TYPE
3-17-50

PLAN

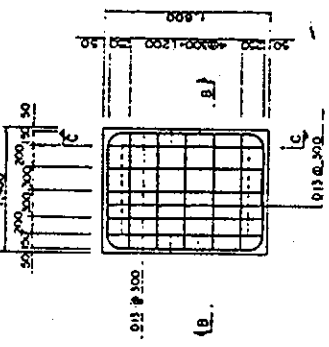


A-A SECTION

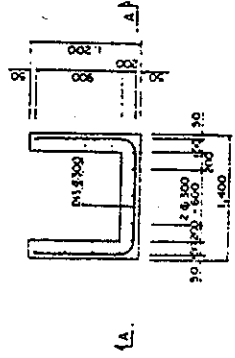


REINFORCEMENT ARRANGEMENT
3-17-50

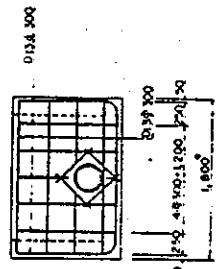
A-A SECTION



B-B SECTION



C-C SECTION

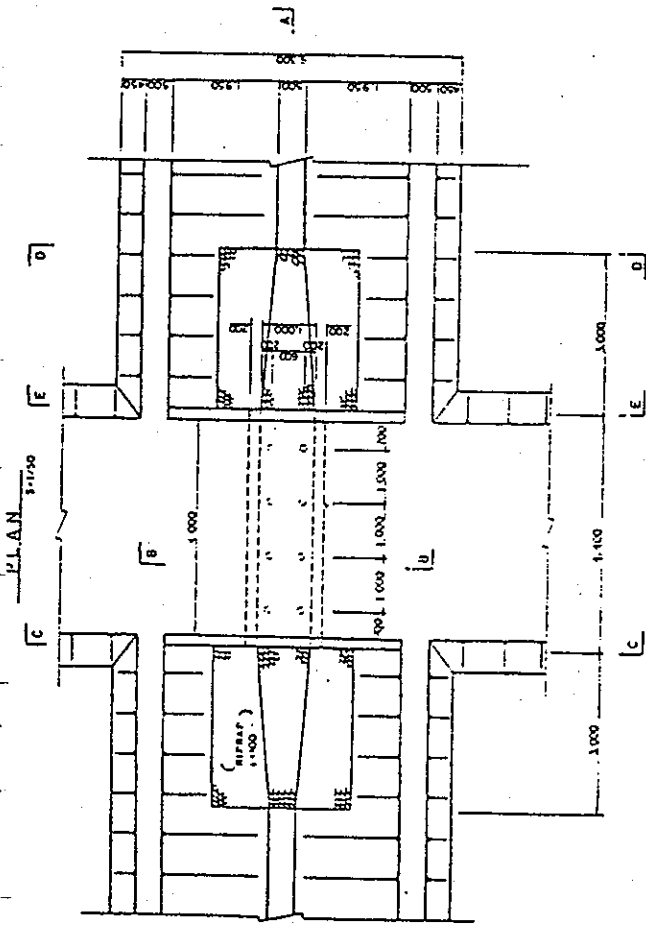


cc. cc.

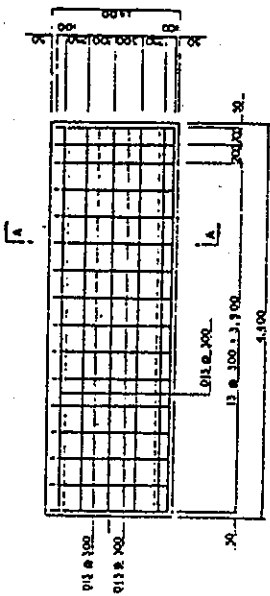
THE GOVERNMENT OF FIJI
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT
TITLE OF DRAWING: CANAL PROJECT
DIVISION WORKS
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN
DWG NO. 10

DR. No. 10 Canal Bifurcation Works

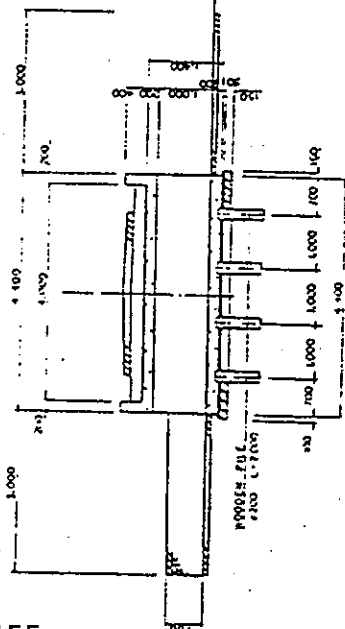
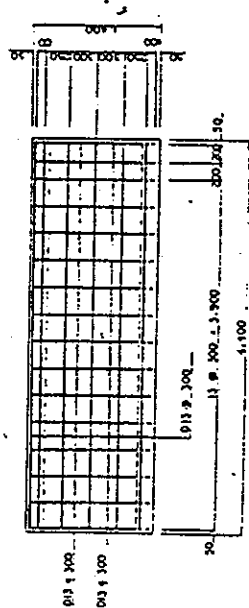
Drain Access Culvert (Type B)
BOX CULVERT



B-B SECTION

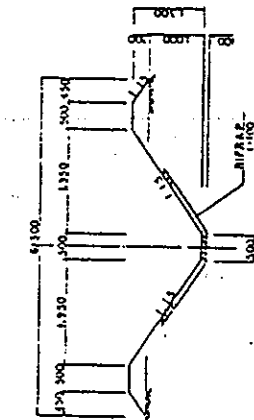


C-C SECTION

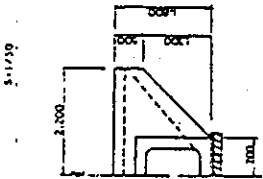


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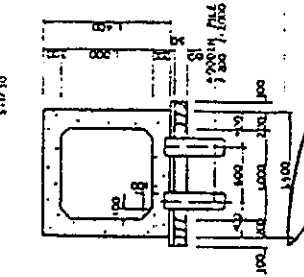
D-D SECTION



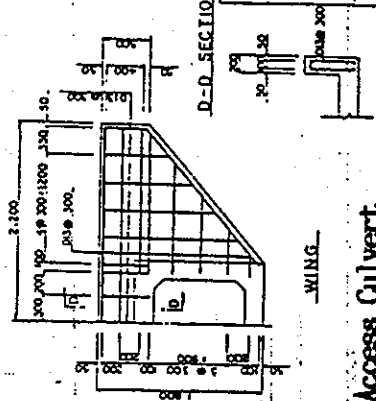
C-C SECTION



B-B SECTION



D-D SECTION



Drain Access Culvert

DR. No. 11

THE GOVERNMENT OF FIJI
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT
TITLE OF DRAWING: BOX CULVERT

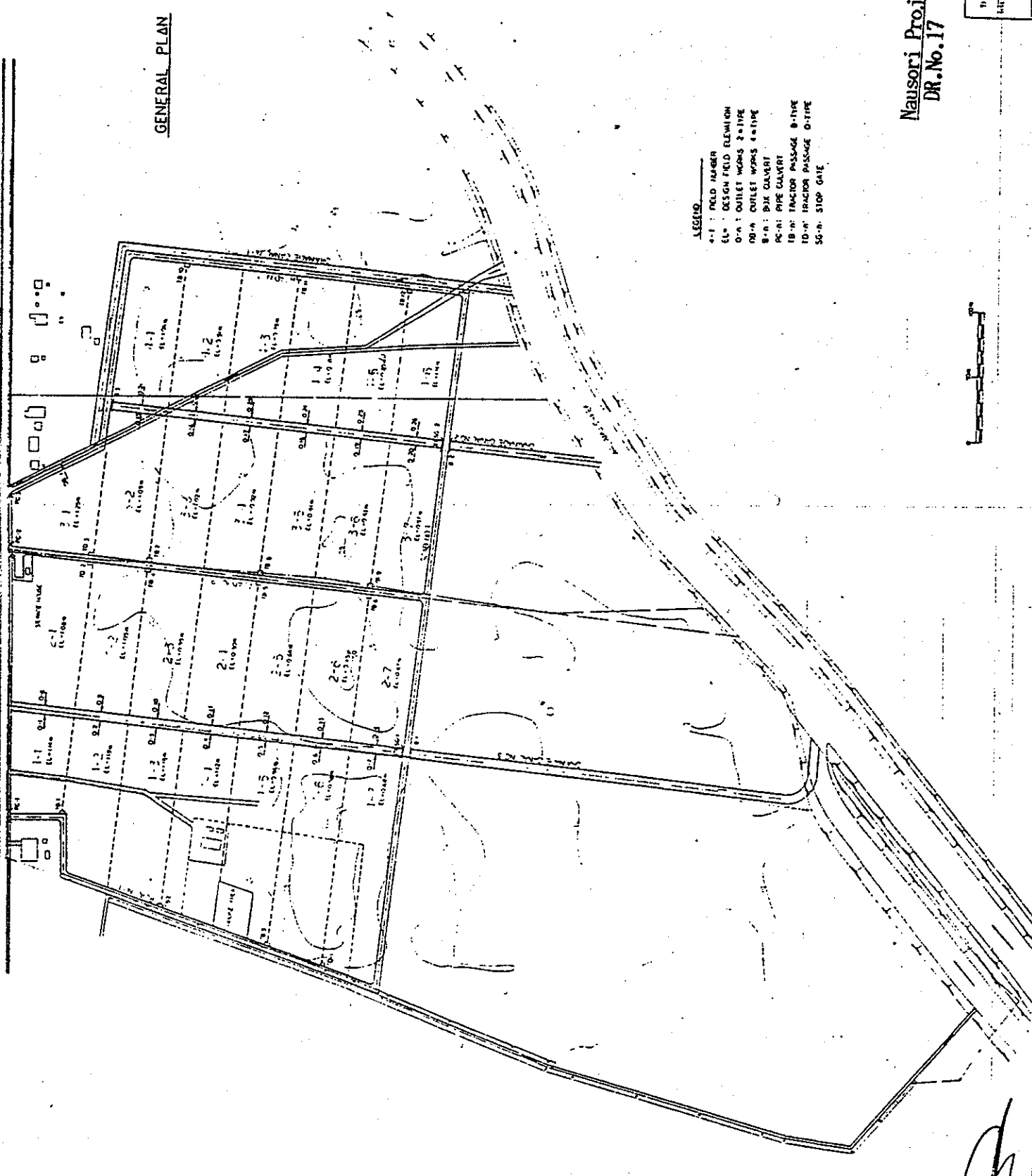
BOX CULVERT

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO, JAPAN

DATE

NO.

GENERAL PLAN



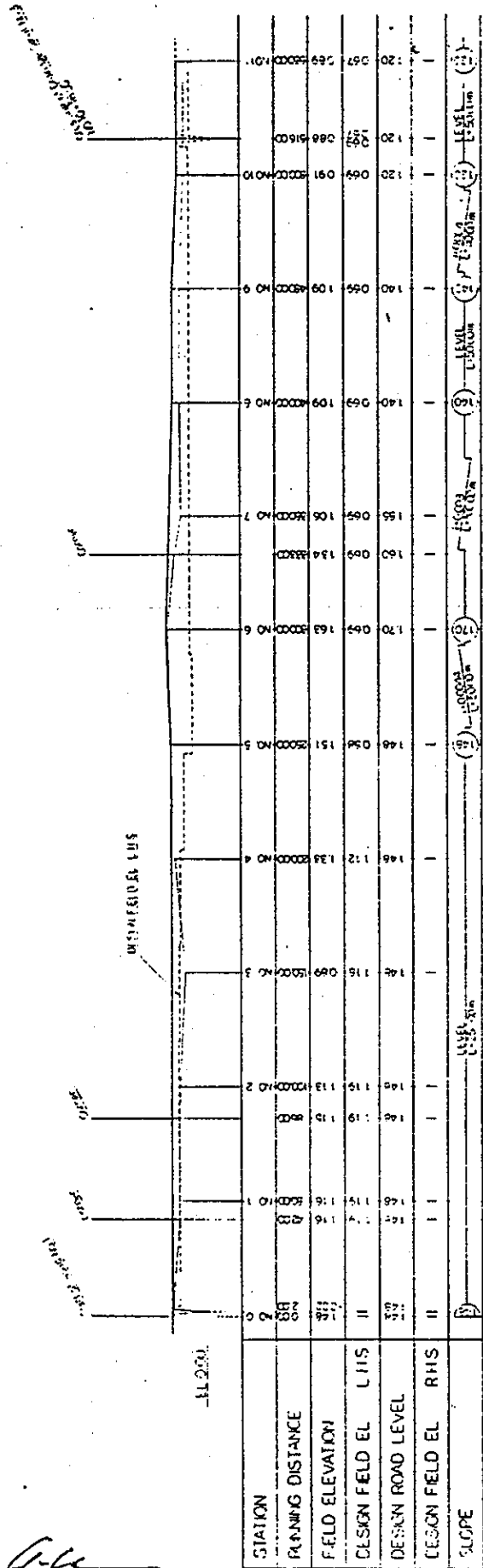
- LEGEND**
- 4-1 : FIELD NUMBER
 - EL : DESIGN FIELD ELEVATION
 - 0-0 : OUTLET WORKS 2-1/2\"/>
 - 8-8 : 8\"/>
 - PC-11 : PIPE CULVERT
 - 18-18 : TRACTOR PASSAGE 8-1/2\"/>
 - 10-10 : TRACTOR PASSAGE 6-1/2\"/>
 - 50-50 : STOP GATE

Mausori Project
DR. No. 17
General Plan

THE GOVERNMENT OF PUNJAB
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGICAL PROJECT
1957-58
GENERAL PLAN
SCALE: 1:10,000

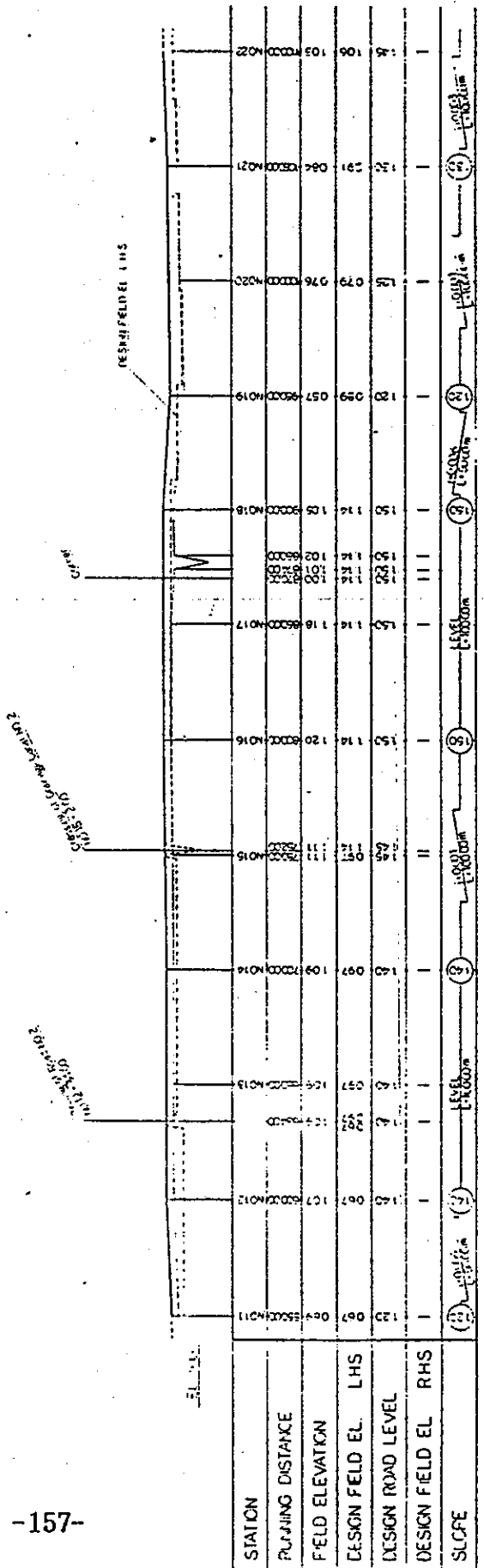
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STATION	PLANNING DISTANCE	FIELD ELEVATION	DESIGN ROAD LEVEL	DESIGN FIELD EL LHS	DESIGN FIELD EL RHS	SLOPE
0	0	116	116	116	116	11
1	10	116	116	116	116	11
2	110	113	113	113	113	11
3	150	109	109	109	109	11
4	190	112	112	112	112	11
5	230	151	151	151	151	11
6	270	163	163	163	163	11
7	310	105	105	105	105	11
8	350	109	109	109	109	11
9	390	109	109	109	109	11
10	430	106	106	106	106	11
11	470	106	106	106	106	11
12	510	106	106	106	106	11
13	550	106	106	106	106	11
14	590	106	106	106	106	11
15	630	106	106	106	106	11
16	670	106	106	106	106	11
17	710	106	106	106	106	11
18	750	106	106	106	106	11
19	790	106	106	106	106	11
20	830	106	106	106	106	11
21	870	106	106	106	106	11
22	910	106	106	106	106	11

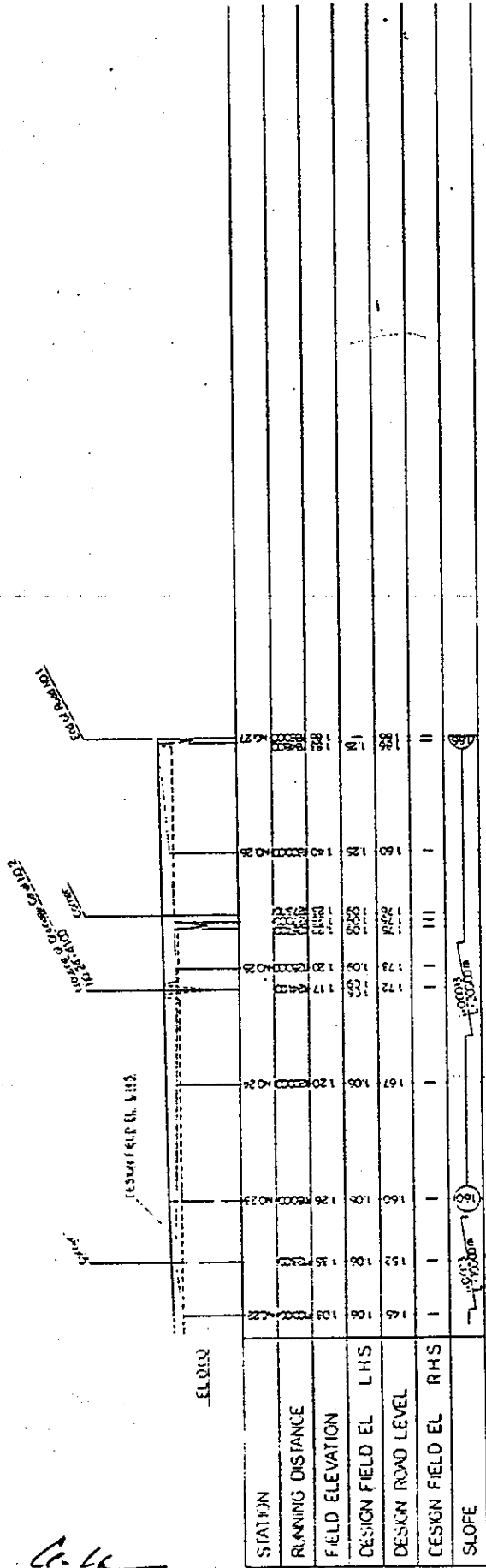
-157-



STATION	PLANNING DISTANCE	FIELD ELEVATION	DESIGN ROAD LEVEL	DESIGN FIELD EL LHS	DESIGN FIELD EL RHS	SLOPE
211	0	106	106	106	106	11
212	10	106	106	106	106	11
213	20	106	106	106	106	11
214	30	106	106	106	106	11
215	40	106	106	106	106	11
216	50	106	106	106	106	11
217	60	106	106	106	106	11
218	70	106	106	106	106	11
219	80	106	106	106	106	11
220	90	106	106	106	106	11
221	100	106	106	106	106	11
222	110	106	106	106	106	11

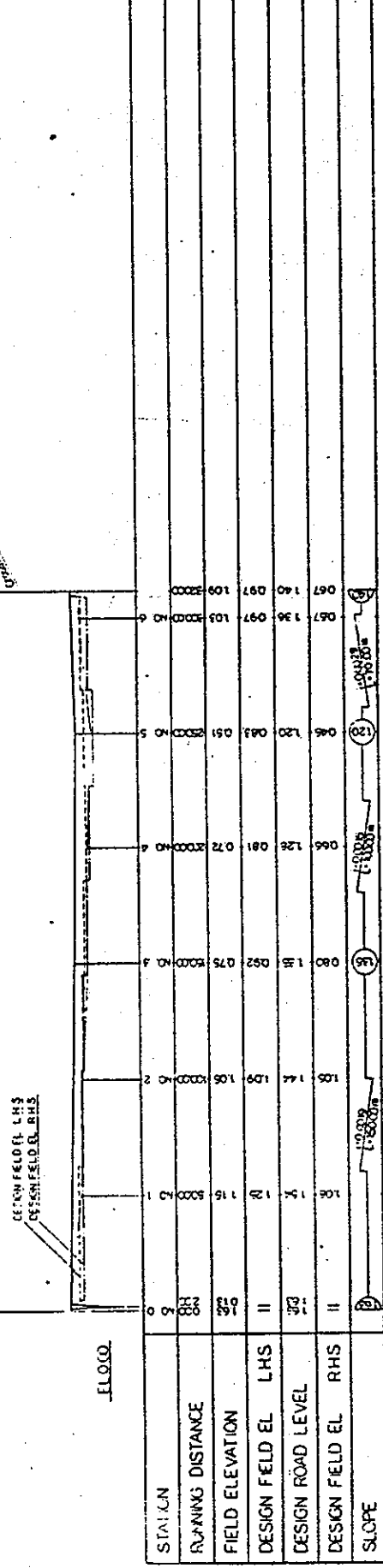
THE GOVERNMENT OF FIJI
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 TITLE OF DRAWING MAUSORI PROJECT
 ROAD No. 1
 LONGITUDINAL SECTION
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DR. No. 18 Road No. 1 Long Section



-158-

1:1000
1:1000
1:1000

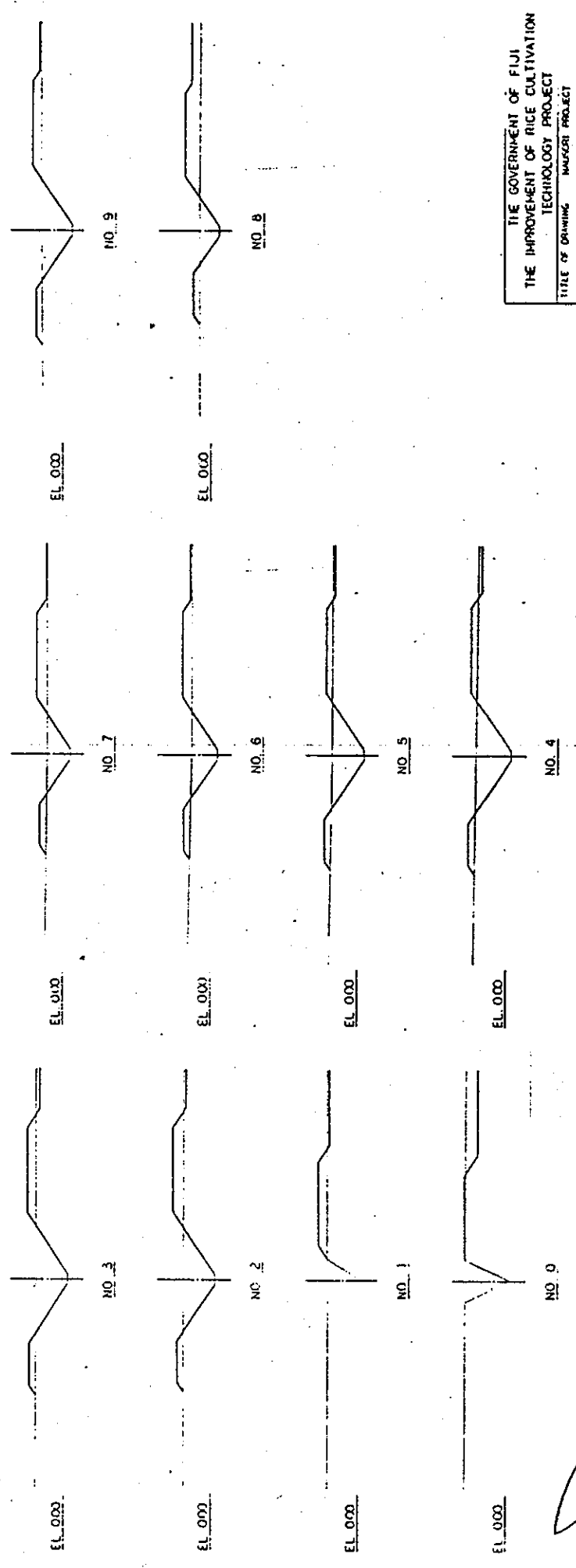


100% GRADE

100% GRADE

RESERVOIR BAS

STATION	RUNNING DISTANCE	FIELD ELEVATION	DESIGN FIELD EL. L.H.S.	DESIGN BED LEVEL	DESIGN FIELD EL. R.H.S.	SLOPE
0+00	0.00	1.20	1.20	1.20	1.20	0.00%
0+25	25.00	1.22	1.22	1.22	1.22	0.00%
0+50	50.00	1.24	1.24	1.24	1.24	0.00%
0+75	75.00	1.26	1.26	1.26	1.26	0.00%
1+00	100.00	1.28	1.28	1.28	1.28	0.00%
1+25	125.00	1.30	1.30	1.30	1.30	0.00%
1+50	150.00	1.32	1.32	1.32	1.32	0.00%
1+75	175.00	1.34	1.34	1.34	1.34	0.00%
2+00	200.00	1.36	1.36	1.36	1.36	0.00%
2+25	225.00	1.38	1.38	1.38	1.38	0.00%
2+50	250.00	1.40	1.40	1.40	1.40	0.00%
2+75	275.00	1.42	1.42	1.42	1.42	0.00%
3+00	300.00	1.44	1.44	1.44	1.44	0.00%
3+25	325.00	1.46	1.46	1.46	1.46	0.00%
3+50	350.00	1.48	1.48	1.48	1.48	0.00%
3+75	375.00	1.50	1.50	1.50	1.50	0.00%
4+00	400.00	1.52	1.52	1.52	1.52	0.00%
4+25	425.00	1.54	1.54	1.54	1.54	0.00%
4+50	450.00	1.56	1.56	1.56	1.56	0.00%
4+75	475.00	1.58	1.58	1.58	1.58	0.00%
5+00	500.00	1.60	1.60	1.60	1.60	0.00%
5+25	525.00	1.62	1.62	1.62	1.62	0.00%
5+50	550.00	1.64	1.64	1.64	1.64	0.00%
5+75	575.00	1.66	1.66	1.66	1.66	0.00%
6+00	600.00	1.68	1.68	1.68	1.68	0.00%
6+25	625.00	1.70	1.70	1.70	1.70	0.00%
6+50	650.00	1.72	1.72	1.72	1.72	0.00%
6+75	675.00	1.74	1.74	1.74	1.74	0.00%
7+00	700.00	1.76	1.76	1.76	1.76	0.00%
7+25	725.00	1.78	1.78	1.78	1.78	0.00%
7+50	750.00	1.80	1.80	1.80	1.80	0.00%
7+75	775.00	1.82	1.82	1.82	1.82	0.00%
8+00	800.00	1.84	1.84	1.84	1.84	0.00%
8+25	825.00	1.86	1.86	1.86	1.86	0.00%
8+50	850.00	1.88	1.88	1.88	1.88	0.00%
8+75	875.00	1.90	1.90	1.90	1.90	0.00%
9+00	900.00	1.92	1.92	1.92	1.92	0.00%
9+25	925.00	1.94	1.94	1.94	1.94	0.00%
9+50	950.00	1.96	1.96	1.96	1.96	0.00%
9+75	975.00	1.98	1.98	1.98	1.98	0.00%
10+00	1000.00	2.00	2.00	2.00	2.00	0.00%



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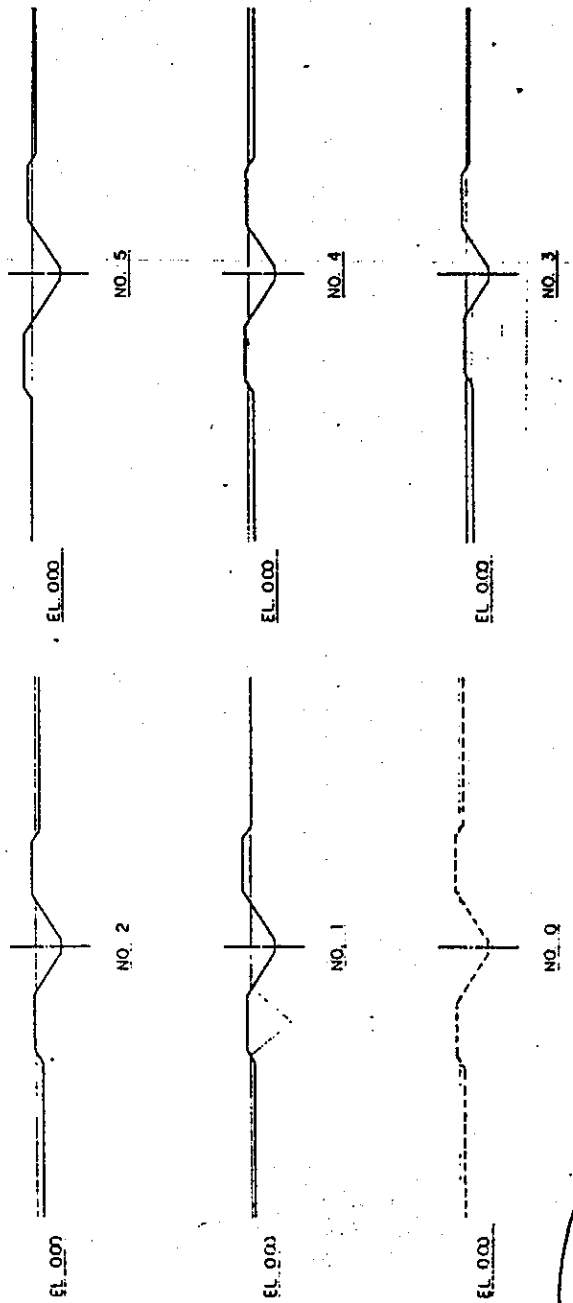
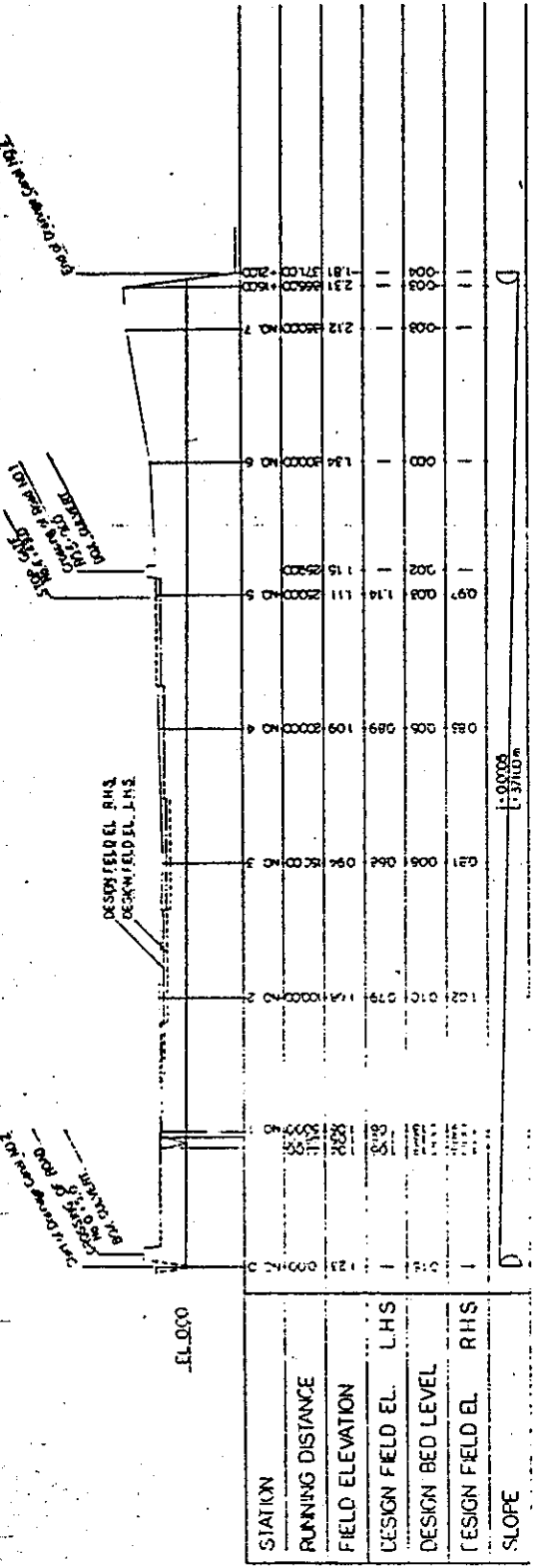
THE GOVERNMENT OF FIJI
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 TITLE OF DRAWING: DRAINAGE CANAL No.1
 LONGITUDINAL AND CROSS SECTION
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO, JAPAN

DR.No.20 Drainage Canal No.1 Long and Cross Section

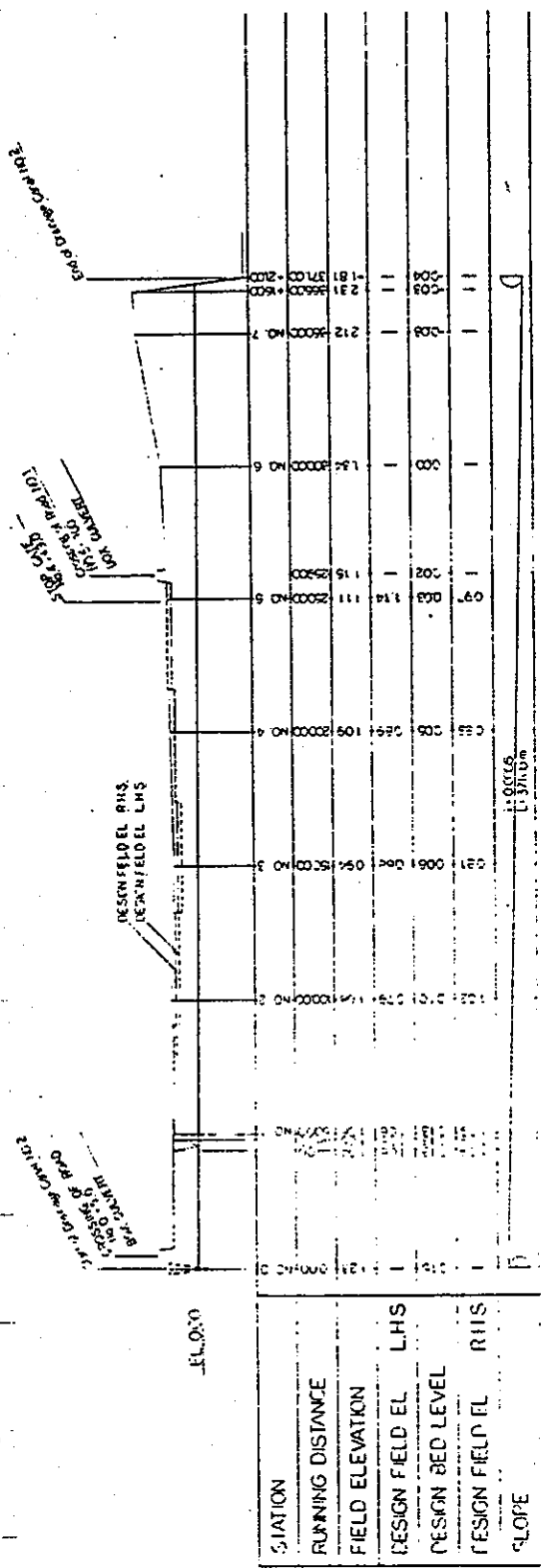
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100% of 1.5m x 1.5m x 0.5m

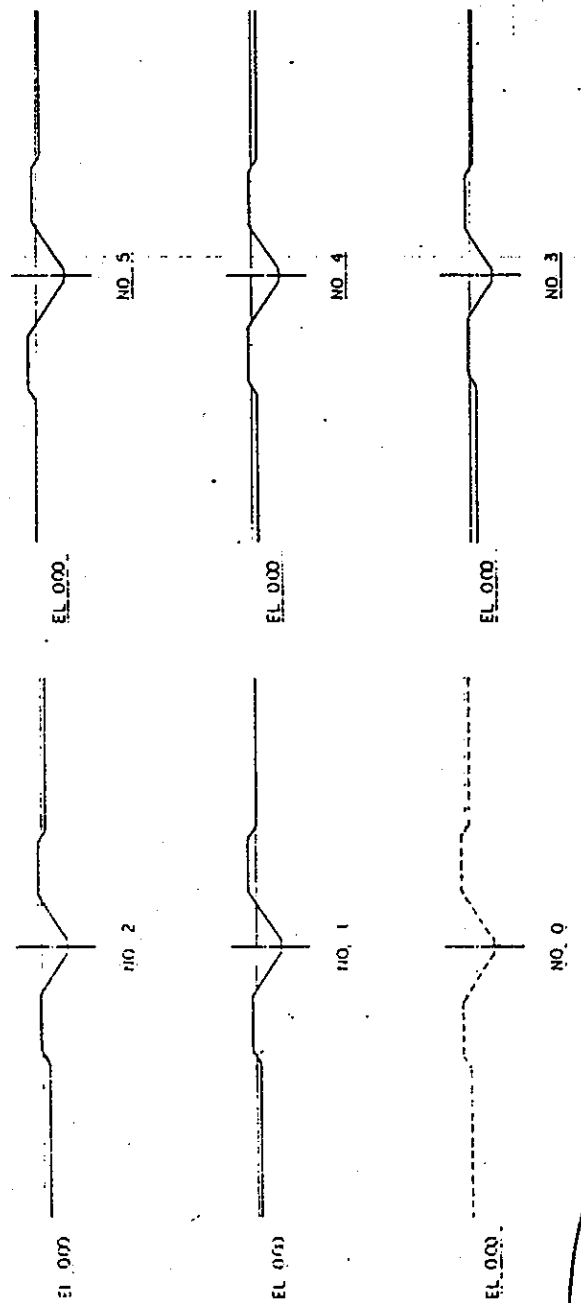
100% of 1.5m x 1.5m x 0.5m



DR. No. 21 Drainage Canal No. 2 Long and Cross Section



STATION	RUNNING DISTANCE	FIELD ELEVATION	DESIGN FIELD EL. LHS	DESIGN BED LEVEL	DESIGN FIELD EL. RHS	SLOPE
212	0000	NO. 7	2.31	0.60	1.1	1:0.016
1.5	2000	NO. 6	1.5	0.00	1.1	1:0.016
1.15	2500	NO. 5	1.15	0.00	1.1	1:0.016
1.09	2000	NO. 4	1.09	0.00	1.1	1:0.016
0.94	1500	NO. 3	0.94	0.00	1.1	1:0.016
0.8	1000	NO. 2	0.8	0.00	1.1	1:0.016
0.7	500	NO. 1	0.7	0.00	1.1	1:0.016
0.6	0	NO. 0	0.6	0.00	1.1	1:0.016



DR. No. 21 Drainage Canal No. 2 Long and Cross Section

THE GOVERNMENT OF FIJI
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 TITLE OF DRAWING: NAUSORI PROJECT
 DRAINAGE CANAL, NO. 2
 LONGITUDINAL AND CROSS SECTION
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO, JAPAN

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For work started on 04/11/59
12.29-11.04
12.27.20.12.28.12.29.12.30.12.31.59

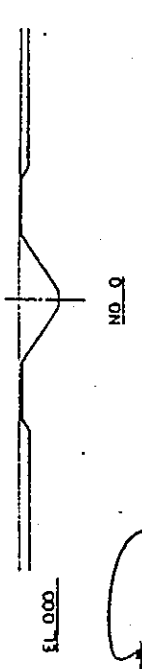
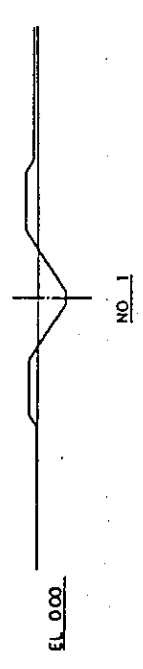
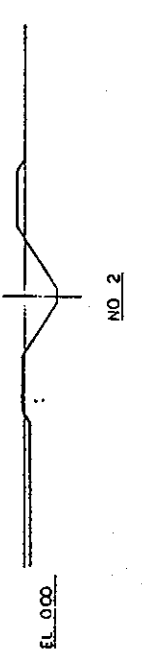
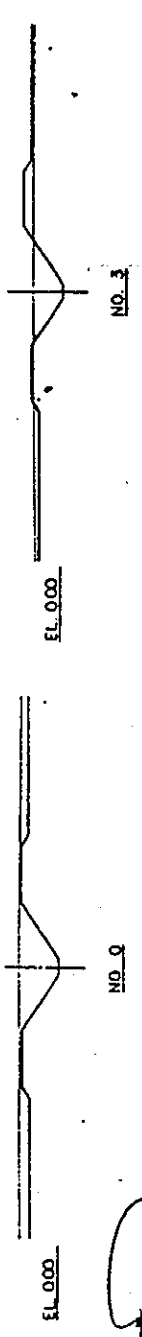
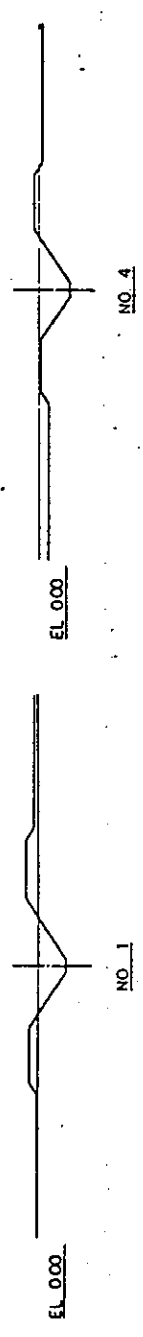
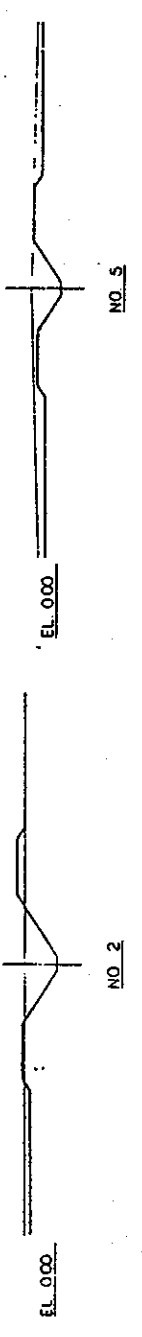
137' 4 1/2" (3281 mm)
38' 2 1/2" (975 mm)
1' 7 1/2" (443 mm)

DESIGN END EL. R.H.S.
DESIGN FIELD EL. L.H.S.

EL. 0.00

STATION																						
RUNNING DISTANCE																						
FIELD ELEVATION																						
DESIGN FIELD EL. L.H.S.		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DESIGN BED LEVEL																						
DESIGN FIELD EL. R.H.S.																						
SLOPE																						

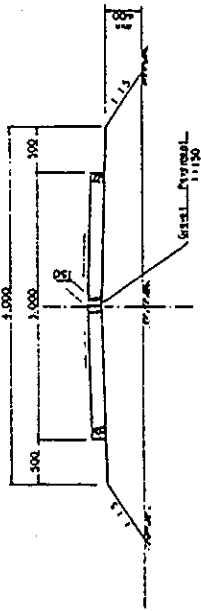
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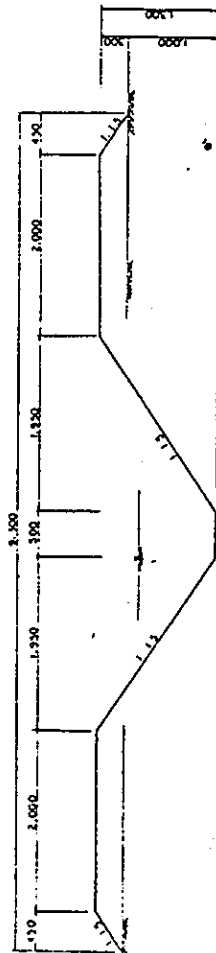
THE GOVERNMENT OF FLA
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT
TITLE OF DRAWING MAZORI PROJECT
DRAINAGE CANAL, No. 3
LONGITUDINAL AND CROSS SECTION
JAPANESE INTERNATIONAL COOPERATION AGENCY
TOYO JOKE

Dr. No. 22 Drainage Canal No. 3 Long and Cross Section

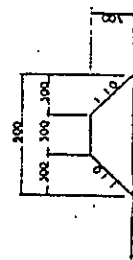
ROAD 3/17/50



DRAINAGE CANAL 3/17/50

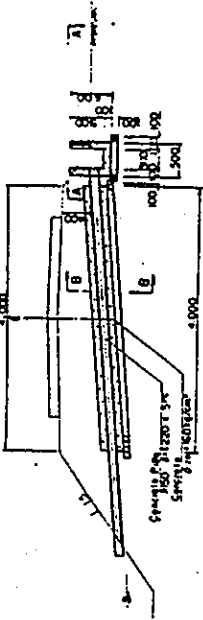


BAND 3/17/50



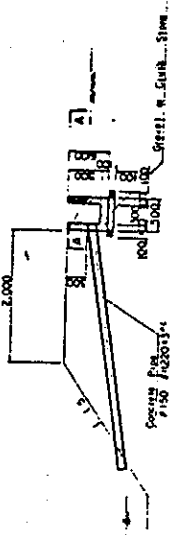
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CROSS SECTION 3/17/50

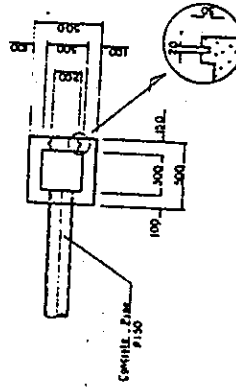


Farm Outlet Works B-TYPE

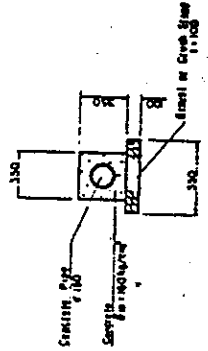
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A-A SECTION 3/17/50



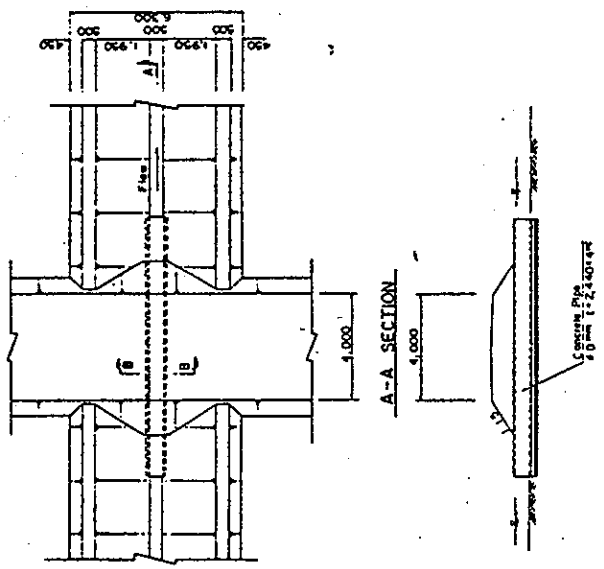
B-B SECTION 3/17/50



THE GOVERNMENT OF FIJI
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 TITLE BY ANDREW SANDREY PROJECT
 TYPICAL SECTIONS OF ROAD, DRAINAGE
 CANAL AND OUTLET WORKS
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TRUHY ATAN

Drain Access Culvert (Type A)
PIPE-CULVERT
 § 1776

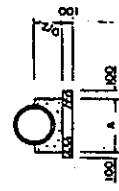
PLAN



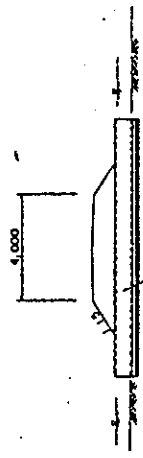
DIMENSION TABLE

	Pipe Dia	A (mm)
A-TYPE	φ 1,225	1,300
B-TYPE	φ 600	800

B-B SECTION

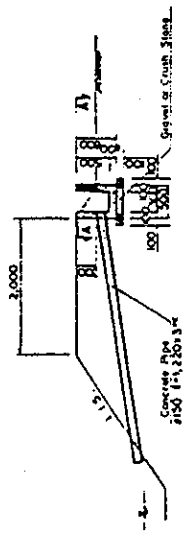


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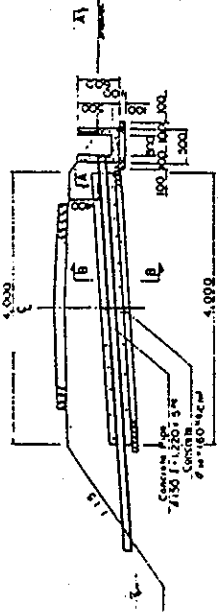
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 § 1776

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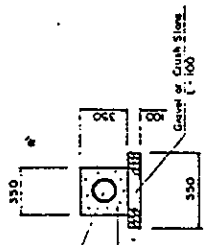


Farm Outlet Works C-TYPE
 § 1776

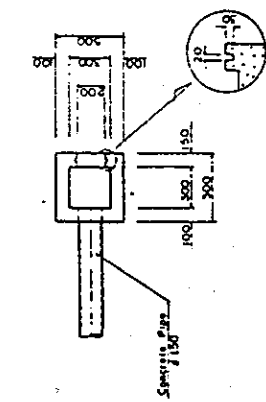
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B-B SECTION
 § 1776

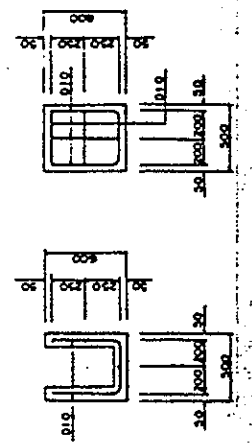


A-A SECTION
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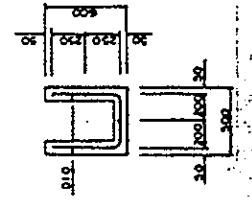


REINFORCEMENT ARRANGEMENT
 § 1776

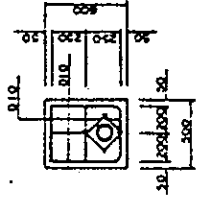
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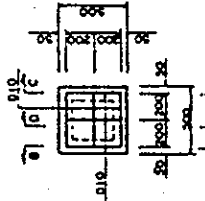
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B-B SECTION



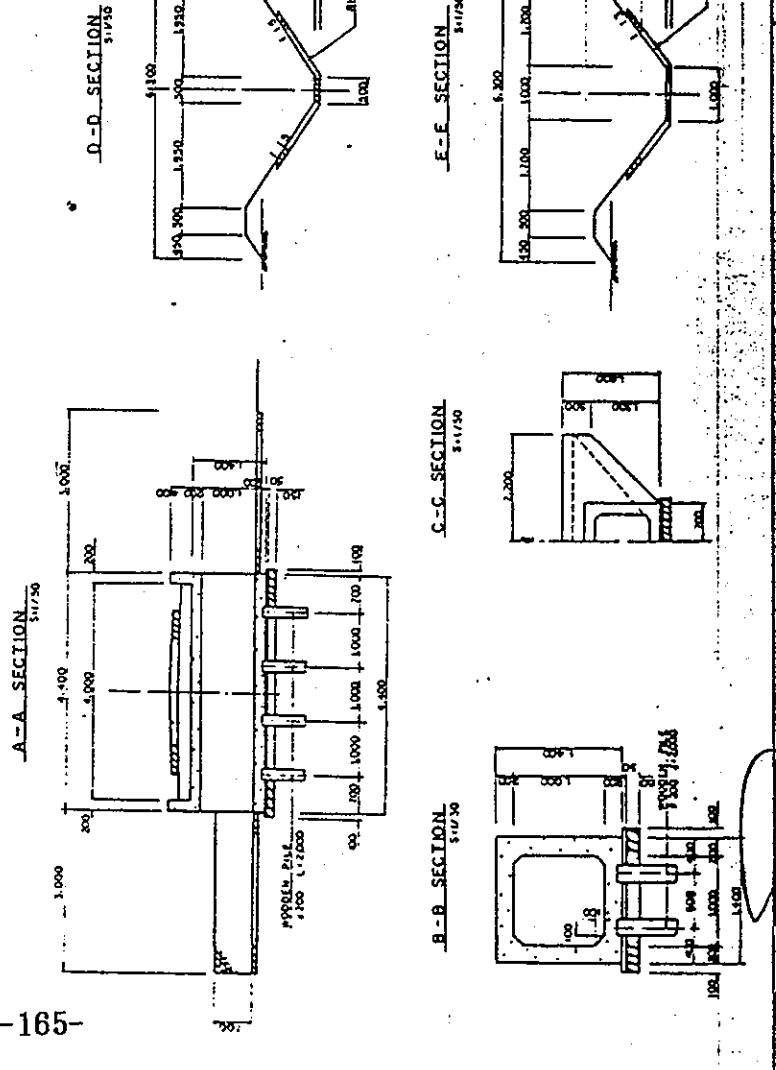
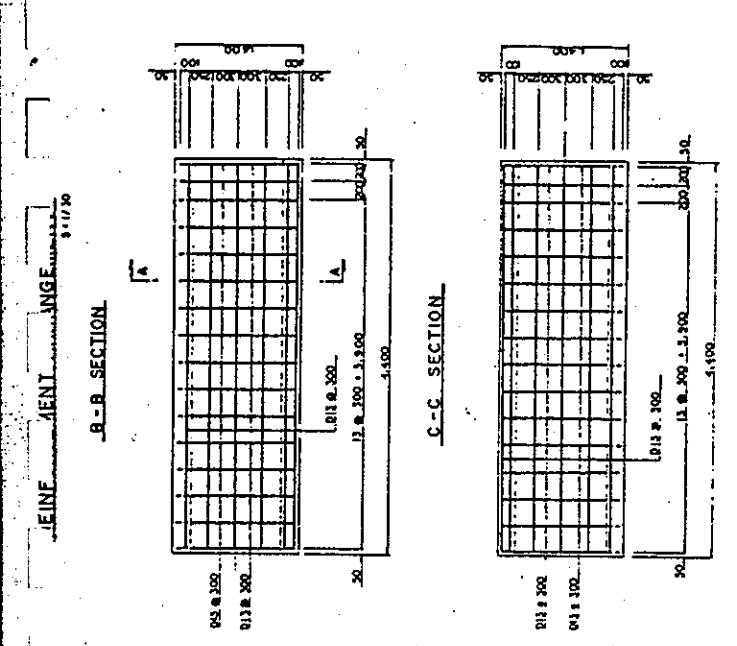
A-A SECTION



THE GOVERNMENT OF FIJI
 THE IMPROVEMENT OF RICE CULTIVATION
 TECHNOLOGY PROJECT
 TITLE OF DRAWING
 OUTLET WORKS AND PIPE CULVERT
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO, JAPAN
 DRAWING NO.
 24

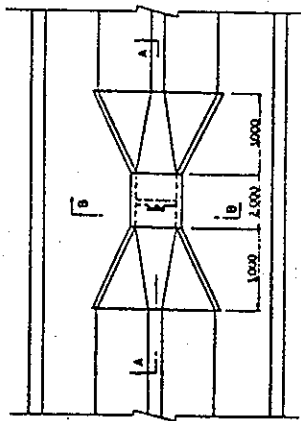
DR. No. 24 Farm Outlet Works and Drain Access Culvert

Drain Access Culvert (Type A)

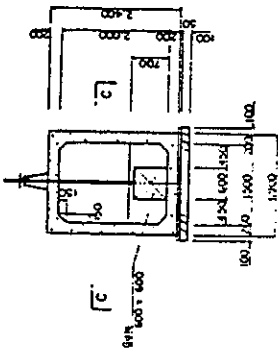


Check Structure
STOP GATE

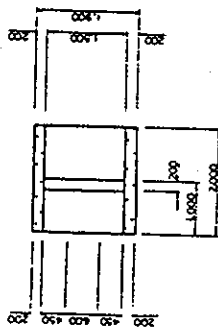
PLAN 1/17/30



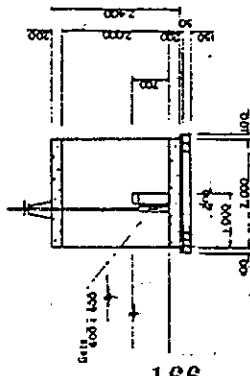
B-B SECTION 1/17/30



C-C SECTION 1/17/30

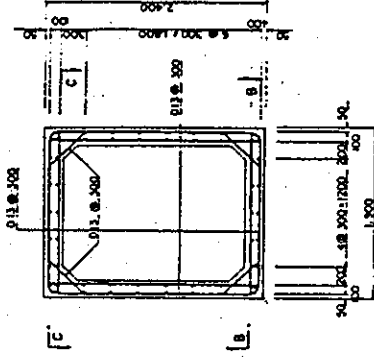


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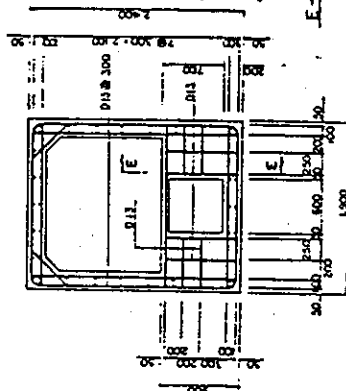


REINFORCEMENT ARRANGEMENT 1/17/30

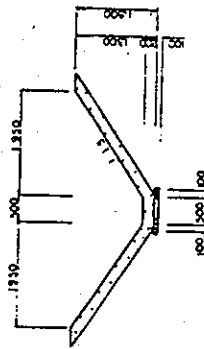
A-A SECTION



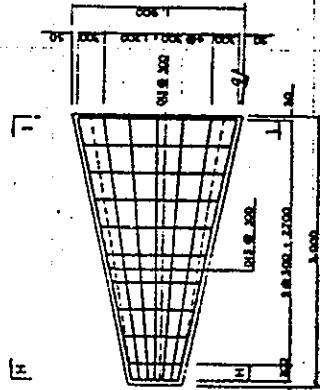
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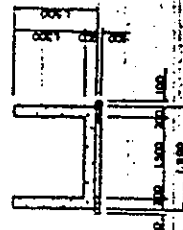
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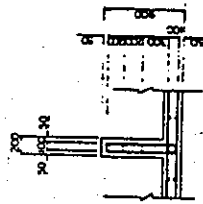
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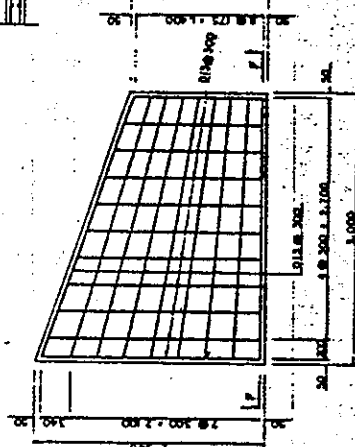
E-E SECTION 1/17/30



E-E SECTION



G-G SECTION



DR. No. 28

Check Structure

THE GOVERNMENT OF FIJI
THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT

TITLE OF DRAWING (English and Fijian)

STOP GATE

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN

26

**CONDITIONS OF CONTRACT
(INTERNATIONAL)
FOR
WORKS OF
CIVIL ENGINEERING CONSTRUCTION
WITH FORMS OF TENDER AND AGREEMENT**

These documents prepared by the Fédération Internationale des Ingénieurs-Conseils (F.I.D.I.C.) jointly with the Fédération Internationale du Bâtiment et des Travaux Publics (F.I.B.T.P.) (now known as Fédération Internationale des Entrepreneurs Européens de Bâtiment et des Travaux Publics—F.I.E.E.B.T.P.) are recommended for general use by those bodies and by the International Federation of Asian and Western Pacific Contractors Associations (I.F.A.W.P.C.A.), the Inter-American Federation of the Construction Industry and the Associated General Contractors of America.

July, 1969
Reprinted 1973

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1957 E Street NW,
Washington DC 20006, U.S.A.

or

From the Organisations listed herein.

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Conditions of Contract

PART 1—GENERAL CONDITIONS

DEFINITIONS AND INTERPRETATION

Definitions.

1. (1) In the Contract (as hereinafter defined) the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:—
 - (a) "Employer" means the party named in Part II who has called for Tenders to build or construct erect or deliver the Works and who will employ the Contractor and the legal successors in title to the Employer but not (except with the consent of the Contractor) any assignee of the Employer.
 - (b) "Contractor" means the person or persons firm or company whose tender has been accepted by the Employer and includes the Contractor's personal representatives, successors and permitted assigns.
 - (c) "Engineer" means the Engineer designated as such in Part II or other the Engineer appointed from time to time by the Employer and notified in writing to the Contractor to act as Engineer for the purposes of the Contract in place of the Engineer so designated.
 - (d) "Engineer's Representative" means any resident engineer or assistant of the Engineer or any clerk of works appointed from time to time by the Employer or the Engineer to perform the duties set forth in Clause 2 hereof whose authority shall be notified in writing to the Contractor by the Engineer.
 - (e) "Works" means the works to be executed in accordance with the Contract.
 - (f) "Contract" means the Conditions of Contract Specification Drawings priced Bill of Quantities Schedule of Rates and Prices (if any) Tender and the Contract Agreement.
 - (g) "Contract Price" means the sum named in the Tender subject to such additions thereto or deductions therefrom as may be made under the provisions hereinafter contained.
 - (h) "Constructional Plant" means all appliances or things of whatsoever nature required in or about the execution completion or maintenance of the Works or Temporary Works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.
 - (i) "Temporary Works" means all temporary works of every kind required in or about the execution completion or maintenance of the Works.
 - (j) "Drawings" means the drawings referred to in the Specification and any modification of such drawings approved in writing by the Engineer and such other drawings as may from time to time be furnished or approved in writing by the Engineer.
 - (k) "Site" means the lands and other places on under in or through which the Works are to be executed or carried out and any other lands or places provided by the Employer for the purposes of the Contract together with such other places as may be specifically designated in the Contract as forming part of the Site.
 - (l) "Approved" means approved in writing including subsequent written confirmation of previous verbal approval and "approval" means approval in writing including as aforesaid.
- (2) Words importing the singular only also include the plural and *vice versa* where the context requires.
- (3) The marginal headings or notes in these General Conditions shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.

ENGINEER'S REPRESENTATIVE

2. The duties of the Engineer's Representative are to watch and supervise the Works and to test and examine any materials to be used or workmanship employed in connection with the Works. He shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract nor except as expressly provided hereunder or elsewhere in the Contract to order any work involving delay or any extra payment by the Employer nor to make any variation of or in the Works.

The Engineer may from time to time in writing delegate to the Engineer's Representative any of the powers and authorities vested in the Engineer and shall furnish to the Contractor a copy of all such written delegations of powers and authorities. Any written instruction or approval given by the Engineer's Representative to the Contractor within the terms of such delegation (but not otherwise) shall bind the Contractor and the Employer as though it had been given by the Engineer. Provided always as follows:—

- (a) Failure of the Engineer's Representative to disapprove any work or materials shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down removal or breaking up thereof.

Singular and Plural.

Marginal Headings or Notes.

Duties and Powers of Engineer's Representative.

- (b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's Representative he shall be entitled to refer the matter to the Engineer who shall thereupon confirm, reverse or vary such decision.

ASSIGNMENT AND SUB-LETTING

3. The Contractor shall not assign the Contract or any part thereof or any benefit or interest therein or thereunder (otherwise than by a charge in favour of the Contractor's Bankers of any monies due or to become due under this Contract) without the prior written consent of the Employer. Assignment.
4. The Contractor shall not sub-let the whole of the Works. Except where otherwise provided by the Contract the Contractor shall not sub-let any part of the Works without the prior written consent of the Engineer (which shall not be unreasonably withheld) and such consent if given shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts defaults and neglects of any sub-contractor his agents servants or workmen as fully as if they were the acts defaults or neglects of the Contractor his agents servants or workmen. Provided always that the provision of labour on a piecework basis shall not be deemed to be a sub-letting under this clause. Sub-letting.

EXTENT OF CONTRACT

5. The Contract comprises the construction completion and maintenance of the Works and except in so far as the Contract otherwise provides the provision of all labour materials Constructional Plant Temporary Works and everything whether of a temporary or permanent nature required in and for such construction completion and maintenance so far as the necessity for providing the same is specified in or reasonably to be inferred from the Contract. Extent of Contract.

CONTRACT DOCUMENTS

6. (1) The language or languages in which the Contract documents shall be drawn up shall be set out in Part II, and if the said documents are written in more than one language the language according to which the Contract is to be construed and interpreted shall also be designated in Part II being therein designated the "Ruling Language". Language/s.

- (2) Except if and to the extent otherwise provided by the Contract the provisions of the General Conditions and Conditions of Particular Application shall prevail over those of any other document forming part of the Contract. Subject to the foregoing the several documents forming the Contract are to be taken as mutually explanatory of one another but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions directing in what manner the work is to be carried out. Provided always that if in the opinion of the Engineer compliance with any such instructions shall involve the Contractor in any expense which by reason of any such ambiguity or discrepancy the Contractor did not and had reason not to anticipate the Engineer shall certify and the Employer shall pay such additional sum as may be reasonable to cover such expenses. Documents Mutually Explanatory.

7. (1) The Drawings shall remain in the sole custody of the Engineer but two copies thereof shall be furnished to the Contractor free of cost. The Contractor shall provide and make at his own expense any further copies required by him. At the completion of the Contract the Contractor shall return to the Engineer all drawings provided under the Contract. Custody of Drawings.

The Contractor shall give adequate notice in writing to the Engineer or the Engineer's Representative of any further drawing or specification that may be required for the execution of the Works or otherwise under the Contract.

- (2) One copy of the Drawings furnished to the Contractor as aforesaid shall be kept by the Contractor on the Site and the same shall at all reasonable times be available for inspection and use by the Engineer and the Engineer's Representative and by any other person authorised by the Engineer in writing. One Copy of Drawings to be kept on Site.

8. The Engineer shall have full power and authority to supply to the Contractor from time to time during the progress of the Works such further drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and maintenance of the Works and the Contractor shall carry out and be bound by the same. Further Drawings and Instructions.

GENERAL OBLIGATIONS

9. The Contractor shall when called upon so to do enter into and execute a contract agreement (to be prepared at the cost of the Employer) in the form annexed with such modifications as may be necessary. Contract Agreement.

10. If the Tender shall contain an undertaking by the Contractor to obtain when required the guarantee of an Insurance Company or Bank or alternatively to provide two good and sufficient sureties to be jointly and severally bound with the Contractor to the Employer in a sum not exceeding 10 per cent of the tender sum for the due performance of the Contract under the terms of a Bond the said Insurance Company or Bank or sureties and the terms of the said Bond shall be such as shall be approved by the Employer and the obtaining of such guarantee or the provision of such sureties and the cost of the Bond to be so entered into shall be at the expense in all respects of the Contractor unless the Contract otherwise provides. Performance Bond.

Inspection
of the

11. The Tender shall be deemed to have been based on such data regarding hydrological climatic and physical conditions as shall have been supplied by the Employer in the documents furnished to the Contractor by the Employer for the purpose of tendering. The Contractor shall nevertheless inspect and examine the Site and its surroundings and shall satisfy himself (so far as is practicable) before submitting his Tender as to the form and nature of the Site the quantities and nature of the work and materials necessary for the completion of the Works and the means of access to the Site the accommodation he may require and in general shall himself obtain all necessary information (subject as above-mentioned) as to risks contingencies and other circumstances which may influence or affect his Tender.

Site
of

12. The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his Tender for the Works and of the rates and prices stated in the priced Bill of Quantities and the Schedule of Rates and Prices (if any) which rates and prices shall except in so far as it is otherwise provided in the Contract cover all his obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the Works. If however during the execution of the Works the Contractor shall encounter physical conditions or artificial obstructions which conditions or obstructions could not have been reasonably foreseen by an experienced contractor the Contractor shall forthwith give written notice thereof to the Engineer's Representative and if in the opinion of the Engineer such conditions or artificial obstructions could not have been reasonably foreseen by an experienced contractor then the Engineer shall certify and the Employer shall pay the additional expense to which the Contractor shall have been put by reason of such conditions including the proper and reasonable expense

Artificial
Obstructions.

- (a) of complying with any instruction which the Engineer may issue to the Contractor in connection therewith and
- (b) of any proper reasonable measures approved by the Engineer which the Contractor may take in the absence of specific instructions from the Engineer

as a result of such conditions or obstructions being encountered.

Work to be
done
of

13. Save in so far as it is legally or physically impossible the Contractor shall execute complete and maintain the Works in strict accordance with the Contract to the satisfaction of the Engineer and shall comply with and adhere strictly to the Engineer's instructions and directions on any matter (whether mentioned in the Contract or not) touching or concerning the Works. The Contractor shall take instructions and directions only from the Engineer or (subject to the limitations referred to in Clause 2 hereof) from the Engineer's Representative.

Programme
to be
submitted.

14. As soon as practicable after the acceptance of his Tender the Contractor shall if required submit to the Engineer for his approval a programme showing the order of procedure and method in which he proposes to carry out the Works and shall whenever required by the Engineer or Engineer's Representative furnish for his information particulars in writing of the Contractor's arrangements for the carrying out of the Works and of the Constructional Plant and Temporary Works which the Contractor intends to supply use or construct as the case may be. The submission to and approval by the Engineer or Engineer's Representative of such programme or the furnishing of such particulars shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

Contractor's
Superintendence.

15. The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor or a competent and authorised agent or representative approved of in writing by the Engineer (which approval may at any time be withdrawn) is to be constantly on the Works and shall give his whole time to the superintendence of the same. If such approval shall be withdrawn by the Engineer the Contractor shall as soon as is practicable (having regard to the requirement of replacing him as hereinafter mentioned) after receiving written notice of such withdrawal remove the agent from the Site and shall not thereafter employ him again on the Site in any capacity and shall replace him by another agent approved by the Engineer. Such authorised agent or representative shall receive on behalf of the Contractor directions and instructions from the Engineer or (subject to the limitations of Clause 2 hereof) the Engineer's Representative.

Contractor's
Employees.

16. (1) The Contractor shall provide and employ on the Site in connection with the execution and maintenance of the Work

- (a) only such technical assistants as are skilled and experienced in their respective callings and such sub-agents foremen and leading hands as are competent to give proper supervision to the work they are required to supervise,
and
- (b) such skilled semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the Works.

(2) The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person employed by the Contractor in or about the execution or maintenance of the Works who in the opinion of the Engineer misconducts himself or is incompetent or negligent in the proper performance of his duties or whose employment is otherwise considered by the Engineer to be undesirable and such person shall not be again employed upon the Works without the written permission of the Engineer. Any person so removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Engineer.

17. The Contractor shall be responsible for the true and proper setting-out of the Works in relation to original points lines and levels of reference given by the Engineer in writing and for the correctness (subject as above-mentioned) of the position levels dimensions and alignment of all parts of the Works and for the provision of all necessary instruments appliances and labour in connection therewith. If at any time during the progress of the Works any error shall appear or arise in the position levels dimensions or alignment of any part of the Works the Contractor on being required so to do by the Engineer or Engineer's Representative shall at his own expense rectify such error to the satisfaction of the Engineer or Engineer's Representative unless such error is based on incorrect data supplied in writing by the Engineer or the Engineer's Representative in which case the expense of rectifying the same shall be borne by the Employer. The checking of any setting-out or of any line or level by the Engineer or the Engineer's Representative shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all bench-marks sight-rails pegs and other things used in setting out the Works.

Setting-out.

18. If at any time during the execution of the Works the Engineer shall require the Contractor to make boreholes or to carry out exploratory excavation such requirement shall be ordered in writing and shall be deemed to be an addition ordered under the provisions of Clause 51 hereof unless a provisional sum in respect of such anticipated work shall have been included in the Bill of Quantities.

Boreholes and
Exploratory
Excavation.

19. The Contractor shall in connection with the Works provide and maintain at his own cost all lights guards fencing and watching when and where necessary or required by the Engineer or Engineer's Representative or by any duly constituted authority for the protection of the Works or for the safety and convenience of the public or others.

Watching and
Lighting.

20. (1) From the commencement to the completion of the Works the Contractor shall take full responsibility for the care thereof and of all Temporary Works and in case any damage loss or injury shall happen to the Works or to any part thereof or to any Temporary Works from any cause whatsoever (save and except the excepted risks as defined in sub-clause (2) of this clause) shall at his own cost repair and make good the same so that at completion the Works shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Engineer's instructions. In the event of any such damage loss or injury happening from any of the excepted risks the Contractor shall if and to the extent required by the Engineer and subject always to the provisions of Clause 65 hereof repair and make good the same as aforesaid at the cost of the Employer. The Contractor shall also be liable for any damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under Clause 49 hereof.

Care of Works.

(2) The "excepted risks" are war hostilities (whether war be declared or not) invasion act of foreign enemies rebellion revolution insurrection or military or usurped power civil war or (otherwise than among the Contractor's own employees) riot commotion or disorder or use or occupation by the Employer of any portion of the Works in respect of which a Certificate of Completion has been issued or a cause solely due to the Engineer's design of the Works or any such operation of the forces of nature as reasonable foresight and ability on the part of the Contractor could not foresee or reasonably provide against (all of which are herein collectively referred to as "the excepted risks").

Excepted Risks.

21. Without limiting his obligations and responsibilities under Clause 20 hereof the Contractor shall insure in the joint names of the Employer and the Contractor against all loss or damage from whatever cause arising (other than the excepted risks) for which he is responsible under the terms of the Contract and in such manner that the Employer and Contractor are covered during the period of construction of the Works and are also covered during the Period of Maintenance for loss or damage arising from a cause occurring prior to the commencement of the Period of Maintenance and for any loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Clause 49 hereof:--

Insurance of
Works, etc.

(a) The Works and the Temporary Works to the full value of such works executed from time to time.

(b) The materials Constructional Plant and other things brought on to the Site by the Contractor to the full value of such materials Constructional Plant and other things.

Such insurances shall be effected with an insurer and in terms approved by the Employer (which approval shall not be unreasonably withheld) and the Contractor shall whenever required produce to the Engineer or the Engineer's Representative the policy or policies of insurance and the receipts for payment of the current premiums. Provided always that without limiting his obligations and responsibilities as aforesaid nothing in this clause contained shall render the Contractor liable to insure against the necessity for the repair or reconstruction of any work constructed with materials or workmanship not in accordance with the requirements of the Contract.

22. (1) The Contractor shall (except if and so far as the Specification provides otherwise) indemnify and keep indemnified the Employer against all losses and claims for injuries or damage to any person or any property whatsoever (other than surface or other damage to land bring or crops being on the Site suffered by tenants or occupiers) which may arise out of or in consequence of the construction and maintenance of the Works and against all claims demands proceedings damages costs charges and expenses whatsoever in respect of or in relation thereto. Provided always that nothing herein contained shall be deemed to render the Contractor liable for or in respect of or to indemnify the Employer against any compensation or damages for or with respect to:--

Damage to
Persons and
Property.

(a) The permanent use or occupation of land by the Works or any part thereof or (save as hereinafter provided) surface or other damage as aforesaid.

- (b) The right of the Employer to construct the Works or any part thereof on over under in or through any land
- (c) Interference whether temporary or permanent with any right of light air way or water or other easement or quasi-easement which is the unavoidable result of the construction of the Works in accordance with the Contract
- (d) Injuries or damage to persons or property resulting from any act or neglect done or committed during the currency of the contract of the Employer his agents servants or other contractors (not being employed by the Contractor) or for or in respect of any claims demands proceedings damages costs charges and expenses in respect thereof or in relation thereto.

Provided further that for the purposes of this clause the expression "the Site" shall be deemed to be limited to the area defined in the specification or shown on the drawings in which land and crops will be disturbed or damaged as an inevitable consequence of the carrying out of the Works.

(2) The Employer will save harmless and indemnify the Contractor from and against all claims demands proceedings damages costs charges and expenses in respect of the matters referred to in the proviso to sub-clause (1) of this clause.

23. (1) Before commencing the execution of the Works the Contractor (but without limiting his obligations and responsibilities under Clause 22 hereof) shall insure against any damage loss or injury which may occur to any property (including that of the Employer) or to any person (including any employee of the Employer) by or arising out of the execution of the Works or Temporary Works or in the carrying out of the Contract otherwise than due to the matters referred to in the proviso to Clause 22 (1) hereof.

(2) Such insurance shall be effected with an insurer and in terms approved by the Employer (which approval shall not be unreasonably withheld) and for at least the amount stated in the Tender and the Contractor shall whenever required produce to the Engineer or the Engineer's Representative the policy or policies of insurance and the receipts for payment of the current premiums.

24. (1) The Employer shall not be liable for or in respect of any damages or compensation payable at law in respect of or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any sub-contractor save and except an accident or injury resulting from any act or default of the Employer his agents or servants and the Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation (save and except as aforesaid) and against all claims demands proceedings costs charges and expenses whatsoever in respect thereof or in relation thereto.

(2) The Contractor shall insure against such liability with an insurer approved by the Employer (which approval shall not be unreasonably withheld) and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall when required produce to the Engineer or the Engineer's Representative such policy of insurance and the receipt for payment of the current premium. Provided always that in respect of any persons employed by any sub-contractor the Contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy but the Contractor shall require such sub-contractor to produce to the Engineer or the Engineer's Representative when required such policy of insurance and the receipt for payment of the current premium.

25. If the Contractor shall fail to effect and keep in force the insurances referred to in Clauses 21, 23 and 24 hereof or any other insurance which he may be required to effect under the terms of the Contract then and in any such case the Employer may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Employer as aforesaid from any monies due or which may become due to the Contractor or recover the same as a debt due from the Contractor.

26. The Contractor shall give all notices and pay all fees required to be given or paid by any National or State Statute Ordinance or other Law or any Regulation or Bye-Law of any local or other duly constituted authority in relation to the execution of the Works or of any Temporary Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works or any Temporary Works.

The Contractor shall conform in all respects with the provisions of any such Statute Ordinance or Law as aforesaid and the Regulations or Bye-laws of any local or other duly constituted authority which may be applicable to the Works or to any Temporary Works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such Statute Ordinance or Law Regulation or Bye-law. Provided always that the Employer will repay or allow to the Contractor all such sums as the Engineer shall certify to have been properly payable and paid by the Contractor in respect of such fees.

27. All fossils coins articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site of the Works shall as between the Employer and the Contractor be deemed to be the absolute property of the Employer and the Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall immediately upon discovery thereof and before removal acquaint the Engineer's Representative of such discovery and carry out at the expense of the Employer the Engineer's Representative's orders as to the disposal of the same.

Remedy by Employer.

Third Party Insurance.

Minimum Amount of Third Party Insurance.

Accident or Injury to Workmen.

Insurance against Accident, etc., to Workmen.

Remedy on Contractor's Failure to Insure.

Giving of Notices and Payment of Fees.

Compliance with Statutes, Regulations, etc.

Fossils, etc.

The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent rights design trademark or name or other protected rights in respect of any Constructional Plant machine work or material used for or in connection with the Works or Temporary Works or any of them and from and against all claims demands proceedings damages costs charges and expenses whatsoever in respect thereof or in relation thereto. Except where otherwise specified the Contractor shall pay all tonnage and other royalties at and other payments or compensation (if any) for getting stone sand gravel clay or other materials required for the Works or Temporary Works or any of them.

Patents Rights and Royalties.

28. All operations necessary for the execution of the Works and for the construction of any Temporary Works shall so far as compliance with the requirements of the Contract permits be carried out so as not to interfere unnecessarily or improperly with the public convenience or the access to use and occupation of public or private roads and footpaths or to or of properties which are in the possession of the Employer or of any other person, and the Contractor shall save harmless and indemnify the Employer in respect of all claims demands proceedings damages costs charges and expenses whatsoever arising out of or in relation to any such matters in so far as the Contractor is responsible therefore.

Interference with Traffic and Adjoining Properties.

(1) The Contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his sub-contractors and in particular shall select routes choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of plant and material from and to the Site shall be limited as far as reasonably possible and so that no unnecessary damage or injury may be occasioned to such highways and bridges.

Extraordinary Traffic.

(2) Should it be found necessary for the Contractor to move one or more loads of Constructional Plant machinery or pre-constructed units or parts of units of work over part of a highway or bridge the moving whereof is likely to damage any highway or bridge unless special protection or strengthening is carried out then the Contractor shall before moving the load on to such highway or bridge give notice to the Engineer or Engineer's Representative of the weight and other particulars of the load to be moved and his proposals for protecting or strengthening the said highway or bridge. Unless within fourteen days of the receipt of such notice the Engineer shall by counter-notice direct that such protection or strengthening is unnecessary then the Contractor will carry out such proposals or any modification thereof that the Engineer shall require and unless there is an item or are items in the Bill of Quantities for pricing by the Contractor of the necessary works for the protection or strengthening aforesaid the costs and expenses thereof shall be paid by the Employer to the Contractor.

Special Loads.

(3) If during the carrying out of the Works or at any time thereafter the Contractor shall receive any claim arising out of the execution of the Works in respect of damage or injury to highways or bridges he shall immediately report the same to the Engineer and thereafter the Employer shall negotiate the settlement of and pay all sums due in respect of such claim and shall indemnify the Contractor in respect thereof and in respect of all claims demands proceedings damages costs charges and expenses in relation thereto. Provided always that if and so far as any such claims or part thereof shall in the opinion of the Engineer be due to any failure on the part of the Contractor to observe and perform his obligations under sub-clauses (1) and (2) of this clause then the amount certified by the Engineer to be due to such failure shall be paid by the Contractor to the Employer.

Settlement of Extraordinary Traffic Claims.

(4) Where the nature of the Works is such as to require the use by the Contractor of waterborne transport the foregoing provisions of this clause shall be construed as though "highway" included a lock, dock, sea wall, or other structure related to a waterway and "vehicle" included craft, and shall have effect accordingly.

Waterborne Traffic.

29. The Contractor shall in accordance with the requirements of the Engineer afford all reasonable opportunities for carrying out their work to any other contractors employed by the Employer and their workmen and to the workmen of the Employer and of any other duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any Contract which the Employer may enter into in connection with or ancillary to the Works. If however the Contractor shall on the written request of the Engineer or the Engineer's Representative make available to any such other contractor or to the Employer or any such authority any roads or ways for the maintenance of which the Contractor is responsible or permit the use by any such of the Contractor's scaffolding or other plant on the Site or provide any other service of whatsoever nature or any such the Employer shall pay to the Contractor in respect of such use or service such sum or sums as shall in the opinion of the Engineer be reasonable.

Opportunities for Other Contractors.

30. Except where otherwise specified the Contractor shall at his own expense supply and provide all the Constructional Plant Temporary Works and materials for temporary and for permanent works labour (including the supervision thereof) transport and from the site and in and about the Works and other things of every kind required for the construction completion and maintenance of the Works.

Supply of Plant Materials and Labour.

31. On the completion of the Works the Contractor shall clear away and remove from the Site all Constructional Plant surplus materials rubbish and Temporary Works of every kind and leave the whole of the Site and Works clean and in a workmanlike condition to the satisfaction of the Engineer.

Clearance of Site on Completion.

LABOUR

32. (1) The Contractor shall make his own arrangements for the engagement of all labour, local or otherwise, and save in so far as the Contract otherwise provides for the transport housing feeding and payment thereof.

Engagement of Labour.

(2) The Contractor shall so far as is reasonably practicable having regard to local conditions provide on the Site to the satisfaction of the Engineer's Representative an adequate supply of drinking and other water for the use of the Contractor's Staff and workpeople.

Supply of Water.

Alcoholic Liquor
or Drugs.

Arms and
Ammunition.

festivals and
religious Customs.

Epidemics.

Disorderly
Conduct, etc.

Observance by
Sub-Contractors.

Returns of
Labour, etc.

Quality of
Materials and
Workmanship
and Tests.

Cost of Samples.

Cost of Tests.

Costs of Tests not
provided for, etc.

Access to
Site.

Examination of
Work before
Covering up.

Uncovering
and Making
Openings.

(3) The Contractor shall not otherwise than in accordance with the Statutes Ordinances and Government Regulations or Orders for the time being in force import sell give barter or otherwise dispose of any alcoholic liquor or drugs or permit or suffer any such importation sale gift barter or disposal by his sub-contractors agents or employees.

(4) The Contractor shall not give barter or otherwise dispose of to any person or persons any arms or ammunition of any kind or permit or suffer the same as aforesaid.

(5) The Contractor shall in all dealing with labour in his employ have due regard to all recognised festivals days of rest and religious or other customs.

(6) In the event of any outbreak of illness of an epidemic nature the Contractor shall comply with and carry out such regulations orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same.

(7) The Contractor shall at all times take all reasonable precautions to prevent any unlawful riotous or disorderly conduct by or amongst his employees and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same.

(8) The Contractor shall be responsible for observance by his sub-contractors of the foregoing provisions.

(9) Any other conditions affecting labour and wages shall be as set out in Part II in sub-clauses numbered 34 (9) (10) etc. as may be necessary.

35. The Contractor shall if required by the Engineer deliver to the Engineer's Representative or at his office a return in detail in such form and at such intervals as the Engineer may prescribe showing the supervisory staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Constructional Plant as the Engineer's Representative may require.

MATERIALS AND WORKMANSHIP

36. (1) All materials and workmanship shall be of the respective kinds described in the Contract and in accordance with the Engineer's instructions and shall be subjected from time to time to such tests as the Engineer may direct at the place of manufacture or fabrication or on the Site or at all or any of such places. The Contractor shall provide such assistance instruments machines labour and materials as are normally required for examining measuring and testing any work and the quality weight or quantity of any material used and shall supply samples of materials before incorporation in the Works for testing as may be selected and required by the Engineer.

(2) All samples shall be supplied by the Contractor at his own cost if the supply thereof is clearly intended by or provided for in the Specification or Bill of Quantities but if not then at the cost of the Employer.

(3) The cost of making any test shall be borne by the Contractor if such test is clearly intended by or provided for in the Specification or Bill of Quantities and (in the cases only of a test under load or of a test to ascertain whether the design of any finished or partially finished work is appropriate for the purposes which it was intended to fulfil) is particularised in the Specification or Bill of Quantities in sufficient detail to enable the Contractor to price or allow for the same in his Tender.

(4) If any test is ordered by the Engineer which is either

(a) not so intended by or provided for or

(b) (in the cases above mentioned) is not so particularised or

(c) though so intended or provided for is ordered by the Engineer to be carried out by an independent person at any place other than the Site or the place of manufacture or fabrication of the materials tested

then the cost of such test shall be borne by the Contractor if the test shows the workmanship or materials not to be in accordance with the provisions of the Contract or the Engineer's instructions but otherwise by the Employer.

37. The Engineer and any person authorised by him shall at all times have access to the Works and to the Site and to all workshops and places where work is being prepared or whence materials manufactured articles or machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

38. (1) No work shall be covered up or put out of view without the approval of the Engineer or the Engineer's Representative and the Contractor shall afford full opportunity for the Engineer or the Engineer's Representative to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the Engineer's Representative whenever any such work or foundations is or are ready or about to be ready for examination and the Engineer's Representative shall without unreasonable delay unless he considers it unnecessary and advises the Contractor accordingly attend for the purpose of examining and measuring such work or of examining such foundations.

(2) The Contractor shall uncover any part or parts of the Works or make openings in or through the same as the Engineer may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of the Engineer. If any such part or parts have been covered up or put out of view after compliance with the requirements of sub-clause (1) of this Clause and are found to be executed in accordance with the Contract the expenses of uncovering making openings in or through reinstating and making good the same shall be borne by the Employer but in any other case all such expenses shall be borne by the Contractor and shall be recoverable from him by the Employer or may be deducted by the Employer from any monies due or which may become due to the Contractor.

39. (1) The Engineer shall during the progress of the Works have power to order in writing from time to time

Removal of Improper Work and Materials.

- (a) The removal from the Site within such time or times as may be specified in the order of any materials which in the opinion of the Engineer are not in accordance with the Contract
- (b) The substitution of proper and suitable materials and
- (c) The removal and proper re-execution (notwithstanding any previous test thereof or interim payment therefor) of any work which in respect of materials or workmanship is not in the opinion of the Engineer in accordance with the Contract.

(2) In case of default on the part of the Contractor in carrying out such order the Employer shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be borne by the Contractor and shall be recoverable from him by the Employer or may be deducted by the Employer from any monies due or which may become due to the Contractor.

Default of Contractor in Compliance.

40. (1) The Contractor shall on the written order of the Engineer suspend the progress of the Works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Engineer. The extra cost including all running wages to be paid on the Site salaries depreciation and maintenance of plant Site on-costs and general overhead costs of the Contract incurred by the Contractor in giving effect to the Engineer's instructions under this Clause shall be borne and paid by the Employer unless such suspension is

Suspension of Work.

- (a) otherwise provided for in the Contract or
- (b) necessary for the proper execution of the work or by reason of weather conditions affecting the safety or quality of the Works or by some default on the part of the Contractor or
- (c) necessary for the safety of the Works or any part thereof.

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives notice in writing of his intention to claim to the Engineer within 28 days of the Engineer's order. The Engineer shall settle and determine such extra payment to be made to the Contractor in respect of such claim as shall in the opinion of the Engineer be fair and reasonable.

(2) If on the written order of the Engineer (in this sub-clause referred to as a "Suspension Order") the progress of the Works or any part thereof shall be suspended for a period or consecutive periods amounting in all to 90 days or if the Engineer having previously issued a Suspension Order for a period which has lasted less than 90 days shall within less than 90 days from the expiration of that period of suspension issue a further Suspension Order either in respect of the whole of the Works or (where the previous Suspension Order has affected only a part) affecting or including that part then and in any such case the Contractor may serve a written notice on the Engineer requiring permission within 28 days from the receipt thereof to proceed with the Works or that part thereof in regard to which progress is suspended and if such permission is not granted within that time the Contractor by a further written notice so served may (but is not bound to) elect to treat the suspension where it affects part only of the Works as an omission of such part under Clause 51 hereof or where it affects the whole Works as an abandonment of the Contract by the Employer.

Suspension Lasting more than 90 days.

COMMENCEMENT TIME AND DELAYS

41. The Contractor shall commence the Works on Site within the period named in the Tender after the receipt by him of an order in writing to this effect from the Engineer and shall proceed with the same with due expedition and without delay except as may be expressly sanctioned or ordered by the Engineer or be wholly beyond the Contractor's control.

Commencement of Works.

42. (1) Save in so far as the Contract may prescribe the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portions shall be made available to him and subject to any requirement in the Contract as to the order in which the Works shall be executed the Employer will with the Engineer's written order to commence the Works give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the construction of the Works in accordance with the programme referred to in Clause 14 hereof (if any) and otherwise in accordance with such reasonable proposals of the Contractor as he shall by notice in writing to the Engineer make and will from time to time as the Works proceed give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the construction of the Works with due despatch in accordance with the said programme or proposals (as the case may be). If the Contractor suffers delay or incurs expense from failure on the part of the Employer to give possession in accordance with the terms of this Clause the Engineer shall grant an extension of time for the completion of the Works and certify such sum as in his opinion shall be fair to cover the expense incurred which sum shall be paid by the Employer.

Possession of Site.

(2) The Contractor shall bear all expenses and charges for special or temporary wayleaves required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional accommodation outside the Site required by him for the purposes of the Works.

Wayleaves, etc.

43. Subject to any requirement in the Specification as to completion of any portion of the Works before completion of the whole the whole of the Works shall be completed within the time stated in the Tender calculated from the last day of the period named in the Tender as that within which the Works are to be commenced or such extended time as may be allowed under Clause 44 hereof.

Time for Completion.

Extension of
Time for
Completion.

44. Should the amount of extra or additional work of any kind or other special circumstances of any kind whatsoever which may occur be such as fairly to entitle the Contractor to an extension of time for the completion of the work the Engineer shall determine the amount of such extension. Provided that the Engineer is not bound to take into account any extra or additional work or other special circumstances unless the Contractor has within 28 days after such work has been commenced or such circumstances have arisen or as soon thereafter as is practicable delivered to the Engineer's Representative full and detailed particulars of any claim to extension of time to which he may consider himself entitled in order that such claim may be investigated at the time.

No Night or
Sunday Work.

45. Subject to any provision to the contrary contained in the Contract none of the permanent work shall save as hereinafter provided be carried on during the night or on Sundays (if locally recognised as days of rest) or their locally recognised equivalent without the permission in writing of the Engineer's Representative save when the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works in which case the Contractor shall immediately advise the Engineer's Representative. Provided always that the provisions of this clause shall not be applicable in the case of any work which it is customary to carry out by rotary or double shifts.

Rate of
Progress.

46. The whole of the materials plant and labour to be provided by the Contractor under Clause 5 hereof and the mode manner and speed of execution and maintenance of the Works are to be of a kind and conducted in a manner to the satisfaction of the Engineer. Should the rate of progress of the Works or any part thereof be at any time in the opinion of the Engineer too slow to ensure the completion of the Works by the prescribed time or extended time for completion the Engineer shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as the Contractor may think necessary and the Engineer may approve to expedite progress so as to complete the Works by the prescribed time or extended time for completion. If the work is not being carried on by day and by night and the Contractor shall request permission to work by night as well as by day then if the Engineer shall grant such permission the Contractor shall not be entitled to any additional payment for so doing but if such permission shall be refused and there shall be no equivalent practicable method of expediting the progress of the work the time for completion shall be extended by such period as is solely attributable to such refusal. All work at night shall be carried out without unreasonable noise and disturbance. The Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims demands proceedings costs charges and expenses whatsoever in regard or in relation to such liability.

Reduction of
Liquidated
Damages for
Delay.

47. (1) If the Contractor shall fail to complete the Works within the time prescribed by Clause 43 hereof or extended time then the Contractor shall pay to the Employer the sum stated in the Tender as liquidated damages for such default and not as a penalty for every day or part of a day which shall elapse between the time prescribed by Clause 43 hereof or extended time as the case may be and the date of completion of the Works. The Employer may without prejudice to any other method of recovery deduct the amount of such damages from any monies in his hands due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works or from any other of his obligations and liabilities under the Contract.

Reduction of
Liquidated
Damages.

(2) If before the completion of the whole of the Works any part of the Works has been certified by the Engineer as completed pursuant to Clause 42 hereof and occupied or used by the Employer the liquidated damages for delay shall for any period of delay after such certification be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works.

Bonus for
Early Completion.

(3) If it is desired to provide in the Contract for the payment of a bonus for early completion of the Works or of any part thereof this shall be prescribed in the Clause numbered 47 (3) in Part II.

Certificate
of Completion
of Works.

48. As soon as in the opinion of the Engineer the Works shall have been substantially completed and shall have satisfactorily passed any final test that may be prescribed by the Contract the Engineer shall on receiving a written undertaking by the Contractor to finish any outstanding work during the Period of Maintenance issue a Certificate of Completion in respect of the Works and the Period of Maintenance of the Works shall commence from the date of such Certificate. Provided that the Engineer may give such a Certificate with respect to any part of the Works before the completion of the whole of the Works and shall upon the written application of the Contractor give such Certificate with respect to any substantial part of the Works which has been both completed to the satisfaction of the Engineer and occupied or used by the Employer and when any such Certificate is given in respect of a part of the Works such part shall be considered as completed and the Period of Maintenance of such part shall commence from the date of such Certificate. Provided also that a Certificate of Completion given in accordance with the foregoing provisions of any part of the Works occupied and used as aforesaid shall not be deemed to certify completion of any ground or surfaces requiring reinstatement unless such Certificate shall expressly so state.

MAINTENANCE AND DEFECTS

Definition of
Period of
Maintenance.

49. (1) In these Conditions the expression "Period of Maintenance" shall mean the period of maintenance named in the Tender calculated from the date of completion of the Works certified by the Engineer in accordance with Clause 48 hereof or in the event of more than one certificate having been issued by the Engineer under the said Clause from the respective dates so certified and in relation to the Period of Maintenance the expression "the Works" shall be construed accordingly.

(2) To the intent that the Works shall at or as soon as practicable after the expiration of the Period of Maintenance be delivered up to the Employer in as good and perfect a condition (fair wear and tear excepted) to the satisfaction of the Engineer as that in which they were at the commencement of the Period of Maintenance the Contractor shall execute all such work of repair amendment reconstruction rectification and making good of defects imperfections shrinkages or other faults as may be required of the Contractor in writing by the Engineer during the Period of Maintenance or within fourteen days after its expiration as a result of an inspection made by or on behalf of the Engineer prior to its expiration.

Execution of
Work of Repair,
etc.

(3) All such work shall be carried out by the Contractor at his own expense if the necessity thereof shall in the opinion of the Engineer be due to the use of materials or workmanship not in accordance with the Contract or to neglect or failure on the part of the Contractor to comply with any obligation expressed or implied on the Contractor's part under the Contract. If in the opinion of the Engineer such necessity shall be due to any other cause the value of such work shall be ascertained and paid for as if it were additional work.

Cost of
Execution of
Work of
Repair, etc.

(4) If the Contractor shall fail to do any such work as aforesaid required by the Engineer the Employer shall be entitled to carry out such work by his own workmen or by other contractors and if such work is work which the Contractor should have carried out at the Contractor's own cost shall be entitled to recover from the Contractor the cost thereof or may deduct the same from any monies due or that become due to the Contractor.

Remedy on
Contractor's
Failure to Carry
out Work
Required.

50. The Contractor shall if required by the Engineer in writing search for the cause of any defect imperfection or fault under the directions of the Engineer. Unless such defect imperfection or fault shall be one for which the Contractor is liable under the Contract the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by the Employer. But if such defect imperfection or fault shall be one for which the Contractor is liable as aforesaid the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair rectify and make good such defect imperfection or fault at his own expense in accordance with the provisions of Clause 49 hereof.

Contractor to
Search.

ALTERATIONS ADDITIONS AND OMISSIONS

51. (1) The Engineer shall make any variation of the form quality or quantity of the Works or any part thereof that may in his opinion be necessary and for that purpose or if for any other reason it shall in his opinion be desirable shall have power to order the Contractor to do and the Contractor shall do any of the following:—

Variations.

- (a) increase or decrease the quantity of any work included in the Contract
- (b) omit any such work
- (c) change the character or quality or kind of any such work
- (d) change the levels lines position and dimensions of any part of the Works and
- (e) execute additional work of any kind necessary for the completion of the Works

and no such variation shall in any way vitiate or invalidate the Contract but the value (if any) of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

(2) No such variation shall be made by the Contractor without an order in writing of the Engineer. Provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this Clause but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities. Provided also that if for any reason the Engineer shall consider it desirable to give any such order verbally the Contractor shall comply with such order and any confirmation in writing of such verbal order given by the Engineer whether before or after the carrying out of the order shall be deemed to be an order in writing within the meaning of this Clause. Provided further that if the Contractor shall confirm in writing to the Engineer any verbal order of the Engineer and such confirmation shall not be contradicted in writing by the Engineer it shall be deemed to be an order in writing by the Engineer.

Orders for
Variations to
be in Writing.

52. (1) The Engineer shall determine the amount (if any) which in his opinion should be added to or deducted from the sum named in the Tender in respect of any extra or additional work done or work omitted by his order. All such work shall be valued at the rates set out in the Contract if in the opinion of the Engineer the same shall be applicable. If the Contract shall not contain any rates applicable to the extra or additional work then suitable prices shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such prices as shall in his opinion be reasonable and proper.

Valuation of
Variations.

(2) Provided that if the nature or amount of any omission or addition relative to the nature or amount of the whole of the contract work or to any part thereof shall be such that in the opinion of the Engineer the rate or price contained in the Contract for any item of the Works is by reason of such omission or addition rendered unreasonable or inapplicable then a suitable rate or price shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such other rate or price as shall in his opinion be reasonable and proper having regard to the circumstances.

Power of Engineer
to fix Rates.

Provided also that no increase of the Contract Price under sub-clause (1) of this Clause or variation of rate or price under sub-clause (2) of this Clause shall be made unless as soon after the date of the order as is practicable and in the case of extra or additional work before the commencement of the work or as soon thereafter as is practicable notice shall have been given in writing:—

- (a) by the Contractor to the Engineer of his intention to claim extra payment or a varied rate or
- (b) by the Engineer to the Contractor of his intention to vary a rate or price as the case may be.

variations exceeding 15 per cent.

(3) If the net effect of all variations (other than those arising by reason of any clause relating to variations in price of materials and/or labour) shall be found on completion of the whole of the Works to result in a reduction or an addition greater than 15 per cent. of the sum named in the Tender the amount of the Contract Price shall be amended by such sum as shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such sum as shall in his opinion be reasonable and proper regard being had to all material and relevant factors including the Contractor's oncosts and overheads.

daywork.

(4) The Engineer may if in his opinion it is necessary or desirable order in writing that any additional or substituted work shall be executed on a daywork basis. The Contractor shall then be paid for such work under the conditions set out in the Daywork Schedule included in the Bill of Quantities and at the rates and prices affixed thereto by him in his Tender.

The Contractor shall furnish to the Engineer such receipts or other vouchers as may be necessary to prove the amounts paid and before ordering materials shall submit to the Engineer quotations for the same for his approval.

In respect of all work executed on a daywork basis the Contractor shall during the continuance of such work deliver each day to the Engineer's Representative an exact list in duplicate of the names occupation and time of all workmen employed on such work and a statement also in duplicate showing the description and quantity of all materials and plant used thereon or therefor (other than plant which is included in the percentage addition in accordance with the Schedule hereinbefore referred to). One copy of each list and statement will if correct or when agreed be signed by the Engineer's Representative and returned to the Contractor. At the end of each month the Contractor shall deliver to the Engineer's Representative a priced statement of the labour material and plant (except as aforesaid) used and the Contractor shall not be entitled to any payment unless such lists and statements have been fully and punctually rendered. Provided always that if the Engineer shall consider that for any reason the sending of such list or statement by the Contractor in accordance with the foregoing provision was impracticable he shall nevertheless be entitled to authorise payment for such work either as daywork (on being satisfied as to the time employed and plant and materials used on such work) or at such value therefor as shall in his opinion be fair and reasonable.

Claims.

(5) The Contractor shall send to the Engineer's Representative once in every month an account giving particulars (as full and detailed as possible) of all claims for any additional expense to which the Contractor may consider himself entitled and of all extra or additional work ordered by the Engineer which he has executed during the preceding month and no claim for payment for any such work will be considered which has not been included in such particulars. Provided always that the Engineer shall be entitled to authorise payment to be made for any such work notwithstanding the Contractor's failure to comply with this condition if the Contractor has at the earliest practicable opportunity notified the Engineer that he intends to make a claim for such work.

PLANT TEMPORARY WORKS AND MATERIALS

Plant, etc., Exclusive Use for the Works.

53. (1) All constructional Plant Temporary Works and materials provided by the Contractor shall when brought on to the Site be deemed to be exclusively intended for the construction and completion of the Works and the Contractor shall not remove the same or any part thereof (save for the purpose of moving it from one part of the Site to another) without the consent in writing of the Engineer which shall not be unreasonably withheld.

Removal of Plant, etc.

(2) Upon completion of the Works the Contractor shall remove from the Site all the said Constructional Plant and Temporary Works remaining thereon and any unused materials provided by the Contractor.

Employer not liable for Damage to Plant, etc.

(3) The Employer shall not at any time be liable for the loss of or injury to any of the said Constructional Plant Temporary Works or materials save as mentioned in Clauses 20 and 65 hereof.

Re-export of Plant.

(4) In respect of any Constructional Plant which the Contractor shall have imported for the purposes of the Works the Employer will assist the Contractor where required in procuring any necessary Government consent to the re-export of such Constructional Plant by the Contractor upon the removal thereof as aforesaid.

Customs Clearance.

(5) The Employer will assist the Contractor where required in obtaining clearance through the Customs of Constructional Plant materials and other things required for the Works.

(6) Any other conditions affecting Plant, Temporary Works and Materials including conditions regarding payment of or relief from Customs or other import duties harbour and port dues wharfage landing pilotage and any other charges or duties set out in Part II in sub-clauses numbered 53 (6) (7) etc., as may be necessary.

Approval of Materials, etc., not implied.

54. The operation of Clause 53 hereof shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to therein nor shall it prevent the rejection of any such materials at any time by the Engineer.

MEASUREMENT

Quantities.

55. The quantities set out in the Bill of Quantities are the estimated quantities of the work but they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfilment of his obligations under the Contract.

56. The Engineer shall except as otherwise stated ascertain and determine by admeasurement the value in accordance with the Contract of work done in accordance with the Contract. He shall when he requires any part or parts of the Works to be measured give notice to the Contractor's authorised agent or representative who shall forthwith attend or send a qualified agent to assist the Engineer or the Engineer's Representative in making such measurement and shall furnish all particulars required by either of them. Should the Contractor not attend or neglect or omit to send such agent then the measurement made by the Engineer or approved by him shall be taken to be the correct measurement of the work. For the purpose of measuring such permanent work as is to be measured by records and drawings the Engineer's Representative shall prepare records and drawings month by month of such work and the Contractor as and when called upon to do so in writing shall within 14 days attend to examine and agree such records and drawings with the Engineer's Representative and shall sign the same when so agreed and if the Contractor does not so attend to examine and agree any such records and drawings they shall be taken to be correct. If after examination of such records and drawings the Contractor does not agree the same or does not sign the same as agreed they shall nevertheless be taken to be correct unless the Contractor shall within 14 days of such examination lodge with the Engineer's Representative for decision by the Engineer notice in writing of the respects in which such records and drawings are claimed by him to be incorrect.

Works to be Measured.

57. The Works shall be measured net notwithstanding any general or local custom except where otherwise specifically described or prescribed in the Contract.

Method of Measurement.

PROVISIONAL AND PRIME COST SUMS

58. (1) Every provisional sum (other than P.C. prices under sub-clause (2) of this Clause) set out in the Bill of Quantities (whether for work to be executed by the Contractor which has not been specified in detail when the Contract is entered into or for work to be executed by a nominated Sub-Contractor as hereinafter defined) together with the charges and profits (if any) which the Contractor shall have added to such sums shall be deducted from the Contract Price and in lieu thereof there shall be added to the Contract Price:—

Provisional Sums.

(a) where work to which the provisional sum relates has been ordered by the Engineer and executed by the Contractor the value of the work so executed valued in accordance with Clause 52 hereof and

(b) where work to which the provisional sum relates has been ordered by the Engineer and executed by a nominated Sub-Contractor (as hereinafter defined) the sum or sums actually paid (subject however to the provisions of sub-clause (5) hereof) by the Contractor to such Sub-Contractor on the direction of the Engineer and (if the Contractor shall have added to the provisional sum to which the work relates any sums in respect of charges and profits) a sum in the same proportion to the sum so actually paid as the said charges and profits bear to the said provisional sum.

(2) Every sum in the Bill of Quantities which contains (either as the whole or part of the sum) a prime cost (P.C.) price for goods or materials to be supplied for or for incorporation into the Works shall be varied by the substitution for the prime cost price of the actual price (subject however to the provisions of sub-clause (5) hereof) paid by the Contractor for the goods or materials on the direction of the Engineer and the Contract Price shall be increased or decreased (as the case may be) by the amount by which the sum in the Bill of Quantities is increased or decreased by such substitution. No variation shall be made to or in respect of any sum added for labours to the prime cost price on account of the said actual price being greater or less than the prime cost price but in respect of all other charges and profit there shall be added or deducted as the case may be a sum representing such percentage as is provided in the Bill of Quantities in relation to the particular item of prime cost concerned or (if none) as is inserted by the Contractor in the form of Tender as the percentage for the adjustment of prime cost sums.

Prime Cost Items.

(3) All sums set out in the Bill of Quantities which shall be stated to be provisional or for contingencies shall be used only at the direction and discretion of the Engineer and if not used either wholly or in part shall as to the amount not used be deducted from the Contract Price.

Use of Provisional and Contingency Items.

(4) The Contractor shall when required by the Engineer produce all quotations invoices vouchers and accounts or receipts in connection with expenditure in respect of provisional or prime cost items.

Production of Vouchers, etc.

(5) In so far as any sum is paid by the Contractor to a nominated Sub-Contractor (as hereinafter defined) by direction of the Engineer under sub-clause (1) (b) or (2) of this Clause before the Contractor shall have received payment of that sum from the Employer there shall for the purpose of adjusting the Contract Price under sub-clause (1) or (2) hereof (as the case may be) be added to the actual sum paid by the Contractor as aforesaid 2½ per cent. of the amount of such actual payment and the benefit of any cash discount allowed in respect thereof shall be passed to the Employer.

Cash Discount.

(6) In the event of a nominated Sub-Contractor (as hereinafter defined) having undertaken towards the Contractor in respect of the work executed or the goods or materials supplied by such nominated Sub-Contractor any continuing obligation extending for a period exceeding that of the Period of Maintenance under this Contract the Contractor shall at any time after the expiration of the Period of Maintenance assign to the Employer at the Employer's request and cost the benefit of such obligation for the unexpired duration thereof.

Assignment of Sub-Contractor's obligations.

59. (1) All specialists merchants tradesmen and others executing any work or supplying any goods for which provisional or prime cost sums are included in the Bill of Quantities who may have been or be terminated or selected or approved by the Employer or the Engineer and all persons to whom by virtue of the provisions of the Bill of Quantities or Specification the Contractor is required to sub-let any work shall in the execution of such work or the supply of such goods be deemed to be Sub-

Nominated Sub-Contractors.

Contractors employed by the Contractor and are hereinafter referred to as "nominated Sub-Contractors." Provided always that the Contractor shall not be required by the Employer or the Engineer or be deemed to be under any obligation to employ any nominated Sub-Contractor who shall decline to enter into a sub-contract with the Contractor containing provisions:—

- (a) That in respect of the work or goods the subject of the sub-contract the nominated Sub-Contractor will undertake towards the Contractor the like obligations and liabilities as are imposed upon the Contractor towards the Employer by the terms of the Contract and will save harmless and indemnify the Contractor from and against the same and from all claims demands proceedings damages costs charges and expenses whatsoever arising out of or in connection therewith or arising out of or in connection with any failure to perform such obligations or to fulfil such liabilities and
- (b) That the nominated Sub-Contractor will save harmless and indemnify the Contractor from and against any negligence by the nominated Sub-Contractor his agents workmen and servants and from and against any misuse by him or them of any Constructional Plant or Temporary Works provided by the Contractor for the purposes of the Contract and from all claims as aforesaid.

(2) Before issuing under Clause 60 hereof any certificate which includes any payment in respect of work done or goods supplied by any nominated Sub-Contractor the Engineer shall be entitled to demand from the Contractor reasonable proof that all payments (less retentions) included in previous certificates in respect of the work or goods of such nominated Sub-Contractor have been paid or discharged by the Contractor in default whereof unless the Contractor shall

- (a) inform the Engineer in writing that he has reasonable cause for withholding or refusing to make such payment and
- (b) produce to the Engineer reasonable proof that he has so informed such nominated Sub-Contractor in writing

the Employer shall be entitled to pay to such nominated Sub-Contractor direct upon the certificate of the Engineer all payments (less retentions) which the Contractor has failed to make to such nominated Sub-Contractor and to deduct by way of set-off the amount so paid by the Employer from any sums due or which become due from the Employer to the Contractor.

Provided always that where the Engineer has certified and the Employer has paid direct as aforesaid the Engineer shall in issuing any further certificate in favour of the Contractor deduct from the amount thereof the amount so paid direct as aforesaid but shall not withhold or delay the issue of the certificate itself when due to be issued under the terms of the Contract.

CERTIFICATES AND PAYMENT

60. (1) Unless otherwise provided payments shall be made at monthly intervals in accordance with the conditions set out in Part II in the Clause numbered 60

(2) *Where advances are to be made by the Employer to the Contractor in respect of Constructional Plant and materials the conditions of payment and repayment will be as set out in Part II in the Clause numbered 60.*

(3) If the execution of the Works shall necessitate the importation of materials plant or equipment from a country other than that in which the Works are being executed or if the Works or any part thereof are to be executed by labour imported from any other such country or if any other circumstance shall render it necessary or desirable a proportion of the payments to be made under the Contract shall be made in the appropriate foreign currencies and the said proportions and the rate of exchange applicable thereto and the conditions under which such payments are to be made shall be as set out in Part II in the Clause numbered 60.

61. No certificate other than the Maintenance Certificate referred to in Clause 62 hereof shall be deemed to constitute approval of any work or other matter in respect of which it is issued or shall be taken as an admission of the due performance of the Contract or any part thereof or of the accuracy of any claim or demand made by the Contractor or of additional or varied work having been ordered by the Engineer nor shall any other certificate conclude or prejudice any of the powers of the Engineer.

62. (1) The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Engineer and delivered to the Employer stating that the Works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer twenty-eight days after the expiration of the Period of Maintenance (or if different Periods of Maintenance shall become applicable to different parts of the Works the expiration of the latest such period) or as soon thereafter as any works ordered during such period pursuant to Clauses 49 and 50 hereof shall have been completed to the satisfaction of the Engineer and full effect shall be given to this Clause notwithstanding any previous entry on the Works or the taking possession working or using thereof or any part thereof by the Employer. Provided always that the issue of the Maintenance Certificate shall not be a condition precedent to payment to the Contractor of the second portion of the retention money in accordance with the conditions set out in Part II in the Clause numbered 60.

(2) The employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or the execution of the Works unless the Contractor shall have made a claim in writing in respect thereof before the giving of the Maintenance Certificate under this Clause.

(3) Notwithstanding the issue of the Maintenance Certificate the Contractor and (subject to sub-clause (2) of this Clause) the Employer shall remain liable for the fulfilment of any obligation incurred under the provisions of the Contract prior to the issue of the Maintenance Certificate which remains unperformed at the time such Certificate is issued and for the purposes of determining the nature and extent of any such obligation the Contract shall be deemed to remain in force between the parties hereto.

Payments to
Nominated
Sub-Contractors.

Certificates
and Payment.

Advances on
Constructional
Plant and Material.
Payment in
Foreign Currencies.

Approval only
by Maintenance
Certificate.

Maintenance
Certificate.

Completion of
Contractor's
Obligations.

REMEDIES AND POWERS

63. (1) If the Contractor shall become bankrupt or have a receiving order made against him or shall present his petition in bankruptcy or shall make an arrangement with or assignment in favour of his creditors or shall agree to carry out the Contract under a committee of inspection of his creditors or (being a corporation) shall go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction) or if the Contractor shall assign the Contract without the consent in writing of the Employer first obtained or shall have an execution levied on his goods or if the Engineer shall certify in writing to the Employer that in his opinion the Contractor:—

Forfeiture.

- (a) has abandoned the Contract or
- (b) without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for 28 days after receiving from the Engineer written notice to proceed or
- (c) has failed to remove materials from the Site or to pull down and replace work for 28 days after receiving from the Engineer written notice that the said materials or work had been condemned and rejected by the Engineer under these conditions or
- (d) is not executing the Works in accordance with the Contract or is persistently or flagrantly neglecting to carry out his obligations under the Contract or
- (e) has to the detriment of good workmanship or in defiance of the Engineer's instructions to the contrary sub-let any part of the Contract

then the Employer may after giving 14 days' notice in writing to the Contractor enter upon the Site and the Works and expel the Contractor therefrom without thereby avoiding the Contract or releasing the Contractor from any of his obligations or liabilities under the Contract or affecting the rights and powers conferred on the Employer or the Engineer by the Contract and may himself complete the Works or may employ any other contractor to complete the Works and the Employer or such other contractor may use for such completion so much of the Constructional Plant Temporary Works and materials which have been deemed to be reserved exclusively for the construction and completion of the Works under the provisions of the Contract as he or they may think proper and the Employer may at any time sell any of the said Constructional Plant Temporary Works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

(2) The Engineer shall as soon as may be practicable after any such entry and expulsion by the Employer fix and determine *ex parte* or by or after reference to the parties or after such investigation or enquiries as he may think fit to make or institute and shall certify what amount (if any) had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract and what was the value of any of the paid unused or partially used materials any Constructional Plant and any Temporary Works.

Valuation at Date of Forfeiture.

(3) If the Employer shall enter and expel the Contractor under this clause he shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the Period of Maintenance and thereafter until the costs of completion and maintenance damages for delay in completion (if any) and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum or sums (if any) as the Engineer may certify would have been due to him upon due completion by him after deducting the said amount. But if such amount shall exceed the sum which would have been payable to the Contractor on due completion by him then the Contractor shall upon demand pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable accordingly.

Payment after Forfeiture.

64. If by reason of any accident or failure or other event occurring to in or in connection with the Works or any part thereof either during the execution of the Works or during the Period of Maintenance any remedial or other work or repair shall in the opinion of the Engineer or the Engineer's Representative be urgently necessary for security and the Contractor is unable or unwilling at once to do such work or repair the Employer may by his own or other workmen do such work or repair as the Engineer or the Engineer's Representative may consider necessary. If the work or repair so done by the Employer is work which in the opinion of the Engineer the Contractor was liable to do at his own expense under the Contract all costs and charges properly incurred by the Employer in so doing shall on demand be paid by the Contractor to the Employer or may be deducted by the Employer from any monies due or which may become due to the Contractor. Provided always that the Engineer or the Engineer's Representative (as the case may be) shall as soon after the occurrence of any such emergency as may be reasonably practicable notify the Contractor thereof in writing.

Urgent Repairs.

SPECIAL RISKS

65. Notwithstanding anything in the Contract contained.

(1) The Contractor shall be under no liability whatsoever whether by way of indemnity or otherwise for or in respect of destruction of or damage to the Works (save to work condemned under the provisions of Clause 39 hereof prior to the occurrence of any special risk hereinafter mentioned) or Temporary Works or to property whether of the Employer or third parties or for or in respect of injury or loss of life which is the consequence whether direct or indirect of war hostilities (whether war be declared or not) invasion act of foreign enemies rebellion revolution insurrection or military or usurped power civil war or (otherwise than among the Contractor's own employees) riot commotion or disorder (hereinafter comprehensively referred to as "the said special risks") and the Employer shall indemnify and save harmless the Contractor against and from the same and against and from all claims demands proceedings damages costs charges and expenses whatsoever arising thereout or in connection therewith and shall compensate the Contractor for any loss of or damage to property of the Contractor used or intended to be used for the purposes of the Works (including property in transit to the Site) and occasioned either directly or indirectly by said special risks.

No Liability for War, etc., Risks.

Damage to
Works, etc., by
Special Risks.

(2) If the Works or Temporary Works or any materials (whether for the former or the latter) on or near or in transit to the Site shall sustain destruction or damage by reason of any of the said special risks the Contractor shall nevertheless be entitled to payment for any permanent work and for any materials so destroyed or damaged and the Contractor shall be entitled to be paid by the Employer the cost of making good any such destruction or damage whether to the Works or the Temporary Works and of replacing or making good such materials so far as may be required by the Engineer or as may be necessary for the completion of the Works on a prime costs basis plus such profit as the Engineer may certify to be reasonable.

Projectile
Missile, etc.

(3) Destruction damage injury or loss of life caused by the explosion or impact whenever and wherever occurring of any mine bomb shell grenade or other projectile missile munition or explosive of war shall be deemed to be a consequence of the said special risks.

Increased Costs
arising from
Special Risks.

(4) The Employer shall repay to the Contractor any increased cost of or incidental to the execution of the Works (other than such as may be attributable to the cost of reconstructing work condemned under the provisions of Clause 39 hereof prior to the occurrence of any special risk) which is howsoever attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks (subject however to the provisions in this clause hereinafter contained in regard to outbreak of war) but the Contractor shall as soon as any such increase of cost shall come to his knowledge forthwith notify the Engineer thereof in writing.

Outbreak of War.

(5) If during the currency of the Contract there shall be an outbreak of war (whether war is declared or not) in any part of the world which whether financially or otherwise materially affects the execution of the Works the Contractor shall unless and until the Contract is terminated under the provisions in this clause contained use his best endeavours to complete the execution of the Works provided always that the Employer shall be entitled at any time after such outbreak of war to terminate this Contract by giving notice in writing to the Contractor and upon such notice being given this Contract shall (save as to the rights of the parties under this clause and to the operation of Clause 67 hereof) terminate but without prejudice to the rights of either party in respect of any antecedent breach thereof.

Removal of Plant
on Termination.

(6) If the Contract shall be terminated under the provisions of the last preceding sub-clause the Contractor shall with all reasonable despatch remove from the Site all Constructional Plant and shall give similar facilities to his sub-contractors to do so.

Payment if
Contract
Terminated.

(7) If the Contract shall be terminated as aforesaid the Contractor shall be paid by the Employer (in so far as such amounts or items shall not have already been covered by payments on account made to the Contractor) for all work executed prior to the date of termination at the rates and prices provided in the Contract and in addition:—

- (a) The amounts payable in respect of any preliminary items so far as the work or service comprised therein has been carried out or performed and a proper proportion as certified by the Engineer of any such items the work or service comprised in which has been partially carried out or performed.
- (b) The cost of materials or goods reasonably ordered for the Works or Temporary Works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery (such materials or goods becoming the property of the Employer upon such payments being made by him).
- (c) A sum to be certified by the Engineer being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Works in so far as such expenditure shall not have been covered by the payments in this sub-clause before mentioned.
- (d) Any additional sum payable under the provisions of sub-clauses (1) (2) and (4) of this clause.
- (e) The reasonable cost of removal under sub-clause (6) of this clause and (if required by the Contractor) return thereof to the Contractor's main plant yard in his country of registration or to other destination at no greater cost.
- (f) The reasonable cost of repatriation of all the Contractor's staff and workmen employed on or in connection with the Works at the time of such termination.

Provided always that against any payments due from the Employer under this sub-clause the Employer shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of plant and materials and any sum previously paid by the Employer to the Contractor in respect of the execution of the Works.

FRUSTRATION

Payment in Event
of Frustration.

66. In the event of the Contract being frustrated whether by war or otherwise howsoever the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as that which would have been payable under Clause 65 hereof if the Contract had been terminated under the provisions of Clause 65 hereof.

SETTLEMENT OF DISPUTES

Settlement of
Disputes—
Arbitration.

67. If any dispute or difference of any kind whatsoever shall arise between the Employer or the Engineer and the Contractor in connection with or arising out of the Contract or the carrying out of the Works (whether during the progress of the Works or after their completion and whether before or after the termination abandonment or breach of the Contract) it shall in the first place be referred to and settled by the Engineer who within a period of 90 days after being requested by

either party to do so shall give written notice of his decision to the Employer and the Contractor. Save as hereinafter provided such decision in respect of every matter so referred shall be final and binding upon the Employer and the Contractor until the completion of the work and shall forthwith be given effect to by the Contractor who shall proceed with the Works with all due diligence whether be or the Employer requires arbitration as hereinafter provided or not. If the Engineer has given written notice of his decision to the Employer and the Contractor and no claim to arbitration has been communicated to him by either the Employer or the Contractor within a period of 90 days from receipt of such notice the said decision shall remain final and binding upon the Employer and the Contractor. If the Engineer shall fail to give notice of his decision as aforesaid within a period of 90 days after being requested as aforesaid or if either the Employer or the Contractor be dissatisfied with any such decision then and in any such case either the Employer or the Contractor may within 90 days after receiving notice of such decision or within 90 days after the expiration of the first named period of 90 days (as the case may be) require that the matter or matters in dispute be referred to arbitration as hereinafter provided. All disputes or differences in respect of which the decision (if any) of the Engineer has not become final and binding as aforesaid shall be finally settled under the Rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said Rules. The said arbitrator/s shall have full power to open up review and revise any decision opinion direction certificate or valuation of the Engineer and neither party shall be limited in the proceedings before such arbitrator/s to the evidence or arguments put before the Engineer for the purpose of obtaining his said decision. No decision given by the Engineer in accordance with the foregoing provisions shall disqualify him from being called as a witness and giving evidence before the arbitrator/s on any matter whatsoever relevant to the dispute or difference referred to the arbitrator/s as aforesaid. The arbitrator/s shall not enter on the reference until after the completion or alleged completion of the Works unless with the written consent of the Employer and the Contractor provided always

- (i) that such reference may be opened before such completion or alleged completion in respect of the withholding by the Engineer of any certificate or the withholding of any portion of the retention money to which the Contractor claims in accordance with the conditions set out in Part II in the Clause numbered 60 to be entitled or in respect of the exercise of the Engineer's power to give a certificate under Clause 63 (1) hereof or in respect of a dispute arising under Clause 71 hereof
- (ii) that the giving of a Certificate of Completion under Clause 48 hereof shall not be a condition precedent to the opening of any such reference.

NOTICES

68. (1) Any notice to be given to the Contractor under the terms of the Contract shall be served by sending the same by post to or leaving the same at the Contractor's principal place of business (or in the event of the Contractor being a Company to or at its registered office).

Service of
Notices on
Contractor.

(2) Any notice to be given to the Employer under the terms of the Contract shall be served by sending the same by post to or leaving the same at the Employer's last known address (or in the event of the Employer being a Company to or at its registered office).

Service of
Notices on
Employer.

DEFAULT OF EMPLOYER

69. (1) In the event of the Employer:—

- (a) Failing to pay to the Contractor the amount due under any certificate of the Engineer within 30 days after the same shall have become due under the terms of the Contract; or
- (b) Interfering with or obstructing the issue of any such certificate; or
- (c) Becoming bankrupt or (being a company) going into liquidation other than for the purposes of a scheme of reconstruction or amalgamation

Default of
Employer.

the Contractor shall be entitled without prejudice to any other rights or remedies to terminate the employment of the Contractor under the Contract by giving notice in writing to the Employer.

(2) Upon the giving of such notice the Contractor shall notwithstanding the provision of Clause 53 (1) hereof) with all reasonable despatch remove from the Site all Constructional Plant brought by him thereon.

(3) In the event of such termination the Employer shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions of Clause 65 hereof but in addition to the payments specified in Clause 65 (7) the Employer shall pay to the Contractor the amount of any loss or damage to the Contractor arising out of or in connection with or by consequence of such termination.

(4) Nothing in this Clause contained shall prejudice the right of the Contractor to exercise either in lieu of or in addition to the rights and remedies in this clause specified any other rights or remedies to which the Contractor may be entitled.

70. Where adjustments are to be made in respect of rise or fall in the costs of labour and/or materials or any other matters affecting the cost of execution of the Works these are as set out in Part II in the Clause numbered 70.

Increase or
Decrease of
Costs.

Major Economic
Dislocation.

71. In the event of there being subsequent to the date of Tender such a major economic dislocation within the country in which the Works are being or are to be constructed as to result in the imposition by the Government of that country of currency restrictions or in devaluation of the currency of that country the Employer shall pay to the Contractor any increased costs of or incidental to the execution of the Works which is howsoever attributable to or consequent on or the result of or in any way whatsoever connected with such economic dislocation provided always that nothing in this Clause contained shall prejudice the right of the Contractor to exercise any other rights or remedies to which the Contractor may be entitled in such event.

NOTE

FOR CONDITIONS OF PARTICULAR APPLICATION—SEE PART II

FOR CONDITIONS OF PARTICULAR APPLICATION TO DREDGING AND RECLAMATION WORK
—SEE PART III

添付資料 7-1-7 工事着工許可通知

P.E. JE

Ref. No: PIIW-2

9 September, 1988

Construction Equipment Hire Ltd.,
4 Lesi Street,
Wailada,
LAMI.

RE: THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS FOR THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

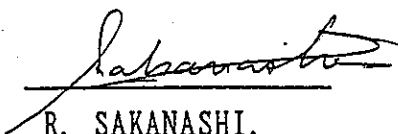
You are hereby instructed to commence THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS FOR THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT.

You are reminded to submit to me immediately the followings:

- (a) The Third Party Insurance for the said contract as per clause 21.
- (b) Your detail work programme as per clause 14.
- (c) Your staff organisation and functions in the said contract as per clause 15.
- (d) The Performance Bond or Bank Guarantee for the performance of the Contract in an amount equal to 10 per cent of the total sum as per clause 10.

I wish you well in execution of this contract.

Thank you.



R. SAKANASHI.

Project Engineer (JICA)
for Resident Representative of JICA



cc: Resident Representative of JICA
Acting Principal Engineer (Drainage & Irrigation)

JAPAN INTERNATIONAL COOPERATION AGENCY

2nd December, 1988

CONSTRUCTION EQUIPMENT HIRE LIMITED

Wailada, Lami, P.O. Box 13831

Suva

Att.: Mr. Gopal Pillay

Dear Sir,

Re: THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

According to your estimated cost for the following additional work on above mentioned project, JICA will order this work to your company.

Scope of Works

Nausori Project

1. Clear bush and disposal A=12,000m²
2. Topsoil handling A=12ha
3. Pipes
1.2m dia x2.44mx 6unit
0.6m dia x2.44mx12unit
0.15m dia x6.00mx41unit

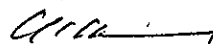
Navua Project

1. Pipes
1.2m dia x2.44mx 6unit
0.6m dia x2.44mx13unit
0.3m dia x2.44mx20unit
0.15m dia x6.00mx49unit
2. Canal and road materials V=3,500 m³
3. Land leveling A=16ha

JAPAN INTERNATIONAL COOPERATION AGENCY

<u>Estimation Cost</u>		RATE	AMOUNT
		(F\$)	(F\$)
Nausori Project			
1. Clear bush and disposal	A=12,000m ²	0.80	9,600.00
2. Topsoil handling	A=12ha	2,350.00	28,200.00
3. Pipes	1.2m dia x2.44mx 6unit	461.78	2,770.68
	0.6m dia x2.44mx12unit	139.70	1,676.40
	0.15m dia x6.00mx41unit	72.82	2,985.62
	SUB TOTAL		45,232.70
Navua Project			
1. Pipes	1.2m dia x2.44mx 6unit	461.78	2,770.68
	0.6m dia x2.44mx13unit	139.70	1,816.10
	0.3m dia x2.44mx20unit	54.78	1,095.60
	0.15m dia x6.00mx49unit	72.82	3,568.18
2. Canal and road materials	V=3,500 m ³	5.35	18,725.00
3. Land leveling	A=16ha	1,650.00	26,400.00
	SUB TOTAL		54,375.56
	TOTAL		99,608.26

Yours faithfully,



 Y. YOSHIDA
 Resident Representative
 JICA Office
 Suva

昭和63年10月28日

国際協力事業団
フィジー事務所
吉田 芳夫 所長 殿

フィジー国稲作研究開発計画
パイロットインフラ整備事業
施工管理担当 岩井 功
坂梨 良介

件名：フィジー国稲作研究開発計画パイロットインフラ整備事業
の工事の第1回中間支払いと検査に関して

標記プロジェクトの工事に関し、施工業者の CONSTRUCTION EQUIPMENT HIRE LTD. より契約書第60条に基づく第1回目の検査要請と中間支払いの請求が10月18日付でありました。

この検査要請に基づき工事の中間検査（第1回目）を行なったところ、請求と相違ないことを確認いたしました。

よって、CONSTRUCTION EQUIPMENT HIRE LTD.（施工業者）への第1回中間支払いを次の金額でお願い致します。

第1回中間支払い金額 : US\$ 57,052.26

以下に施工業者からの請求書と内訳書を添付しました。

CONSTRUCTION EQUIPMENT HIRE LIMITED

* CONTRACT EARTHWORKS * LAND DRAINAGE * EXCAVATION * PIPEWORK

PHONE:362-766

OPERATIONAL HEAD OFFICE, WAILADA, LAMI.

PLEASE REPLY TO
G.P.O. Box 13831, Suva
FIJI ISLANDS

DIRECTORS:

18th October, 1988

The Resident Representative
Japan International Cooperation
Agency
S u v a

Attention: Mr Yoshio YOSHIDA

Dear Sir,

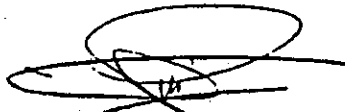
re: PROGRESS CLAIM FOR NAUSORI & NAVUA RICE CULTIVATION
PROJECTS

We are submitting our first progress claims for the above projects for the sum of \$57,052.26 (Fifty seven thousand fifty two dollars & twenty six cents) as details attached.

NAUSORI PROJECT	\$ 40,019.76
NAVUA PROJECT	\$ 17,032.50
TOTAL.	<u>\$ 57,052.26</u>

Your earliest consideration for the above payment will be highly appreciated.

Yours faithfully
CONSTRUCTION EQUIPMENT HIRE LTD



.....
Mr G. Pillay
Managing Director

Progress Claim

Date:18/10/88.....

CONTRACTOR : CONSTRUCTION EQUIPMENT HIRE LTD
 ADDRESS : P.O. BOX 13831, SUVA.
 CONTRACT : NAUSORI RICE CULTIVATION TECHNOLOGY PROJECT TENDER NO. CT.
 PROGRESS CLAIM NO. ONE for PERIOD ENDING (JICA) 18/10/88

SUMMARY		
Bill No. 1	Item No. 1	9,750.00
1	" " 2	1,620.00
1	" " 3	8,960.00
1	" " 5	5,120.00
1	" " 6	7,200.00
Bill No 5	Item No. 3	2,216.40
Variations		
Variation Orer No. 1	Clear bush and disposal	9,600.00
Progress Claim No.: ONE	Total	44,446.40
Prepared by: Mr G. Pillay	Less 10% Retention	4,446.64
Date: 18/10/88	Total minus retention	40,019.76
	Less previous payment	Nil
	Payment due	40,019.76

SITE ENGINEER/
 SUPERVISOR

Date:

PROGRESS CLAIM NO. ONE


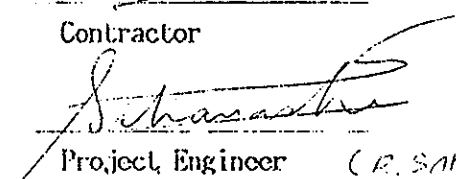
Bill No.:...5.....

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date	
3	unit	12	12	Nil	12	45.00	540.00	540.00	
		As attached purchase docket of culverts 0.60m dia x 2.44m							
		from Humes Industries.				Cost + 10% (Transport)		1,676.40	
								\$ 2,216.40	

JAPAN INTERNATIONAL COOPERATION AGENCY

VARIATION ORDER

TO CONSTRUCTION EQUIPMENT HIRE LTD. DATE September 19, 1988
 ORDER NO. 1
 CONTRACT THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS ON THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT (NAUSORI PROJECT)

DESCRIPTION OF WORK	UNIT	Q'TY	RATE
<p><u>Bill No.1 Order No.1</u></p> <p>As discussed, please carry out the following works on the following rates,</p> <p>1. Clear Bush and Desposal</p> <p>Agreed : </p> <p>Contractor</p> <p> Project Engineer (R. SAKAWASILE)</p>	<p>-</p> <p>m²</p> <p>-</p>	<p>-</p> <p>12,000</p> <p>-</p>	<p>-</p> <p>F\$0.80</p> <p>-</p>

SUVA OFFICE & FACTORY
P.O. BOX 133, SUVA. TEL: 361410
LAUTOKA FACTORY
P.O. BOX 314, LAUTOKA. TEL: 90551

HJME INDUSTRIES (SUVA) LTD

DELIVERY NOTE/
CARRIER'S COPY
CASH SALE

ACCOUNT NO

0	0	0	1	9
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FACTORY
INVOICE NUMBER **22858**
SALES ORDER No.
DATE 11/15/68

CONSTRUCTION EQUIPMENT
P.O. BOX 12821
SUVA.

DELIVERY INSTRUCTION

ORDERED		No	DETAILS	No./M	Rate	AMOUNT								
Number	Balance													
12	-	12	600 X 2.44 FOX 10% CRPK	12	127.00	1524 00								
RECEIVED \$ 127.00 CASH Signed [Signature] for HJME INDUSTRIES (SUVA) LTD.														
<table border="1" style="width: 100%;"> <tr> <td>RECEIVED IN GOOD ORDER AND CONDITION GOODS LISTED ABOVE</td> <td>CARRIER</td> <td>CUSTOMER'S O/N</td> <td>TONNES</td> </tr> <tr> <td></td> <td></td> <td>DATE 11/15</td> <td>6.00</td> </tr> </table>							RECEIVED IN GOOD ORDER AND CONDITION GOODS LISTED ABOVE	CARRIER	CUSTOMER'S O/N	TONNES			DATE 11/15	6.00
RECEIVED IN GOOD ORDER AND CONDITION GOODS LISTED ABOVE	CARRIER	CUSTOMER'S O/N	TONNES											
		DATE 11/15	6.00											
						INVOICE TOTAL								
						\$								

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co427 is held.

Progress Claim

Date:18/10/88.....

CONTRACTOR : CONSTRUCTION EQUIPMENT HIRE LIMITED

ADDRESS : P.O. BOX 13831, SUVA.

CONTRACT : NAVUA RICE CULTIVATION TECHNOLOGY PROJECT TENDER NO. CT.

PROGRESS CLAIM NO. ONE (JICA) for PERIOD ENDING 18/10/88

SUMMARY		
Bill No.1	Item No. 1	12,925.00
1	" " 8	6,000.00
Progress Claim No.: ..ONE.....	Total	18,925.00
Prepared by: Mr G. Pillay	Less 10% Retention	1,892.50
Date: 18/10/88	Total minus retention	17,032.50
	Less previous payment	Nil
	Payment due	17,032.50

SITE ENGINEER/
SUPERVISOR

Date:

N.B.: Submit 4 copies + 1 Original

PROGRESS CLAIM NO. ONE

Bill No.: 1

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	ha	11	5.5	Nil	5.5	2,350	12,925	12,925.00
8	m ³	6,000	3,000	Nil	3,000	2.00	6,000	6,000.00
								\$ 18,925.00

昭和63年12月 7日

国際協力事業団
フィジー事務所
吉田 芳夫 所長 殿

フィジー国稲作研究開発計画
パイロットインフラ整備事業
施工管理担当 岩井 功 (印)

件名：フィジー国稲作研究開発計画パイロットインフラ整備事業
の工事の第2回中間支払いと検査に関して

標記プロジェクトの工事に関し、施工業者の CONSTRUCTION EQUIPMENT HIRE LTD.
より契約書第60条に基づく第2回目の検査要請と中間支払いの請求が11月25日付
でありました。

この検査要請に基づき工事の中間検査（第2回目）を行なったところ、請求と相違
ないことを確認いたしました。

よって、CONSTRUCTION EQUIPMENT HIRE LTD.（施工業者）への第2回中間支払いを
次の金額でお願い致します。

第2回中間支払い金額 : F \$ 109,383.30

以下に施工業者からの請求書と内訳書を添付しました。

CONSTRUCTION EQUIPMENT HIRE LIMITED

* CONTRACT EARTHWORKS * LAND DRAINAGE * EXCAVATION * PIPEWORK

PHONE:362-766

OPERATIONAL HEAD OFFICE, WAILADA, LAMI.

PLEASE REPLY TO
G.P.O. Box 13831, Suva
FIJI ISLANDS

DIRECTORS:

25th November, 1988

The President Representative
Japan International Cooperation
Agency
Suva

Attn: Mr Yoshio Yoshida

Dear Sir,


RE: PROGRESS CLAIM FOR NAUSORI & NAVUA RICE CULTIVATION
PROJECTS

We are submitting our second progress claims for the above projects for the sum of \$109,383.30 (one hundred nine thousand three hundred eighty three dollars & thirty cents).

NAUSORI PROJECT	50,260.50
NAVUA "	59,122.80
TOTAL	<u>\$ 109,383.30</u>

Your earliest consideration for the above payment will be highly appreciated.

Yours sincerely,
CONSTRUCTION EQUIPMENT HIRE LTD


.....
Mr G. Pillay
Managing Director

Progress Claim

Date: ...25/11/88.....

CONTRACTOR: Construction Equipment Hire Limited

ADDRESS: P.O Box 13831, Suva.

CONTRACT: Nausori Rice Cultivation Technology Project TENDER NO. CT. _____
(JICA)

PROGRESS CLAIM NO. Two for PERIOD ENDING 25/11/88

SUMMARY		
Bill No.1	Item no. 1,2,3,6	17,206.00
" " 3	" " 3,5	1,250.00
" " 5	" " 1,2,3	262.50
" " 6	" " 1,2,3,4,5	8,926.50
etc.		
Variations		
Variation Orer No. 2	Topsoil handling	28,200.00
Progress Claim No.: <u>Two</u>		Total 55,845.00
Prepared by: <u>Mr. G. Pillay</u>		Less 10% Retention 5,584.50
Date: <u>25/11/88</u>		Total minus retention 50,260.50
		Less previous payment
		Payment due 50,260.50

SITE ENGINEER/
SUPERVISOR

Date: 5/12/88

N.B.: Submit 4 copies + 1 Original

PROGRESS CLAIM

Bill No.: ONE

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	ha	13	13	6.5	6.5	1500	9750	19,500.00
2	m	2700	2430	1350	1080	1.20	1296	2,916.00
3	m	3200	2880	2240	640	4.00	2560	11,520.00
5	m ²	6400	6400	6400	0	0.80	0	5,120.00
6	m ³	4800	4320	2880	1440	2.50	3600	10,800.00
							17206	49,856.00
		Bill no. 1 Variation order no. 1						
1	m ²	12000	12000	12000	0	0.80	0	9,600.00
		Bill no. 1 Variation order no. 2						
		(Topsoil handling)						
1	ha	12	12	Nil	12	2350	28200	28,200.00
							17206.00	87,656.00

90

PROGRESS CLAIM

Bill No.: THREE.....

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
2	m ³	14	14	Nil	14	25	350	350.00
5	m ³	3	3	Nil	3	300	900	900.00
							1250.00	1,250.00

22

PROGRESS CLAIM

Bill No.: FIVE

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date	
1	m ³	25	25	Nil	25	6.5	162.50	162.50	
2	m ³	4	4	Nil	4	25	100.00	100.00	
3	Unit	12	12	Nil	0	45	0	540.00	
		Pipe (Purchased docketts)					LS	0	1,676.40
							262.50	2,478.90	

CP

PROGRESS CLAIM

Bill No.: SIX

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	25	25	Nil	25	6.50	162.50	162.50
2	Unit	24	24	Nil	24	25	600.00	600.00
3	m ³	4	4	Nil	4	25	100.00	100.00
4	m ³	2	2	Nil	2	200	400.00	400.00
5	kg	1120	1120	Nil	1120	2.20	2464.00	2,464.00
6	m ³	20	20	Nil	20	260	5200.00	5,200.00
							8926.50	8,926.50

90

JAPAN INTERNATIONAL COOPERATION AGENCY

VARIATION ORDER

TO CONSTRUCTION EQUIPMENT HIRE LTD DATE September 25, 1988
 ORDER NO 2
 CONTRACT THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS ON THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT (NAUSORI PROJECT)

DESCRIPTION OF WORK	UNIT	Q' TY	RATE
<p><u>Bill No.1 Order No.2</u></p> <p>As discussed, please carry out the following works on the following rates,</p> <p>1. Topsoil Handling -Remove 0.10m thick topsoil layer, shift over max.length of 40m, and stockpile. Upon completion of field levelling operations,spread stockpiled topsoil in 0.10m thick layer over the field, and trim and compact as directed by the Engineer.</p> <p>Agreed : <u>(Signature)</u> (C.E.H.J.D) Contractor</p> <p><u>(Signature)</u> (I.Z.O.A.I) Project Engineer</p>	<p>ha</p>	<p>12</p>	<p>F\$2,350</p>

PROGRESS CLAIM

Bill No.: ONE.....

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	ha	11	11	5.5	5.5	2350	12925	25,850.00
2	ha	5	5	Nil	5	2350	11750	11,750.00
3	ha	11	11	Nil	11	1500	16500	16,500.00
4	m	1280	1280	Nil	1280	.95	1216	1,216.00
5	m	4740	4740	Nil	4740	3.65	17301	17,301.00
8	m ³	6000	6000	3000	3000	2.00	6000	12,000.00
							65692.00	84,617.00

09

昭和63年12月21日

国際協力事業団
フィジー事務所
吉田 芳夫 所長殿

フィジー国稲作研究開発計画
パイロットインフラ整備事業
施工管理担当 岩井 功

件名：フィジー国稲作研究開発計画パイロットインフラ整備事業
の工事の完工時支払いと検査に関して

標記プロジェクトの工事に関し、施工業者の CONSTRUCTION EQUIPMENT HIRE LTD.
より契約書第60条に基づく完工時の検査要請と完工時支払いの請求が12月19日
付でありました。

この検査要請に基づき工事の完工検査を行なったところ、請求と相違ないことを確
認いたしました。

よって、CONSTRUCTION EQUIPMENT HIRE LTD.（施工業者）への完工時支払いを次の
金額でお願い致します。

完工時支払い金額 : F\$158,411.01

以下に施工業者からの請求書と内訳書を添付しました。

CONSTRUCTION EQUIPMENT HIRE LIMITED

* CONTRACT EARTHWORKS * LAND DRAINAGE * EXCAVATION * PIPEWORK

PHONE:362-766

OPERATIONAL HEAD OFFICE, WAILADA, LAMI.

PLEASE REPLY TO
G.P.O. Box 13831, Suva
FIJI ISLANDS

DIRECTORS

19th December, 1983

The President Representative
Japan International Coopera-
tion Agency
Suva

Attn: Mr Yoshio Yoshida

Dear Sir,

RE: PROGRESS CLAIM FOR NAUSORI AND NAVUA RICE CULTIVATION
PROJECTS


We are submitting our final claim no three for the above projects for the sum of \$158,411.01 (one fifty eight thousand four hundred eleven dollars and one cent).

NAUSORI PROJECT	46,492.38
NAVUA	111,918.63
	<u>\$ 158,411.01</u>

Your earliest consideration for the above payment will be highly appreciated.

Thank you.

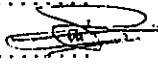
Yours sincerely,
CONSTRUCTION EQUIPMENT HIRE LIMITED


.....
Mr G. Pillay
Managing Director

Progress Claim

Date: 19/12/88

CONTRACTOR: Construction Equipment Hire Limited.
 ADDRESS: P.O Box 13831, Suva.
 CONTRACT: Nausori Rice Cultivation Technology Project TENDER NO. CT.
 PROGRESS CLAIM NO. Three & Final for PERIOD ENDING (JIRA) 19th December, 1988

SUMMARY		
Bill No. 1	Item no. 2,3,4,6,	21,804.00
2	" " 1-5	9,862.00
3	" " 1,3,4,6	4,187.50
4	" " 1	250.00
6	" " 7	1,800.00
etc.		
Variations		
Variation Order No. 3	Pipes	5,756.30
Progress Claim No.:	Three & Final	Total 43,659.20
Prepared by:	Mr G. Pillay 	Less 10% Retention 4,365.93
Date:	19/12/88	Total minus retention 39,293.27
		Less previous payment
		Payment due 39,293.27
		+ 50% of retention 7,198.56
		Payment Due \$ 46,492.38
SITE ENGINEER/ SUPERVISOR <u>J. Mani</u>		
Date: <u>20/12/88</u>		

N.B.: Submit 4 copies + 1 Original

PROGRESS CLAIM

Bill No.: 1

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	ha	13	13	13	0	1500	0	19,500.00
2	m	2700	2700	2430	270	1.20	324	3,240.00
3	m	3200	3200	2880	320	4.00	1280	12,800.00
4	m ²	760	760	Nil	760	25.00	19000	19,000.00
5	m ²	6400	6400	6400	0	0.80	0	5,120.00
6	m ³	4800	4800	4320	480	2.50	1200	12,000.00
							21804	71,660.00
		Variation Order No.3						
3		As attached purchase order of culverts						
		2	x 1.22m dia x 2.44m	(cost + 10%)			923.56	923.56
		2	x 1.22m dia x 2.44m	(cost + 10%)			923.56	923.56
		2	x 1.22m dia x 2.44m	(cost + 10%)			923.56	923.56
		6	x 0.15m dia x 6.00m	(cost + 10%)			436.92	436.92
		35	x 0.15m dia x 6.00m	(cost + 10%)			2548.70	2,548.70
							5756.30	5,756.30
							21804	71,660.00

PROGRESS CLAIM

Bill No.:.....3.....

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	110	110	Nil	110	8.50	935	935.00
2	m ³	14	14	14	0	25.00	0	350.00
3	kg	165	165	Nil	165	2.50	412.50	412.50
4	unit	166	166	Nil	166	15.00	2490	2,490.00
5	m ³	3	3	3	0	300.00	0	900.00
6	m ³	35	35	Nil	35	10.00	350	350.00
							4187.50	5,437.50

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PROGRESS CLAIM

Bill No.: ... 4

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	25	25	Nil	25	10.00	250.00	250.00
							250.00	250.00

CO

PROGRESS CLAIM

Bill No.:.....5.....

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	25	25	25	0	6.50	0	162.50
2	m ³	4	4	4	0	25.00	0	100.00
3	unit	12	12	12	0	45.00	0	540.00
							0	802.50

22

PROGRESS CLAIM

Bill No.:.....6.....


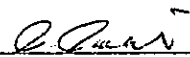
Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	25	25	25	0	6.50	0	162.50
2	unit	24	24	24	0	25.00	0	600.00
3	m ³	4	4	4	0	25.00	0	100.00
4	m ³	2	2	2	0	200	0	400.00
5	kg	1120	1120	1120	0	2.20	0	2,464.00
6	m ³	20	20	20	0	260	0	5,200.00
7	m ³	60	60	Nil	60	30.00	1800	1,800.00
							1,800	10,726.50

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JAPAN INTERNATIONAL COOPERATION AGENCY

VARIATION ORDER

TO CONSTRUCTION EQUIPMENT HIRE LTD DATE October 15, 1988
 ORDER NO 3
 CONTRACT THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS ON THE IMPROVEMENT OF RICE CULTIVATION
TECHNOLOGY PROJECT (NAUSORI PROJECT)

DESCRIPTION OF WORK	UNIT	Q'TY	RATE
<u>Bill No.1 Order No.3</u>			
As discussed, please carry out the following works on the following rates,			
1. Pipes			
-Supply and transport the following pipes from Suva to job site,			
1.22m dia x 2.44m long	Nos	6	F\$461.78
0.60m dia x 2.44m long	Nos	12	F\$139.70
0.15m dia x 6.00m long	Nos	41	F\$72.82
Agreed : 	Contractor		
	Project Engineer		

SUVA OF ICE & FACTORY
 P.O. BOX 133, SUVA. TEL: 361410
 LAUTOKA FACTORY
 P.O. BOX 314, LAUTOKA. TEL: 80551

HUME INDUSTRIES (SOUTH SEAS) LIMITED

ACCOUNT NO

00019

CASH SALE

FACTORY SUVA
 INVOICE NUMBER 22915
 SALES ORDER No. _____

DATE 27. 10. 88

DELIVERY INSTRUCTION

CONSTRUCTION EQUIPMENT HIRE
 P. O. BOX 13251
 SUVA

ORDERED	
Number	Balance

No	DETAILS	No./M ³	Rate	AMOUNT
2	1200 X 2.44 FJX	2	419.80	839.60
RECEIVED \$ 839.60 CASH SIGNED: <i>[Signature]</i> for HUME INDUSTRIES (SOUTH SEAS) LTD.				
C/P No. 6226				
RECEIPT No. 02868 OF 27/10				

RECEIVED IN GOOD ORDER AND CONDITION GOODS LISTED ABOVE	CARRIER	CUSTOMER'S O/V/N	TONNES	\$	INVOICE TOTAL
CARRIER	TRUCK No. B47735	DATE	3.55	839	60

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
 Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co427 is held.

Suva Stationery 0587(m)

SUVA OFFICE & FACTORY
P.O. BOX 133, SUVA. TEL: 361410
LAUTOKA FACTORY
P.O. BOX 314, LAUTOKA. TEL: 60551

MANUFACTURE

HUME INDUSTRIES (SOUTH SEAS) LIMITED

CASH SALE

ACCOUNT NO.

0	0	0	1	9
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FACTORY: SUVA
INVOICE NUMBER: 22910
SALES ORDER No.:
DATE: 27. 10. 88
DELIVERY INSTRUCTION:

CONSTRUCTION EQUIPMENT HIRE
P.O. BOX 13331
SUVA

ORDERED	
Number	Balance

No	DETAILS	No. AM	Rate	AMOUNT
2	1200 X 2.44 FX	2	419.80	839.60
				465.96
46	NO. 6221			

RECEIVED \$ 839.60 GASHI
CPR.
Signed: [Signature]
for HUME INDUSTRIES (SOUTH SEAS) LTD.

RECEIPT No. 02266 OF 27/10

RECEIVED IN GOOD ORDER AND
CONDITION GOODS LISTED ABOVE
CARRIER: [Signature]
CUSTOMER: [Signature]

CARRIER:
TRUCK NO. BF 725-

CUSTOMER'S O/N [Signature]
DATE

TONNES 3.55

INVOICE TOTAL \$ 839.60
~~465.96~~

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. C0427 is held.

Suva Stationery GS87(m)

SUVA OFFICE & FACTORY
P.O. BOX 133, SUVA. TEL: 361410
LAUTOKA FACTORY
P.O. BOX 314, LAUTOKA. TEL: 60551

HUME INDUSTRIES (SOUTH SEAS) LIMITED

ACCOUNT NO

00019

CASH SALE

CONSTRUCTION EQUIPMENT HIRE
P.O. Box 13831
SUVA

FACTORY SUVA
INVOICE NUMBER 22929
SALES ORDER No.
DATE 31.10.88

DELIVERY INSTRUCTION

ORDERED

Number Balance

No	DETAILS	No./M	Rate	AMOUNT
2	1200 x 2.44 FLX	2	419.80	839.60

TONNES \$ 839.60
3.55 INVOICE TOTAL

CUSTOMER'S O/R
C/S DATE

RECEIVED IN GOOD ORDER AND
CONDITION GOODS LISTED ABOVE
CARRIER

TRUCK No. BH725
CARRIER

RECEIVED \$839.60 CASH
CHO. Signed... for HUME INDUSTRIES (SOUTH SEAS) LTD.

RECEIPT No. 40 N = 6240

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co427 is held.

Suva Stationery 0387(m)

WHOLESALE CREDIT SALE

MAJOREL

CUSTOMER COPY

builders merchants

A Division of Carpenters Fiji Limited

46 Matija Street, Waiu Bay, Suva, Fiji. Phone 313-155



NAME: *Compensation Project*

ADDRESS: *Waiu Bay*

CUSTOMER NUMBER: *512 = 514*

DATE OF SALE: *2/11/83*

CUSTOMER ORDER No.: *662*

BRANCH LOCATION CODE: *316*

293398

QTY SUPPLIED	CHECK	DESCRIPTION	SALE DISSECTION	OFFICE	PER	OFFICE	UNIT SELLING PRICE	TOTAL SELLING PRICE
<i>10</i>		<i>1/2" galv pipe</i>	<i>539</i>		<i>21</i>		<i>66.20</i>	<i>397.20</i>
		<i>1/2" galv pipe</i>						
		<i>1/2" galv pipe</i>						
		<i>1/2" galv pipe</i>						
		<i>1/2" galv pipe</i>						
		<i>1/2" galv pipe</i>						

DELIVERY INSTRUCTIONS (PLEASE TICK BOX)

DELIVER COLLECT

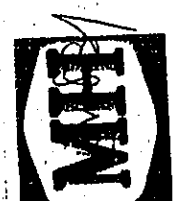
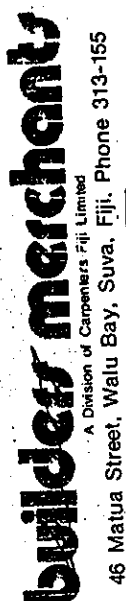
ADDRESS (IF DIFFERENT FROM ABOVE)

CUSTOMER APPROVES ORDER: *[Signature]*

SOLD BY: *[Signature]* CHECKED BY: *[Signature]*

NET TOTAL \$ *397.20*

BRANCHES - SUVA Phone 313-155 LAUTOKA Phone 61-440 LABASA Phone 81-656 NADI Phone 71723 BA Phone 75-238 SIGATOKA Phone 50-520



builder merchants
A Division of Carpenters Fiji Limited
46 Matua Street, Walu Bay, Suva, Fiji. Phone 313-155

WHOLESALE CREDIT SALE
NAUSE B-1
CUSTOMER COPY

NAME _____
ADDRESS _____
CITY _____
COUNTRY _____

DATE OF SALE: 22/1/12
BRANCH:
CUSTOMER ORDER No. G62
BRANCH LOCATION CODE: 2/16
296081

QTY SUPPLIED	CHECK	DESCRIPTION	SALE DISSECTION	OFFICE	PER	OFFICE	UNIT SELLING PRICE	TOTAL SELLING PRICE
		34 LITRES ISOMAXOLAM P.V.C Save life den erected 1/12 1A v 150-y br Supplies 1/12	11				664.30	664.30

NET TOTAL \$ 664.30

DELIVERY INSTRUCTIONS (PLEASE TICK BOX)
 DEWER
 COLLECT
 ADDRESS (IF DIFFERENT FROM ABOVE) _____
 TO BE COLLECTED BY: _____
 DATE: / /

CUSTOMER APPROVES ORDER: _____
 SOLD BY: _____ CHECKED BY: _____
 BRANCHES - SUVA Phone 313-155 Phone 61-440
 LAUTOKA Phone 81-656
 LABASA Phone 71723
 NADI Phone 75-238
 BA Phone 50-520
 SIGATOKA

Uma Primary Ltd. 2087/G-05

Progress Claim


Date: ...19/12/88.....

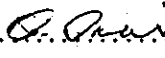
CONTRACTOR: Construction Equipment Hire Limited

ADDRESS: P.O Box 13831, Suva.

CONTRACT: Navua Rice Cultivation Technology Project TENDER NO. CT. _____

PROGRESS CLAIM NO. Three & Final for PERIOD ENDING ^(JICA) 19th December, 1988

SUMMARY		
Bill No.1	Item no. 6,7	16,580.00
2	" " 1-9	7,916.00
3	" " 1-6	9,340.00
4	" " 1-8	13,377.50
5	" " 1-3	1,040.00
6.	" " 1-7	10,726.50
Variations		
Variation Orer No. 1	Pipes	9,250.56
2	Canal and Road Materials	18,725.00
3	Land Leveling	26,400.00
Progress Claim No.:	Three & final	Total 113,355.56
Prepared by:	Mr G. Pillay 	Less 10% Retention 11,335.55
Date:	19/12/88	Total minus retention 102,020.01
		Less previous payment
		Payment due 102,020.01

SITE ENGINEER/
SUPERVISOR 

Date: 20/12/88

+ 50% of retention	9,898.62
Payment Due	111,918.63

PROGRESS CLAIM

Bill No.:.....1.....

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	ha	11	11	11	0	2350	0	25,850.00
2	ha	5	5	5	0	2350	0	11,750.00
3	ha	11	11	11	0	1500	0	16,500.00
4	m	1280	1280	1280	0	0.95	0	1,216.00
5	m	4740	4740	4740	0	3.65	0	17,301.00
6	m ³	560	560	Nil	560	3.25	1820	1,820.00
7	m ³	820	820	Nil	820	18.00	14760	14,760.00
	m ³	6000	6000	6000	0	2.00	0	12,000.00
							16580	101,197.00
		Variation Order No.1						
		As attached purchase docket of culverts						
1		8 x 0.60m dia x 2.44m	(Cost + 10%)				1117.60	1,117.60
		2 x 1.22m dia x 2.44m	(Cost + 10%)				923.56	923.56
		4 x 1.22m dia x 2.44m	(Cost + 10%)				1847.12	1,847.12
		5 x 0.60m dia x 2.44m	(Cost + 10%)				698.50	698.50
		19 x 0.30m dia x 2.44m	(Cost + 10%)				1040.82	1,040.82
		1 x 0.30m dia x 2.44m	(Cost + 10%)				54.78	54.78
		6 x 0.15m dia x 6.00m	(Cost + 10%)				436.92	436.92
		43 x 0.15m dia x 6.00m	(Cost + 10%)				3131.26	1,131.26
							9250.56	9,250.56
		Variation Order No.2						
2	m ³	3500	3500	Nil	3500	5.35	18725	18,725.00
		Variation Order No.3						
3	ha	16	16	Nil	16	1650	26400	26,400.00
							16580	101,197.00

09.

PROGRESS CLAIM

Bill No.:.....3.....

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	210	210	Nil	210	8.50	1785	1,785.00
2	m ³	40	40	Nil	40	22.00	880	880.00
3	kg	340	340	Nil	340	2.50	850	850.00
4	unit	234	234	Nil	234	12.50	2925	2,925.00
5	m ³	7	7	Nil	7	300.00	2100	2,100.00
6	m ³	80	80	Nil	80	10.00	800	800.00
							9340	9,340.00

00

PROGRESS CLAIM

Bill No.: 4

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	12	12	Nil	12	25.00	300	300.00
2	m ³	2	2	Nil	2	200.00	200	400.00
3	kg	1100	1100	Nil	1100	2.20	2420	2,420.00
4	unit	25	25	Nil	25	27.50	687.50	687.50
5	m ³	30	30	Nil	30	270.00	8100	8,100.00
6	m ²	24	24	Nil	24	30.00	720	720.00
7	m ³	60	60	Nil	60	7.50	450	450.00
8	m ³	30	30	Nil	30	10.00	300	300.00
							13377.50	13,377.50

09

PROGRESS CLAIM

Bill No.: 5

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	30	30	Nil	30	6.50	195	195.00
2	m ³	5	5	Nil	5	25.00	125	125.00
3	unit	16	16 -	Nil	16	45.00	720	720.00
							1040	1,040.00

09

PROGRESS CLAIM

Bill No.:.....6.....

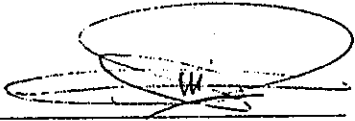

Item	Unit	Total Contract Quantity	Quantity to Date	Previous Payment Quantity	Quantity for Period	Rate	Value for Period	Value to Date
1	m ³	25	25	Nil	25	6.50	162.50	162.50
2	unit	24	24	Nil	24	25.00	600.00	600.00
3	m ³	4	4	Nil	4	25.00	100.00	100.00
4	m ³	2	2	Nil	2	200.00	400.00	400.00
5	kg	1120	1120	Nil	1120	2.20	2464.00	2,464.00
6	m ³	20	20	Nil	20	260.00	5200.00	5,200.00
7	m ²	60	60	Nil	60	30.00	1800.00	1,800.00
Total							10726.50	10,726.50

00

JAPAN INTERNATIONAL COOPERATION AGENCY

VARIATION ORDER

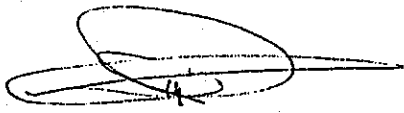
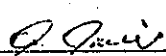
TO CONSTRUCTION EQUIPMENT HIRE LTD DATE October 17, 1988
 ORDER NO 1
 CONTRACT THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS ON THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT (NAVUA PROJECT)

DESCRIPTION OF WORK	UNIT	Q'TY	RATE
<u>Bill No.1 Order No.1</u>			
As discussed, please carry out the following works on the following rates,			
1.Pipes			
Supply and transport the following pipes from Suva to job site,			
1.22m dia x 2.44m long	Nos	6	F\$461.78
0.60m dia x 2.44m long	Nos	13	F\$139.70
0.30m dia x 2.44m long	Nos	20	F\$54.78
0.15m dia x 6.00m long	Nos	49	F\$72.82
<p>Agreed: </p> <p style="text-align: center;">Contractor</p> <p style="text-align: center;"></p> <p style="text-align: center;">Project Engineer</p>			

JAPAN INTERNATIONAL COOPERATION AGENCY

VARIATION ORDER

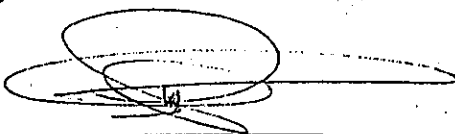

TO CONSTRUCTION EQUIPMENT HIRE LTD DATE November 3, 1988
 ORDER NO 2
 CONTRACT THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS ON THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT (NAVUA PROJECT)

DESCRIPTION OF WORK	UNIT	Q'TY	RATE
<p>Bill No.1 Order No.2</p> <p>As discussed, please carry out the following works on the following rates,</p> <p>1. Canal and Road Materials Excavate approved fill materials in burrow area, haulaged distance not exceeding 500m, spread, compact in layers not exceeding 0.15m, to form canal pad and road and trim to profile.</p> <p>Agreed :  _____ Contractor</p> <p> _____ Project Engineer</p>	<p>m³</p>	<p>3,500</p>	<p>F\$5.35</p>

JAPAN INTERNATIONAL COOPERATION AGENCY

VARIATION ORDER

TO CONSTRUCTION EQUIPMENT HIRE LTD DATE December 2, 1988
ORDER NO 3
 CONTRACT THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS ON THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT (NAVUA PROJECT)

DESCRIPTION OF WORK	UNIT	Q'TY	RATE
<u>Bill No.1 Order No.3</u>			
As discussed, please carry out the following works on the following rates,			
1. Land Leveling Cut and fill to achieve designed field elevation level where max. cutting depth will be 0.20m and average earthmoving per ha will be 1,000m ³ . Filling operation to be in layers not exceeding 0.10m thickness and track rolled compacted to the satisfaction of the Engineer.	ha	16	F\$1,650.00
Agreed :  _____ Contractor			
 _____ Project Engineer			

LVA OFFICE & FACTORY
 .O. BOX 133, SUVA. TEL: 961410
 AUTOKA FACTORY
 .O. BOX 314, LAUTOKA. TEL: 60651

LA VVA

HUME INDUSTRIES (SOUTH SEAS) LIMITED

ACCOUNT NO
 0 0 0 1 9

CASH SALE

FACTORY SUVA
 INVOICE NUMBER 22898
 SALES ORDER No.
 DATE 21. 10. 88

CONSTRUCTION EQUIPMENT HIRE
 P. O. BOX 13831
 SUVA

DELIVERY INSTRUCTION

ORDERED	Balance
Number	242-

No	DETAILS	No./MT	Rate	AMOUNT
8	600 X 2.44 FVX	8	127.00	1016.00
L/D No. 6209				
RECEIVED \$1016.00 CASH SIGNED Stanley for Hume Industries (SOUTH SEAS) LTD. RECEIPT No. 02858 OF 2/10.				
				INVOICE TOTAL
				\$ 1,016.00

RECEIVED IN GOOD ORDER AND
 CONDITION GOODS LISTED ABOVE
 CARRIER
 CUSTOMER'S O/N
 DATE 2/10
 TRUCK No.
 B0155

TONNES
 4.523

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
 Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co-427 is held.

Suva Stationery 6387(m)

UVA OFFICE & FACTORY
P.O. BOX 133, SUVA, TEL: 361410,
AUTOKA FACTORY
P.O. BOX 314, LAUTOKA. TEL: 80551

NAUVA

HUME INDUSTRIES (SOUTH SEAS) LIMITED

ACCOUNT NO 00019

CASH SALE

FACTORY SEUVA
INVOICE NUMBER 22906
SALES ORDER No.
DATE 25. 10. 88

EQUIPMENT SERVICES LTD.
P. O. BOX 13821
SEUVA.

DELIVERY INSTRUCTION

ORDERED Number	No	DETAILS	No./MT	Rate	AMOUNT	
					TONNES	INVOICE TOTAL
243	2	1200 X 2.44 FOX <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">RECEIVED \$ 839.60 Signed: <i>[Signature]</i> for HUME INDUSTRIES (SOUTH SEAS) LTD.</div>	2	419.80	839.60	839.60

RECEIVED IN GOOD ORDER AND CONDITION GOODS LISTED ABOVE
CARRIER CUSTOMER'S O/N
 TRUCK No. DATE

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co427 is held.

SUVA OFFICE & FACTORY
 P.O. BOX 133, SUVA, TEL: 361410
 AUTOKA FACTORY
 P.O. BOX 314, LAUTOKA, TEL: 60551

NAVA
HUME INDUSTRIES (SOUTH SEAS) LIMITED

ACCOUNT NO
 0 0 0 1 9

CASH SALE

CONSTRUCTION EQUIPMENT HIRE
 P O. BOX 1333/
 SUVA.

FACTORY SUVA
 INVOICE NUMBER 22919
 SALES ORDER No.
 DATE 28. 10. 88
 DELIVERY INSTRUCTION

ORDERED	
Number	Balance
4	-
	244-

No	DETAILS	No./M	Rate	AMOUNT
4	1200 X 2.44 FX	4	419.80	1679.20
1	RECEIVED \$ 1679.20 CASH CHQ Signed: <i>[Signature]</i> for Finance Dept. (P.O. Box 133) Ltd.			
	AB NO. 6230			

RECEIVED IN GOOD ORDER AND
 CONDITION GOODS LISTED ABOVE
 CARRIER
 CUSTOMER

CARRIER
 TRUCK No. BAFYS

CUSTOMER'S O/N
 DATE

TONNES
 7.10.

\$ 1,679.20
 INVOICE TOTAL

RECEIPT No. 02870 OF 28/10

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
 Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co427 is held.

SUVA OFFICE & FACTORY
P. O. BOX 133, SUVA. TEL: 361410
LAUTOKA FACTORY
P. O. BOX 314, LAUTOKA. TEL: 60551

NAVIA

HUME INDUSTRIES (SOUTH SEAS) LIMITED

ACCOUNT NO
00019

CASH SALE

CONSTRUCTION EQUIPMENT Hire
P. O. BOX 13831
SUVA

FACTORY SUVA
INVOICE NUMBER 22920
SALES ORDER No.
DATE 28. 10. 88
DELIVERY INSTRUCTION

ORDERED Number	Balance	DETAILS	
		No.	AMOUNT
5	-	5	635.00
	245		

DETAILS		No./AM	Rate	AMOUNT						
5	600 X 2.44 FIX	5	127.00	635.00						
<table border="1"><tr><td>RECEIVED \$635.00</td><td>CHG</td></tr><tr><td>Signed: <i>[Signature]</i></td><td></td></tr><tr><td>1st TIME (SOUTH SEAS) LTD.</td><td></td></tr></table>					RECEIVED \$635.00	CHG	Signed: <i>[Signature]</i>		1st TIME (SOUTH SEAS) LTD.	
RECEIVED \$635.00	CHG									
Signed: <i>[Signature]</i>										
1st TIME (SOUTH SEAS) LTD.										
4/11/88 6231										
RECEIPT No. 02870 OF 28/6										
RECEIVED IN GOOD ORDER AND CONDITION GOODS LISTED ABOVE										
CARRIER B	CUSTOMER'S O/N C/S	TONNES 2.83	\$	635.00						
TRUCK No. BQ/155	DATE / /	INVOICE TOTAL								

CARRIER	CUSTOMER'S O/N
TRUCK No.	DATE

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co427 is held.

SUVA OFFICE & FACTORY
 P.O. BOX 130, SUVA. TEL: 361410
 LAUTOKA FACTORY
 P.O. BOX 314, LAUTOKA. TEL: 60551

NAVULA

HUME INDUSTRIES (SOUTH SEAS) LIMITED

ACCOUNT NO
 00019

CASH SALE

FACTORY SUVA
 INVOICE NUMBER No. 22962
 SALES ORDER No. _____
 DATE 24. 11. 88
 DELIVERY INSTRUCTION _____

CONSTRUCTION EQUIPMENT HIRE
P. O. BOX 13831.
SUVA.

ORDERED		No	DETAILS	PROD. CODE	No./M	Rate	AMOUNT
Number	Balance						
	246	19	300 X 2.44 FIX	C300	19	49.80	946.20

RECEIVED \$ 946.20
 Signed: [Signature]
 for HUME INDUSTRIES (SOUTH SEAS) LTD.

YAND. 1317

RECEIPT No. 02906 OF 24/11

RECEIVED IN GOOD ORDER AND
 CONDITION GOODS LISTED ABOVE
 CARRIER BH725
 CUSTOMER'S O/N [Signature]
 DATE _____
 TONNES 3.591
 INVOICE TOTAL \$ 946.20

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
 Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co427 is held.

SUVA OFFICE & FACTORY
 P.O. BOX 133, SUVA. TEL: 361410
 LAUTOKA FACTORY
 P.O. BOX 314, LAUTOKA. TEL: 60551

NAVIT

HUME INDUSTRIES (SOUTH SEAS) LIMITED

ACCOUNT NO
 0 0 0 1 9

CASH SALE

EQUIPMENT SERVICES LTD
 P. O. Box 13231
 SUVA.

FACTORY **SUVA**
 INVOICE NUMBER **No. 23032**
 SALES ORDER No. **-**
 DATE **8.12.88**
 DELIVERY INSTRUCTION

ORDERED	
Number	Balance
	247

No	DETAILS	PROD. CODE	No. AM	Rate	AMOUNT
1	200 X 2.44 FIX	C300	1	49.80	49.80

RECEIVED \$49.80
 Signed: *[Signature]*
 for HUME INDUSTRIES (SOUTH SEAS) LTD.

40.12.6361

RECEIVED IN GOOD ORDER AND
 CONDITION GOODS LISTED ABOVE
 CARRIER *[Signature]*
 CUSTOMER *[Signature]*

CARRIER
 TRUCK No. AX 286

CUSTOMER'S O/N
 C/S
 DATE 8/12

TONNES
 .189

\$ 49.80
 INVOICE TOTAL

CONDITIONS OF SALE: All sales are subject to the conditions printed on the reverse.
 Deduction of Provisional Tax should not be made from this account. Certificate of Exemption No. Co427 is held.

WHOLESALE CREDIT SALE

NAVA

CUSTOMER COPY



builders merchants

A Division of Carpenters Fiji Limited

46 Matua Street, Watu Bay, Suva, Fiji. Phone 313-155

JAME
ADDRESS

Wholesale Credit Sale

Permanence

05/11/12

CUSTOMER NUMBER: 5 1 2 = 5 2 1 4

DATE OF SALE: 11/12/12

CUSTOMER ORDER No.: G62

BRANCH LOCATION CODE: 3/16

2933399

QTY SUPPLIED	CHECK	DESCRIPTION	SALE DISSECTION	OFFICE	PER	OFFICE	UNIT SELLING PRICE	TOTAL SELLING PRICE	
		<p><i>36 length bar x 100m Price</i></p> <p><i>50</i></p> <p><i>(see invoice #11)</i></p> <p><i>(see attached)</i></p>	-						
				-					
				-					
				-					
				-					
					59.		66.20	397.20	
								NET TOTAL \$	397.20

DELIVERY INSTRUCTIONS PLEASE TICK BOX

DELIVER

TO BE COLLECTED BY -

DATE

ADDRESS (IF DIFFERENT FROM ABOVE)

CUSTOMER APPROVES ORDER.

SOLD BY:

CHECKED BY:

Lika Primary Ltd. 208/G-OS.

SIGATOKA Phone 50-520

BA Phone 75-238

NADI Phone 71723

LABASA Phone 81-656

LAUTOKA Phone 61-44C

SUVA Phone 313-155

BRANCHES -

WHOLESALE CREDIT SALE **CUSTOMER COPY**



builders merchants
A Division of Carpenters Fiji Limited
46 Matua Street, Walu Bay, Suva, Fiji. Phone 313-155

NAME: *Construction Equipment*

ADDRESS: *Level 2nd Suva*

CUSTOMER NUMBER: *517514*

DATE OF SALE: *12/12/11*

BRANCH: *Suva*

CUSTOMER ORDER No.: *G62*

BRANCH LOCATION CODE: *316*

2403

297675

QTY SUPPLIED	CHECK	DESCRIPTION	SALE DISSECTION	OFFICE	PER	OFFICE	UNIT SELLING PRICE	TOTAL SELLING PRICE
43		43 x 19th 6mm x 150mm PVC Soil Pipe	539		SA.		66-20	2845.60
		<i>Do not or</i>						
		<i>Please collect order when Suva</i>						

NET TOTAL \$ *2845.60*

Customer Approves Order: *[Signature]*

Checked By: *[Signature]*

Address (if different from above): *Suva*

To be collected by: *[Signature]* Date: *1/1*

BRANCHES - SUVA Phone 313-155 Phone 61-440 LAUTOKA Phone 81-686 LABASA Phone 71723 NADI Phone 75-238 BA SIGATOKA Phone 50-520



MINISTRY OF PRIMARY INDUSTRIES
P O BOX 1292 SUVA FIJI

TEL. NO. 312355

REF. NO. DI 1/11

DATE :

添付資料 7-1-12 D & I への引き継ぎ書

30 December 1988

Mr Y Yoshida
Resident Representative
JICA Office
SUVA

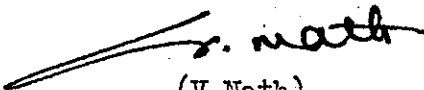
Dear Sir

Pilot Infra-structure Improvement
Work for the IRCTP

Thank you for your letter dated 29/12/88 on the above.

I wish to advise that we will accede to your request in getting the various outstanding works completed.

Sincerely yours


(V Nath)
Director of Drainage & Irrigation

29th December, 1988.

Mr. Vijay Nath
Director of Drainage & Irrigation
P.O. Box 1292
SUVA

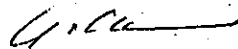
Dear Mr. Nath

RE: THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS FOR THE IMPROVEMENT
OF RICE CULTIVATION TECHNOLOGY PROJECT

JICA request the Director (D&I) of MPI to carry out the followings:

1. Director (D&I) to execute all the works as specified in Page 2 & 3 after the JICA Project Engineer leaves the country on 30/12/88.
2. Director (D&I) will administer the contract on behalf of JICA.
3. JICA will pay the final claim after the Principal Engineer (D&I) certifies it.
4. JICA will return the bond after the contractor has satisfactorily completed the works during maintenance period. This to be certified by the Principal Engineer (D&I).

Yours faithfully



Y. Yoshida
Resident Representative
JICA OFFICE, SUVA

JAPAN INTERNATIONAL COOPERATION AGENCY

RE: THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS ON THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

JICA and D&I representatives have carried out a joint inspection of the above mentioned project. The inspection of the Navua Project was carried out on 21st December, 1988 and that of the Nausori Project on the 23rd December, 1988.

As result of these inspection the works listed below have been observed to be either defective or incomplete.

JICA therefore, instructes the contractor, namely Equipment Services Limited, to:-

- (i) Recitify all defective works as outlined below.
- (ii) Complete all incomplete works as outlined below to the satisfaction of the Principal Engineer (D&I).
- (iii) All the costs incurred will be met by JICA.


A. NAVUA PROJECT

1. Level of all fields be taken using a 10m grid pattern and the resulting data submitted to Principal Engineer (D&I) for review.
2. All fields to be graded horizontally level or flat and to within a tolerance of ± 2 inches.
3. All bunds to be trimmed down to a uniform width.
4. Recompact bunds judged poorly compacted.
5. The outside slopes of irrigation canals to be trimmed to the specified slope of 1 : 1.5.
6. All bifurcation gates to be checked and to be operating smoothly.
7. Recompact material around outlet pipes where leakage is noted.
8. Access road gravelling to be completed to the satisfaction of the Principal Engineer(D&I).
9. Contractor to fulfill all contractual and/or verbal agreement with the borrow area landlord.
10. All drainage canal side slope failures to be recitified to the satisfaction of the Principal Engineer(D&I).

B. NAUSORI PROJECT


- 1. Level of all fields be taken using a 10m grid pattern and the resulting data submitted to Principal Engineer (D&I) for reviews.
- 2. All fields to be graded horizontally level or flat and to within a tolerance of \pm 2 inches.
- 3. Recompact bunds judged poorly compacted.
- 4. All stop gates to be checked and to be operating smoothly. Side slope protection to be incorporated in these structures.
- 5. Recompact access culvert backfill.
- 6. Recompact material around outlet pipes where leakage is noted.
- 7. Access road gravelling to be completed to the satisfaction of the Principal Engineer (D&I).

I agree to do the above works.



.....

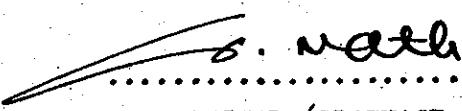
CONTRACTOR
(G.PILLAY)



.....

JICA ENGINEER
(I.IWAI)

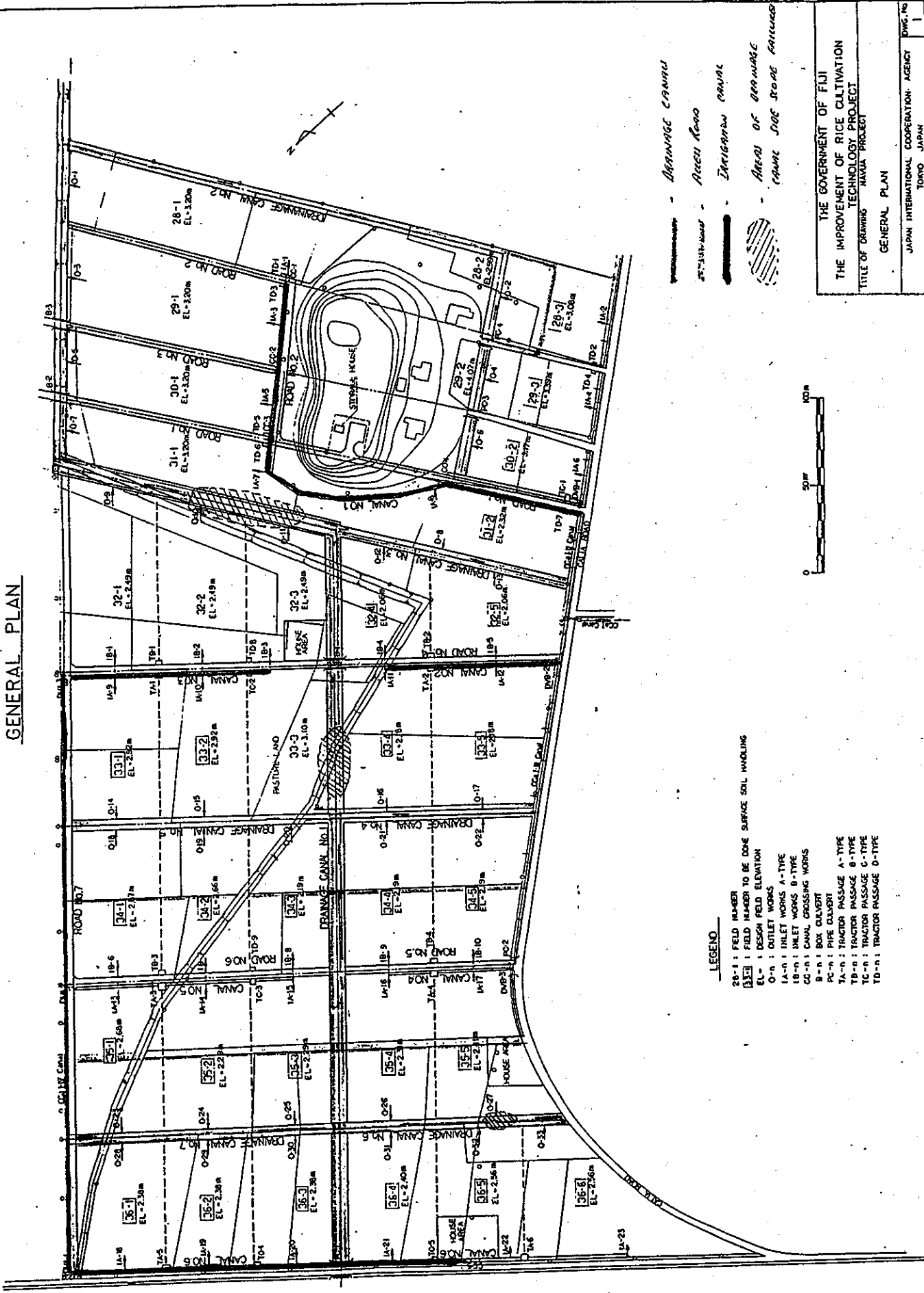
Signed in the presence of Director (Drainage & Irrigation)



.....

DIRECTOR (DRAINAGE & IRRIGATION)

GENERAL PLAN



- LEGEND**
- 28-1 : FIELD NUMBER TO BE DONE SURFACE SOIL INVOLVING
 - 32-1 : DESIGN FIELD ELEVATION
 - O-n : OUTLET WORKS
 - IA-n : INLET WORKS A-TYPE
 - IB-n : INLET WORKS B-TYPE
 - CC-n : CANAL CROSSING WORKS
 - B-n : BOX CULVERT
 - PC-n : PIPE CULVERT
 - TA-n : TRACTOR PASSAGE A-TYPE
 - TB-n : TRACTOR PASSAGE B-TYPE
 - TC-n : TRACTOR PASSAGE C-TYPE
 - TD-n : TRACTOR PASSAGE D-TYPE

- DRAINAGE CANAL
- ACCESS ROAD
- IRRIGATION CANAL
- AREA OF DRAINAGE CANAL SIDE ROAD PASSAGE

THE GOVERNMENT OF FIJI	DWG. NO
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT	1
TITLE OF DRAWING	GENERAL PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	

5

MEMORANDUM

FROM : Engineer (Irrigation)
TO : The Acting Principal Engineer
REFERENCE : JICA PADDY FIELDS PILOT PROJECT
- CALIA, NAVUA

PHONE NO. : 312355
FILE NO. : 41 L/H-III
DATE : 27/12/88

1.0 INTRODUCTION

This brief report presents the results of my visual inspection, carried out on the 20 Dec., 1988, of the abovementioned project area. The development sited in Calia, Navua, consists of seven (7) drainage canals, seven (7) access roads, five (5) irrigation canals and various structures and paddy fields. The general layout of the various components of this development is as shown on Figure 1.0 attached and contained within 16 Hectares.

This report discusses the engineering aspects of the development and at some risk of being overly critical, highlights only the short-comings of these engineering works. In short, it deals only with 'what exists' and not with 'what-could-have-been' and how the 'what exists' meets good engineering practices.

2.0 CANAL AND STRUCTURES

2.1 Irrigation Canals

There are in total five (5) irrigation canal components to this project. In general the following have been observed :-

- * The excavated canals indicate that adequate compaction has been achieved,
- * The outside side slopes has not been trimmed to the required 1:1.5 slopes as specified. Other than being aesthetically displeasing, this excess spoil will be claimed by the recipient farmers to be encroaching on potential farming land,
- * Our experience with similiar material indicates that the fill material used for the irrigation canals, under the weather conditions experienced in Navua area is susceptible to accelerated erosion. It is therefore necessary to topsoil these canals to minimise potential erosion,
- * With reference to the second point raised in this section, it is necessary that the sides be trimmed to specification so as it can be ascertained as to whether adequate width of canal pad prior to excavation had been compacted,

2.2 Structures

The structures of importance to which attention is drawn are the control gates and the field outlets. The two control gates of concern are DVA-1 and DVA-2 which have been noted to be very stiff in its upward and downward movements. The exact cause of this stiffness has not been ascertained at the time of our inspection due to the high water levels in the canals. No leakage had been observed at any of the control gates,

With regards to the field outlet structures the following had been observed :-

- * Excessive leakage in some of the outlets under the outlet pipes had been observed, At two of these structures this leakage has caused the material surrounding the outlet pipes to be washed out completely. The cause of this problem can be summed up as inadequate compaction around these outlet structures,
- * The outlets have been noted to set too far into the field bunds. This has led to a situation where potential 'weak-spots' being created in these bunds, Outlet number O-29 highlights this potential weakness where the bund has been observed to be almost completely breached at the outlet structure position, This situation has been created by inadequate compaction around these structures and shorter seepage paths for the retained water,

3.0 PADDY FIELDS AND BUNDS

3.1 Paddy Field Levelling

From the General Plan attached it is noted that various design field levels have been specified, It is further noted that the fields are designed/specified to be horizontally level,

Our field inspection had been preceded by heavy downpour, With outlets open, numerous field revealed large areas where water had ponded, This indicates that the fields are not, as specified, horizontally level. In certain fields the depth of water stagnated is estimated to be as much as 150mm to 200mm deep. Although difficult without the benefit of surveyed levels, it is estimated that in some fields the difference between the highest to the lowest points could be as much as 500mm ,

As this non-horiztional levels is likely to cause problems during paddy seed casting and germination period, poor water control and/or usage, we recommend that survey levels of these fields be carried out at reasonably close intervals and fields showing large depression areas be levelled again,

3.2 Paddy Field Bunds

Inspection of the field bunds revealed the following :-

- * Doubtful compaction, This is based on visual inspection and needs to be investigated further,
- * Questionable material used for certain bunds, In certain bunds numerous tension cracks and slumps or slip failures along these bunds had been observed, The use of highly silty/sandy material excavated from drainage canals have been used for bund formation, This has led to the failures mentioned, These bunds are not likely to be as impervious as intended,
- * Certain bunds have been noted to unnecessarily wide, This is likely to invite complaints from recipient framers of potential farm land encroachment,
- * In one particular area ,ie the junction of fields 35-4 and 35-5 and drain No 6 seepage from the bund/field interface had been observed, Further investigation is required to ascertain the reasons for this,

4.0 DRAINAGE CANALS

The only point of concern (a major concern at that) is the large scale slip failures observed in areas shown on Figure 1.0 attached, While the reasons for these failures are many, remedial measures could be too few Immediate attention needs to be focused to this problem as the slips are not showing signs of stabilising.

The cause of action to halt these slips is beyond the scope of this report and left to JICA engineers to decide.

5.0 ACCESS ROADS,

During the time of the inspection , gravelling of the access roads had not been completed, due it is understood, to adverse weather, Whatever has been completed has been noted to be satisfactory,

6.0 BORROW AREA AND BORROWING OPERATIONS

It would be desirable that all contract and/or verbal agreement between contractor/JICA and landowners from whose land fill material had been borrowed be fulfilled before the Department takes the project over,

It is noted that mud flow has completely blocked one of the Departments irrigation canals, This mud flow has been observed to be the direct result of the contractors borrowing operations and/or method, It is desirable that the contractor clears these canals as soon as possible and at his own expense,

Andkom

ENGINEER (I)

NAVUA PROJECT (CALIA, Irrigated area)

1. Area Description

Calia of Navua area located 40km to the west of Suva city has been selected for the irrigation farm. Calia is located within the Navua East Project. The total area is 16.4ha excluding a 1.5ha of small hill about 4-9m high in the south of the area. The land is already reclaimed for paddy field and owned by 9 farmers. The size of each plot is 0.1-0.2ha at present, and elevation varies EL 2-4m.

2. Project Description

The total area of 16.4ha is free hold land owned by 9 farmers namely No.28-No36, ranging from 1.5ha to 2.3ha per farmer. Each free hold land is long in the direction of east to west and width is 40m or 80m. Since it is impossible to change the boundaries, the road and irrigation and drainage canals were arranged along the boundaries. The house area and pasture area are planned by the request of land owners.

Land use plan is as follows;

Paddy Field	13.4ha
House Area	0.2ha
Pasture Area	0.4ha
Road, Canal Area	2.4ha
Total	16.4ha

3.Design Detail

(1) Farm Plot Plan

The design size of farm plot is planned 0.4ha (80mx50m), considering the area of each farmer and the rice cultivation technology.

(2) Land Consolidation Plan

The land is leveled within each plot, the elevation of which shall be suppliable with water level of irrigation canal CCa I-II, CCa I-III and CCa I-IV.

The fertile surface soil shall be utilized again with the sequence of surface soil removing, land grading, subsoil compaction and backfilling.

(3) Road Plan

The road network within the area is planned along the boundaries of land ownership along the short side of each plot.

The road effective width is planned as 3.0m with gravel pavement thickness of 15cm and total width is 4.0m. The elevation of surface is 40cm above the field surface.

(4) Irrigation Plan

The unit water requirement of Navua East Irrigation Project is adopted to the area, that is 1.0 l/s/ha.

The irrigation network within the area is planed along the short side of each plot. Collateral work comprises of division work from existing canal, inlet work to each plot and road crossing work are planned.

(5) Drainage Plan

The unit discharge of Navua East Project is adopted to the area, that is 12 l/s/ha. The drainage network within the area is planned along short side of each plot and connected to the drainage canal No.1.

The type of drainage canal is earth canal with 1:1.5 slope. The longitudinal gradient of drainage canal No.1 is planned as 1/536, the other canals (No.2-No7) are 1/2,000. The depth of canal is designed more than 1.0m so as to dry up paddy field. For the drainage canal pipe culvert are designed to cross passage ways.

4. Completed Work

The construction was started on 22nd September 1988 and completed works were as follows;

(1) Land consolidation works	16.4 ha
Net paddy field	13.4 ha
Farm plot	32 plot
 (2) Irrigation canal works	 1,050 m
Canal crossing work	
0.3m dia.x2.44mx1	3 Nos
0.3m dia x2.44mx2	6 Nos
0.3m dia x2.44mx3	1 Nos
Division work	4 Nos
Inlet work	31 Nos

(3) Drainage canal work	1,500 m
Canal crossing work	
0.6m dia. x2.44mx1	1 Nos
0.6m dia. x2.44mx2	3 Nos
0.6m dia. x2.44mx4	1 Nos
1.2m dia. x2.44mx2	1 Nos
1.2m dia. x2.44mx3	2 Nos
1.2m dia. x1.22mx7	1 Nos
Outlet work	32 Nos

(4) Farm road 1,810 m

Total construction cost was F\$197,972.56

5. Conclusion

This Project was constructed to be utilized for implementation of the Pilot Farm for the irrigated farm.

MEMORANDUM

OF 137

From Engineer (Irrigation) Phone No. 312355
 To Acting Principal Engineer File No. _____
 RE: JICA PADDY FIELD PILCT PROJECT - NAUSORI Date 28.12.88
 (Your reference _____)

1.0 Introduction

This brief report presents the results of my visual inspection, carried out on the 23 December 1988, of the abovementioned project. The development project and its layout is as shown on Figure 1.0 attached.

This report discusses the engineering aspects of the development and highlights only the short comings of these.

2.0 Structures

The only structures discussed herein are the control or stop gates and field outlets.

The control gate structure of concern is designated SG - 1 (See plan attached). It was observed to be leaking, when closed, from the lower side of the gate. Further to this, the concrete works in the structure close to the gate had been noted to be just plastic works and weak. Cracks were observed in this section and it is in danger of 'peeling-off'. As this will lead to further leakage, remedial works is necessary. This should be effected immediately.

Fill in and around these structures have been noted to be loose and it is assumed that no compaction had been carried out. This fill must be compacted to prevent erosion losses.

It is further noted that concrete aprons at the control gates has not been built and therefore there is not protection of the drain side slopes at these structures. It is not known to us whether this had been eliminated from the design at the time of construction by the Project Engineer. It must be noted never the less that this protection is necessary.

With regards to the field outlet structures, excessive leakage under the outlet pipes had been observed at all outlet structures. This can be attributed to inadequate compaction. As this leakages is likely to cause breaches in the bunds, it is recommended that remedial works be effected immediately.

3.0 Paddy Fields And Bunds3.1 Paddy Field Levelling

From the General Plan attached it is noted that various design field levels have been specified. It is further noted that the fields are designed/specified to be horizontally level.

D(D+I)

I suggest we take over the Nausori Pilot project provided the rectification works carried out as outlined in page 4

Dr. D. D. D.
28/12/88

time

Our field inspection had been preceded by heavy downpour. With outlets open, numerous fields revealed large areas where water had ponded. This indicates that the fields are not, as specified, horizontally level.

As this non-horizontal levels is likely to cause problems during paddy seed casting and germination period, poor water control and/or usage, we recommend that survey levels of these fields be carried out at reasonably close intervals and fields showing large depression areas be levelled again.

3.2 Paddy Field Bunds

Inspection of the field bunds reveals that the compaction is questionable. This based on visual inspection and needs further investigation.

4.0 Access Roads

During the time of our inspection, all access roads had been gravelled. It is however noted that it lacks adequate compaction. Further track rolling will solve this problem.

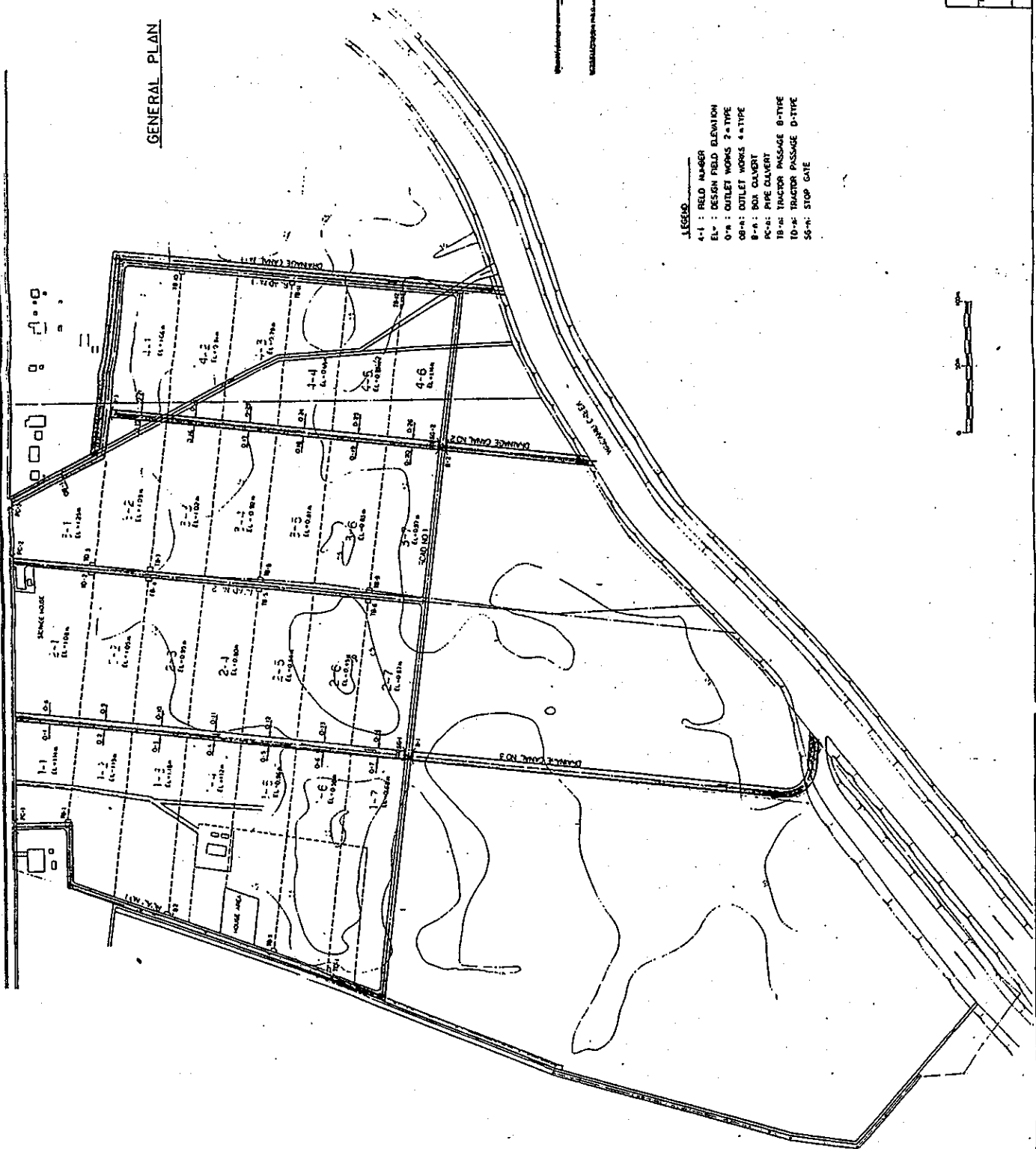
Handlam
ENGINEER (Q&I)

FIGURE 1.0

GENERAL PLAN

— Inoperative Canals
--- Project Canals

- LEGEND
- 4-1 : FIELD NUMBER
 - EL : DESIGN FIELD ELEVATION
 - 0-8 : OUTLET WORKS 2-TYPE
 - 08-81 : OUTLET WORKS 4-TYPE
 - 8-8 : BOX CALVERT
 - PC-81 : PIPE CALVERT
 - 18-81 : TRACTOR PASSAGE 8-TYPE
 - 10-81 : TRACTOR PASSAGE 0-TYPE
 - 56-81 : STOP GATE



THE GOVERNMENT OF JAPAN
 THE IMPROVED IRRIGATION AND FLOOD CONTROL PROJECT
 TITLE: THE IMPROVED IRRIGATION AND FLOOD CONTROL PROJECT
 GENERAL PLAN
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO, JAPAN

Nausori Project (Vusuya, Rainfed wetland area)

1. Area Description

Vusuya area has been selected for the rainfed wetland farm. The area located at the north of Waidamu Creek is owned by two Mataqalis. The total area is 14.3 ha. At present, the land is used mainly grassland and cassava cultivation except 2-3 ha of paddy field. The land being generally flat at the elevation of EL.0.5-1.8m, is low in the center part and makes a slight ascent toward the Vusuya road of the north side and Waidamu Creek of the south side.

2. Project Description

The boundary of two Mataqalis lies from north to south in the middle of the area. A road is designed along the boundary. Two drainage canals toward Waidamu Creek are planned in the area. Flood water from outside of the area is bypassed with a new drainage canal along the east side of the area. The total area of 14.3ha has been selected taking into account soils, topography and vegetation. Land use plan is as follows;

Paddy Field	12.5ha
House Area	0.1ha
Road, Canal Area	1.7ha
Total	14.3ha

3.Design Detail

(1) Farm plot plan

As a standard, the design of farm plot is planned 0.44ha with long side 110m and short side 40m, taking into account the shape of owned land.

(2) Land consolidation plan

The land is leveled within each plot. The fertile surface soil shall be utilized again with the sequence of surface soil removing, land grading, subsoil compaction and backfilling.

(3) Road Plan

The road network of the area is planned along the boundary of two Mataqalis and circumference of the area. The road effective width is planned as 3.0m with gravel pavement 15cm in thickness, and total width is 4.0m. The elevation of road surface is 40cm above the field surface.

(4) Drainage Plan

The unit discharge adopted to the area is 12 l/s/ha. The drainage network within the area is planned along the short side of each plot. Flood water from outside of the area is bypassed with a new drainage canal along the east side of the area. The type of drainage canal is earth canal with 1:1.5 slope. The longitudinal gradient of drainage canal is planned 1/2,000. The bottom elevation of drainage canal is more than 1.0m below field level to dry up the field. Pipe culverts are designed at the place of road crossing.

4. Completed Work

The construction was started on 19th September 1988, and completed works were as follows;

(1) Land Consolidation Works	14.3ha
Net paddy field	12.5ha
Farm plot	27 plot
(2) Drainage canal work	1,880 m
Canal crossing work	
0.6m dia. x2.44mx2	1 Nos
0.6m dia. x2.44mx3	3 Nos
0.9m dia. x2.44mx2	1 Nos
1.2m dia. x2.44mx2	3 Nos
Outlet work	27 Nos
Stop gate work	2 Nos
(3) Farm Road	1,670 m

The total construction cost was F\$143,971.20.

5. Conclusion

This Project was constructed to be utilized for implementation of the Pilot Farm for the rainfed wetland farm.

MEMORANDUM

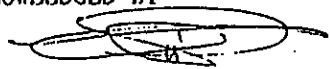
SUBJECT : Clear bush and disposal	REF. NO	1
	DATE	19th, September, 1988
	PLACE	Nausori Project
	ATTEND	

CONTENTS :

The contractor shall carry out the clear bush and disposal work for 1.2 ha in Nausori Project area.

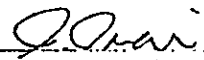
This work will be ordered by variation order No.1 using the same rate of Item 5 in Bill No.1 (Nausori Project)

ACKNOWLEDGED BY



CONTRACTOR

MPI



JICA ENGINEER

MEMORANDUM

SUBJECT : Topsoil handling	REF. NO	2
	DATE	25th, September, 1988
	PLACE	Nausori Project
	ATTEND	

CONTENTS :

The contractor shall carry out the topsoil handling work for 12 ha in Nausori Project area the same of Navua Project.

This work will be ordered by variation order No.2 using the same rate of Navua Project.

ACKNOWLEDGED BY



CONTRACTOR



JICA



JICA ENGINEER

MEMORANDUM

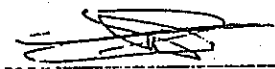
SUBJECT : Purchase cost of concrete pipe	REF.NO	3
	DATE	15th, October, 1988
	PLACE	Navua and Nausori Project
	ATTEND	

CONTENTS :

For the cost of concrete pipe purchase on B.Q. in contract document, the owner (JICA) agreed to payment a special outlay based on the bill.

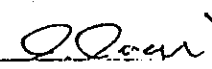
This work will be ordered by variation order No.3 at Nausori Project and variation order No.1 at Navua Project.

ACKNOWLEDGED BY



CONTRACTOR

HPI



JICA ENGINEER

MEMORANDUM

SUBJECT : Alternation of box culvert design	REF. NO	4
	DATE	17th, October, 1988
	PLACE	Navua and Nausori Project
	ATTEND	

CONTENTS :

Design of drain access culvert shall alter to pipe culvert style using 1.2m dia. concrete pipe the same of Fiji standard design.

And, for the all of pipe culvert, head walls will be installed at both edges.

ACKNOWLEDGED BY



CONTRACTOR

MPI



JICA ENGINEER

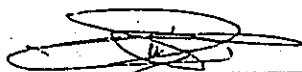
MEMORANDUM

SUBJECT : Alteration of pipe material	REF.NO	5
	DATE	17th, October, 1988
	PLACE	Navua Project
	ATTEND	

CONTENTS :

The pipe material less than 150mm dia. shall alter concrete pipe to PVC pipe due to small dia. concrete pipe were difficult to get the necessary quantity within contract period.

ACKNOWLEDGED BY



CONTRACTOR

MPI



JICA ENGINEER

MEMORANDUM

SUBJECT : Alteration of inlet, outlet box and check structure design.	REF.NO	6
	DATE	17th, October, 1988
	PLACE	Navua Project
	ATTEND	

CONTENTS :

Design of inlet, outlet box and check structure shall alter to Fiji standard style.

ACKNOWLEDGED BY



CONTRACTOR

HPI



JICA ENGINEER

MEMORANDUM

SUBJECT : Canal and road materials	REF. NO	7
	DATE	3rd, November, 1988
	PLACE	Navua Project
	ATTEND	

CONTENTS :

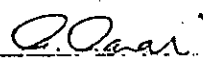
The contractor shall use the excavate approved fill materials for canal and road where the field condition is soft instead of field materials.

This work will be ordered by variation order No.2.

ACKNOWLEDGED BY



CONTRACTOR



JICA ENGINEER

MPI

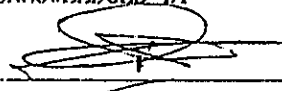
MEMORANDUM

SUBJECT : land leveling	REF. NO	8
	DATE	2nd, December, 1988
	PLACE	Navua Project
	ATTEND	

CONTENTS :

The contractor shall carry out the land leveling work for 16ha in Navua
Project area.
This work will be ordered by variation order No.3.

ACKNOWLEDGED BY



CONTRACTOR

MP1



JICA ENGINEER

7-2 圃場管理棟工事関係添付資料

添付資料 7-2-1 圃場管理棟の位置変更



TEL. NO. 47044

MINISTRY OF PRIMARY INDUSTRIES
Koronivia Research Station
PO Box 77
NAUSORI

REF. NO.

DATE 26/7/88

Dr Yutaka Watanabe
Japanese Team Leader
Improvement for Rice Cultivation
Technology Project
PO Box 77
NAUSORI

Dear Dr Watanabe

SUBJECT: NAUSORI & NAVUA STORAGE ROOMS TRANSFER
TO KORONIVIA RESEARCH STATION

With reference to Detailed Design Report on the Pilot Infrastructure, I would like to request your office for transfer of storage rooms in Navua and Nausori to Koronivia Research Station due to the following reasons:

1. Safety to keep necessary equipment in Koronivia Research Station.
2. Lack of staff to stay on site.
3. The two sites are not far from Koronivia Research Station.
4. More convenient and effective usage at Koronivia Research Station.
5. Easy to manage and maintain.
6. Avoid trouble from farmers.

Your consideration would be very much appreciated.


P. Sivan

添付資料 7-2-2 圃場管理棟工事費積算

CONTRACT OF STORAGE HOUSE WORK
OF
THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

BILL OF QUANTITIES

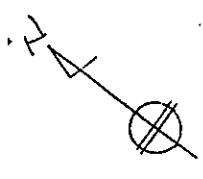
(ENGINEER'S ESTIMATION)

BILL OF QUANTITIES

<u>ITEMS</u>	<u>QUANTITIE</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
16mm Dia Steel Rod	136 length	10.50 (\$)	1,428.00 ✓
12mm Dia Steel Rod	280 length	3.67	1,027.60 ✓
6mm Dia Steel Rod	555 length	1.45	804.75 ✓
Cement	23 tons	145.00	3,335.00 ✓
Crush Metal	11 loads	85.00	935.00 ✓
Fine Sand	8 loads	35.00	280.00 ✓
Nuts and Bolts	1 LS		500.00 ✓
Lysht Plates	1 LS		500.00 ✓
Concrete Blocks 6"	3,800 pieces	0.48	1,824.00 ✓
8 Blades Louvers and Flame	66 sets	23.10	1,524.60 ✓
4 x 2 Timber	1,300 sf	65.00/100sf	845.00 ✓
6 x 2 Timber	650 sf	65.00/100sf	422.50 ✓
Fascia Board 12 x 1-1/2	150 sf	65.00/100sf	97.50 ✓
Fascia Board 12 x 1-1/4	400 sf	65.00/100sf	260.00 ✓
Ridge Board 12 x 1-1/4	125 sf	65.00/100sf	81.25 ✓
3 x 2 Purlins	400 sf	65.00/100sf	260.00 ✓
2 x 2 Nogging	920 sf	65.00/100sf	598.00 ✓
3mm Ply Board	220 sheets	13.00	2,860.00 ✓
6 x 2 Timber	802 sf	65.00/100sf	521.30 ✓
Eave Btms 3 x 1	200 sf	65.00/100sf	130.00 ✓
Skirting 4 x 1	220 sf	65.00/100sf	143.00 ✓
Roofing Iron	15/15'	1.70	382.50 ✓
Roofing Iron	45/15'	1.70	1,147.50 ✓
Cyclonic Screws	4,000	50/100	2,000.00 ✓
Roofing Nail	35 kg	3.45	120.75 ✓
Pannel Pin	35 kg	4.50	157.50 ✓
Claw Tax	20 kg	3.30	66.00 ✓
3" Galv Nail	15 kg	2.80	42.00 ✓

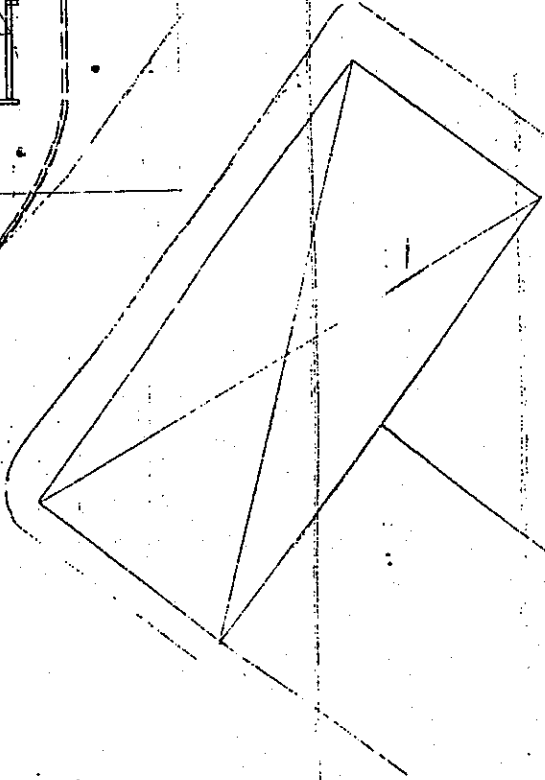
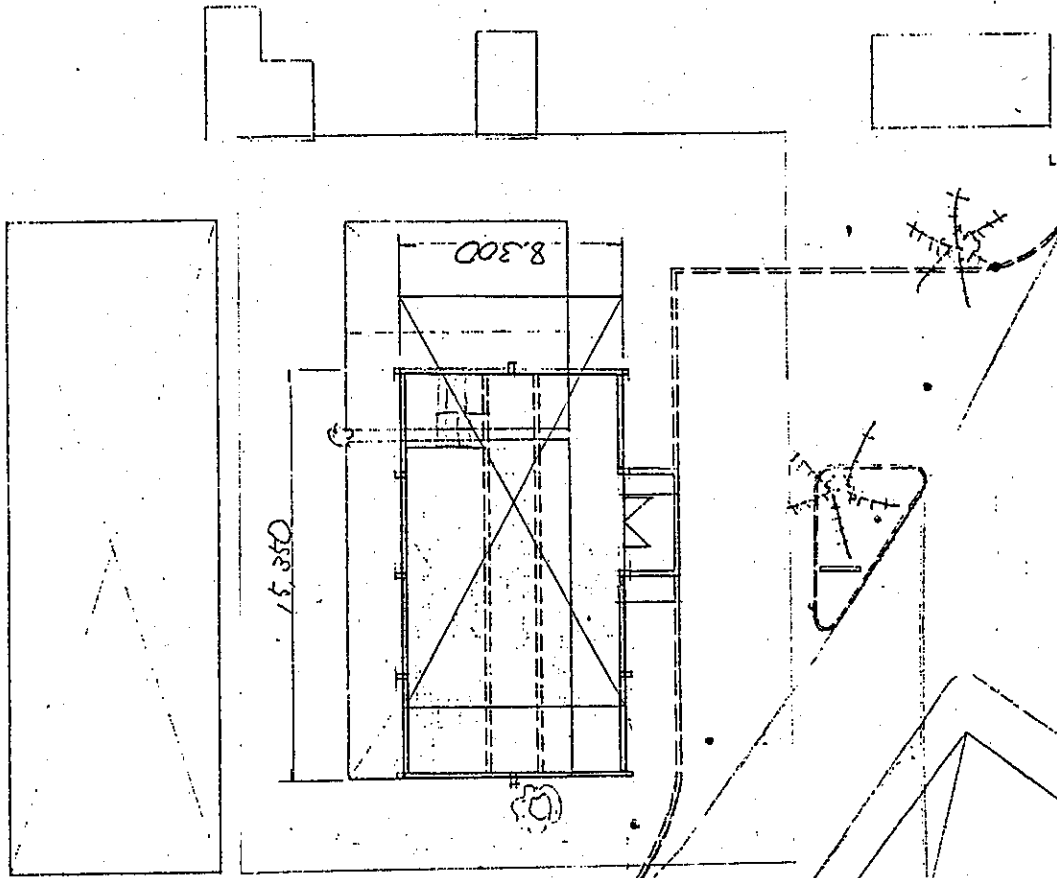
- Contd -

1-1/2" Galv Nail	35 kg	2.80	98.00
Iron Flushing	30 x 6'	7.20	216.00
Iron Flushing	10 x 6'	7.20	72.00
Strapping	5 x 30m	29.00	145.00
Strapping	2 x 30m	29.00	58.00
Down Pipe	5 x 3" dia	19.60	98.00
Down Pipe	2 x 3" dia	19.60	39.20
Sisalation Foil	3 coils	28.80	86.40
Door Provision	1 LS		1,500.00
Painting	1 LS		2,000.00
Electrical	1 LS		1,900.00
Ridge Cad	10 x 6'	5.70	57.00
6 x 1 Flooring	1,550 sf	65.00/100sf	1,007.50
Miscellaneous	1 LS		649.15
<u>Sub Total</u>			<u>30,000.00</u>
Labour	1 LS		10,000.00
Transportation	1 LS		1,000.00
Overhead/Profit			9,000.00
<u>Total</u>			<u>50,000.00</u>

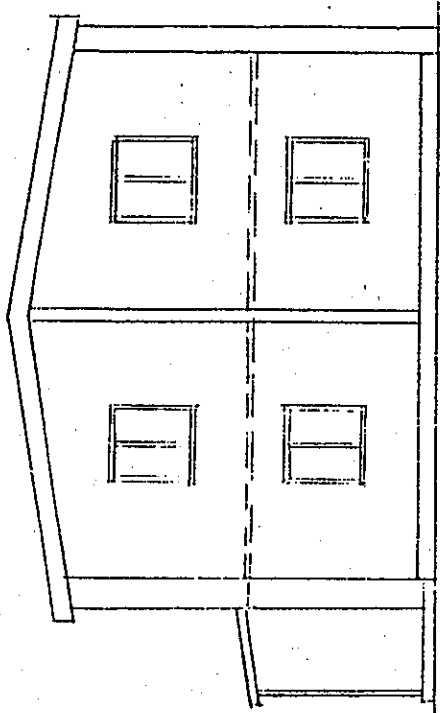


SITE PLAN

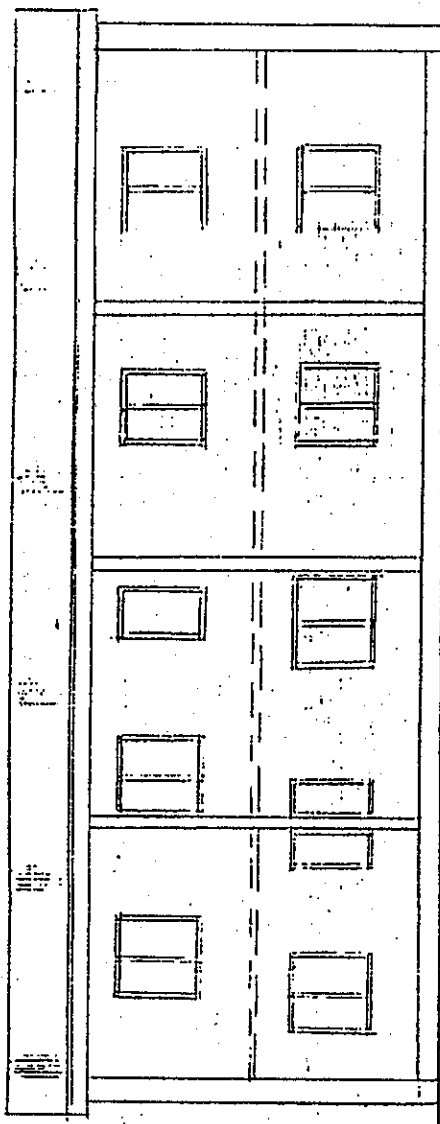
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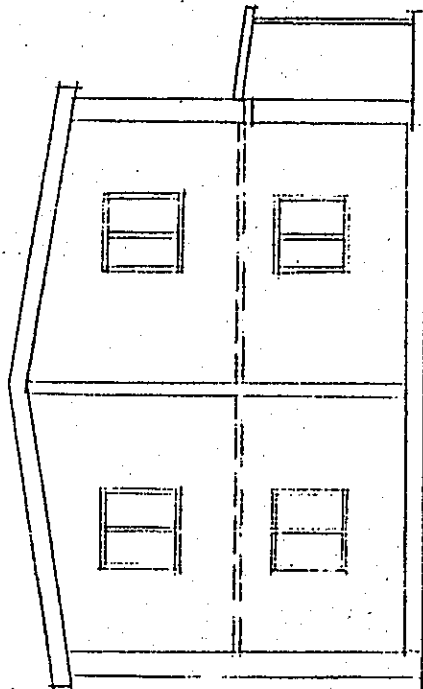
SKETCH PLAN



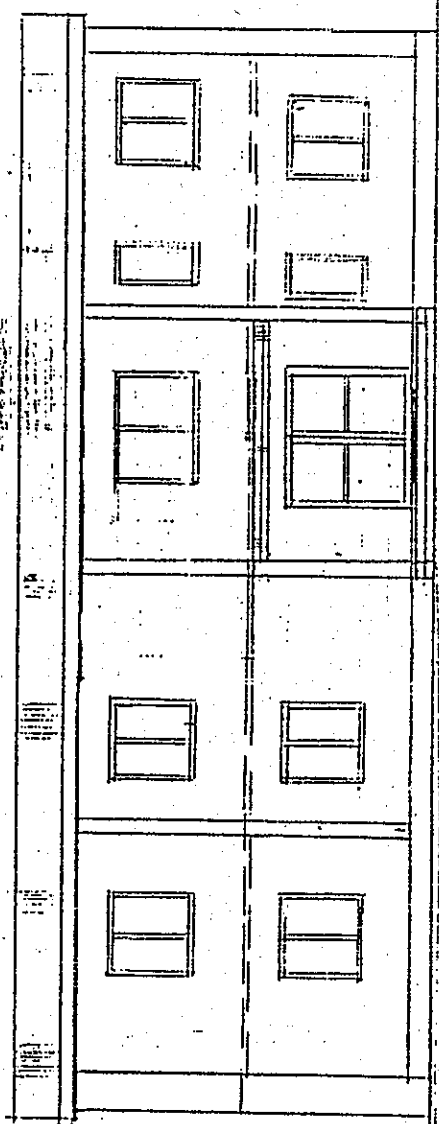
ELEVATION C



ELEVATION B



ELEVATION A



ELEVATION D

STRUCTURAL DESIGN AND CERTIFIED FOR
SOUND STRUCTURE BY DIVYENDU C. PATER
B.E. (CIVIL), AUDELAND, N.E., MILL GAUSAHA

CHAND

92

CONTRACT OF STORAGE HOUSE WORK
OF
THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

BILL OF QUANTITIES

(ENGINEER'S ESTIMATION)

BILL OF QUANTITIES

<u>ITEMS</u>	<u>QUANTITIE</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
16mm Dia Steel Rod	136 length	10.50 (\$)	1,428.00 ✓
12mm Dia Steel Rod	280 length	3.67	1,027.60 ✓
6mm Dia Steel Rod	555 length	1.45	804.75
Cement	23 tons	145.00	3,335.00 ✓
Crush Metal	11 loads	85.00	935.00 ✓
Fine Sand	8 loads	35.00	280.00 ✓
Nuts and Bolts	1 LS		500.00 ✓
lysht Plates	1 LS		500.00 ✓
Concrete Blocks 6"	3,800 pieces	0.48	1,824.00 ✓
8 Blades Louvers and Flame	66 sets	23.10	1,524.60 ✓
4 x 2 Timber	1,300 sf	65.00/100sf	845.00 ✓
6 x 2 Timber	650 sf	65.00/100sf	422.50 ✓
Fascia Board 12 x 1-1/2	150 sf	65.00/100sf	97.50 ✓
Fascia Board 12 x 1-1/4	400 sf	65.00/100sf	260.00 ✓
Ridge Board 12 x 1-1/4	125 sf	65.00/100sf	81.25 ✓
3 x 2 Purlins	400 sf	65.00/100sf	260.00 ✓
2 x 2 Nogging	920 sf	65.00/100sf	598.00 ✓
3mm Ply Board	220 sheets	13.00	2,860.00
6 x 2 Timber	802 sf	65.00/100sf	521.30 ✓
Eave Btms 3 x 1	200 sf	65.00/100sf	130.00 ✓
Skirting 4 x 1	220 sf	65.00/100sf	143.00 ✓
Roofing Iron	15/15'	1.70	382.50 ✓
Roofing Iron	45/15'	1.70	1,147.50 ✓
Cyclonic Screws	4,000	50/100	2,000.00 ✓
Roofing Nail	35 kg	3.45	120.75 ✓
Pannel Pin	35 kg	4.50	157.50 ✓
Claw Tax	20 kg	3.30	66.00 ✓
3" Galv Nail	15 kg	2.80	42.00 ✓

- Contd -

1-1/2" Galv Nail	35 kg	2.80	98.00
Iron Flushing	30 x 6'	7.20	216.00
Iron Flushing	10 x 6'	7.20	72.00
Strapping	5 x 30m	29.00	145.00
Strapping	2 x 30m	29.00	58.00
Down Pipe	5 x 3" dia	19.60	98.00
Down Pipe	2 x 3" dia	19.60	39.20
Sisalation Foil	3 coils	28.80	86.40
Door Provision	1 LS		1,500.00
Painting	1 LS		2,000.00
Electrical	1 LS		1,900.00
Ridge Cad	10 x 6'	5.70	57.00
6 x 1 Flooring	1,550 sf	65.00/100sf	1,007.50
Miscellaneous	1 LS		649.15
<u>Sub Total</u>			<u>30,000.00</u>
Labour	1 LS		10,000.00
Transportation	1 LS		1,000.00
Overhead/Profit			9,000.00
<u>Total</u>			<u>50,000.00</u>

添付資料 7-2-4 指名通知

03 October, 1988.

Begg Construction Ltd.,
Dainive Road, Valelevu,
SUVA.
Phone: 393981.

Dear Sir,

Re : Invitation to Bid for Storage House Work in the Pilot
Infrastructure Improvement Works on the Improvement of Rice
Cultivation Technology Project

Japan International Cooperation Agency (JICA) Suva Office hereby invites bids for the above-mentioned project which is situated at Koronivia Research Station in Nausori. The condition of new house is as follows:

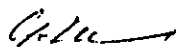
Size : 15.35m (L) x 8.30m (W)

Story : Two (2)

Structure : Concrete Column, Brick Wall and Iron Roofing

Bids document shall be available for JICA, Suva Office on October 11, 1988. at 9 o'clock a.m.

Thank you.



Mr. Yoshio YOSHIDA
RESIDENT REPRESENTATIVE of JICA
Suva Office

CONTRACT OF STORAGE HOUSE WORK
OF
THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

CONTENTS

<u>Pages</u>	
1	Nature of Work
1	Terms & Conditions
3	Contract Signatures
4	Bill of Quantities
7	List of Drawings

JAPAN INTERNATIONAL COOPERATION AGENCY

AB

641-

CONTRACT OF STORAGE HOUSE WORK
OF
THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

OWNER : RESIDENT REPRESENTATIVE OF FIJI JICA OFFICE
3rd Floor, Dominion House, Suva.

CONTRACTOR : BEGG CONSTRUCTION LIMITED a duly incorporated company having
its registered office at Danive Road, Valelevu, Suva.

SITE : AT KORONIVIA RESEARCH STATION, NAUSORI

Nature of Work

1. The construction or the completion of construction of office project on the aforesaid site.
2. The construction or execution of repairs and renovation and extension to the Building of the site in accordance with the plans and specification for such work designed by Begg Construction Ltd on the 14th day of September, 1988.

CONTRACT PRICE : F\$50,000.00
(Fifty Thousand Dollars only)

TERMS & CONDITIONS :

1. The contractor will for such prize excute and complete the said work at contractors cost with materials and workmanship of the best quality and in a substantial and workmanlike manner and in accordance with the said plans and specification (work are the property of the owner) to the reasonable satisfaction of the owner.

2. The contractor will pay all workman and provide all materials and everything necessary in and for the perfect construction of work.
3. All materials bought on the premises by the contractor shall be deemed to be the property of owner but the owner shall be under no liability for loss thereof or damage thereto arising from any course whatsoever. Any materials left over after the completion of the said work shall belong to the contractor.
4. The contractor shall conform to the provision of all ordinances, regulations and by-law relating to the said work and will pay all necessary fees to all Government Departments and Local Authorities chargeable in respect of the said works except any building fee.
5. The contractor will be given possession of the site on the 13th day of October, 1988 and will forthwith commence and thereafter continuously proceed with the said work with all reasonable speed and diligence and will fully complete the said work by the 13th day of January, 1989. If the work be not so completed the contractor shall pay or allow to the owner a sum computed at the rate of P\$50.00 per day as liquidated and ascertained damages for delay provided however if the work be delayed by force majeure or by reason of exceptionally inclement weather or other authorized extras or additions or strikes or lock-outs a fair or reasonable extension of time shall be allowed if the contractor shall without delay expressly in writing request an extension.
6. The contractor will forthwith make good any defects, shrinkages or other faults which may appear within 28 days after completion of the work.
7. If the contractor cannot finish the work in the price agreed the owner has full authority to take legal action on the contractor.
8. The contractor shall clean all the dirt and waste materials from the site before handing over the premises to the owner.
9. Owner to pay the said contract sum in stages of progress. Owner to discuss with the contractor for the progress payments on stages.
10. Any extra work rather than mentioned in plan owner has to pay extra sum for the additional works.

11. The stages of payment will be as follows.
- a) Advance payment (Within few days after contract signing)
 - b) Interim payment I (The end of October, 1988)
 - c) Interim payment II (The end of November, 1988)
 - d) Final payment (The end of December, 1988)

IN WITNESS whereof the hands of the parties this 13th day of October, 1988.

Owner's SIGNATURE (JAPAN INTERNATIONAL COOPERATION AGENCY)

Signed by Toshio Yoshida

Capacity Resident Representative, JICA Fiji Office

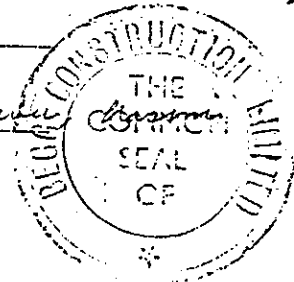


THE COMMON SEAL OF BEGG CONSTRUCTION LIMITED as contractor here unto affixed in the presence of

Contractor's SIGNATURE (BEGG CONSTRUCTION LIMITED)

Signed by ALIM BEGG

Capacity : Managing Director, Valuetec



Witness's SIGNATURE

Signed by M. Katanabe

Capacity : Japanese Team Leader

PAB

04.

CONTRACT OF STORAGE HOUSE WORK
OF
THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

BILL OF QUANTITIES

0.4.

AD

BILL OF QUANTITIES

<u>ITEMS</u>	<u>QUANTITIE</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
16mm Dia Steel Rod	138 length	(\$) \$10.50	1,428.00
12mm Dia Steel Rod	280 length	3.67	1,027.60
8mm Dia Steel Rod	555 length	1.45	805.00
Cement	23 tons	145.00	3,335.00
Crush Metal	11 loads	85.00	935.00
Fine Sand	8 loads	35.00	280.00
Nuts and Bolts	1 LS		500.00
Lysht Plates	1 LS		500.00
Concrete Blocks 6"	3,800 pieces	.48	1,824.00
8 Blades Louvers and Flame	66 sets	23.10	1,524.60
4 x 2 Timber	1,300 sf	65.00	845.00
6 x 2 Timber	1,452 sf	65.00	943.80
Fascia Board-12 x 1-1/4	550 sf	65.00	357.50
Ridge Board 12 x 1-1/4	125 sf	65.00	81.25
3 x 2 Purlins	400 sf	65.00	260.00
2 x 2 Nogging	920 sf	65.00	598.00
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Roofing Iron	15/15'	1.70	382.50
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Claw Tax	20 kg	3.30	66.00
3" Galv Nail	15 kg	2.80	42.00
1-1/2" Galv Nail	35 kg	2.80	98.00
Iron Flushing	30 x 6'	7.20	216.00

44.

AD

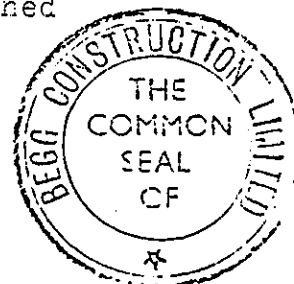
ITEMS	QUANTITIES	UNIT PRICE (\$)	AMOUNT (\$)
Iron Flushing	10 x 6'	7.20	72.00
Strapping	5 x 30m	29.00	145.00
Strapping	2 x 30m	29.00	58.00
Down Pipe	5 x 3" dia	19.60	98.00
Down Pipe	2 x 3" dia	19.60	39.20
Sisalation Foil	3 coils	28.80	86.40
Door Provision	1 LS		1,550.00
Painting	1 LS		2,000.00
Electrical	1 LS		1,900.00
Ridge Cad	10 x 6'	5.70	57.00
6 x 1 Flooring	1,550 sf	65.00	1,007.50
Miscellaneous	1 LS		1,200.00
<u>Sub Total</u>			<u>30,321.10</u>
Labour	1 LS		10,621.95
Transportation	1 LS		1,000.00
Overhead/Profit			7,556.95
<u>Total</u>			<u>50,000.00</u>

Dollars

Place

Date. Oct. 11th 1988

Signed

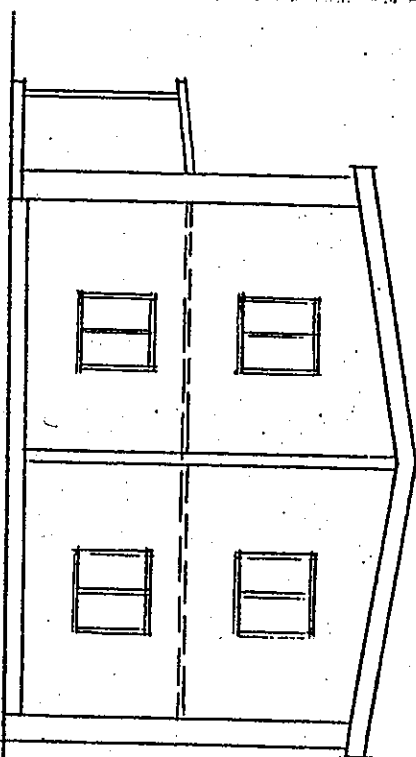


64.

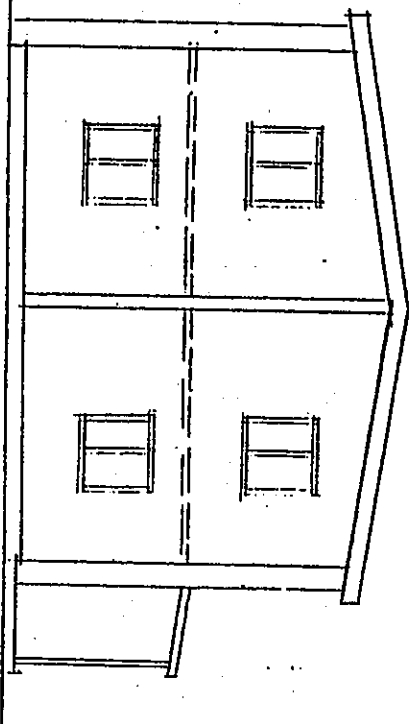
DRAWINGS OF STORAGE HOUSE WORKS
OF
THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

LIST OF DRAWINGS

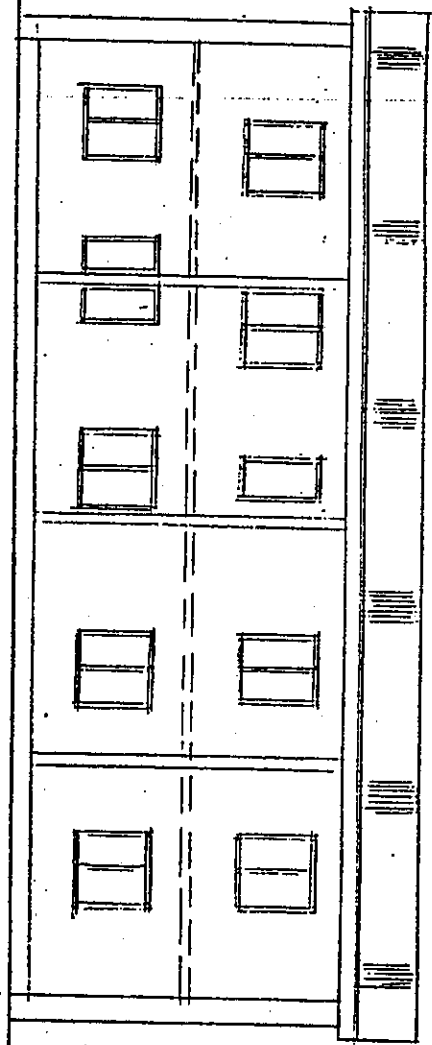
S1	PLAN
S2	ELEVATION A, B, C, D
S3	FOUNDATION PLAN
S4	CROSS SECTION AT "aa"
S5	DETAIL R/002, R/004
S6	DETAIL R/001, R/003, R/005
S7	RC FOOTING DETAIL



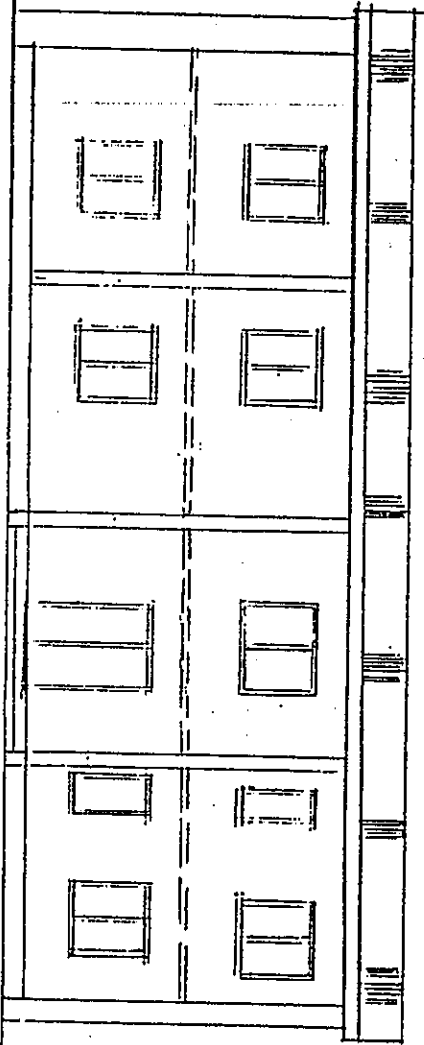
ELEVATION C
1:100



ELEVATION A
1:100



ELEVATION B
1:100



ELEVATION D
1:100

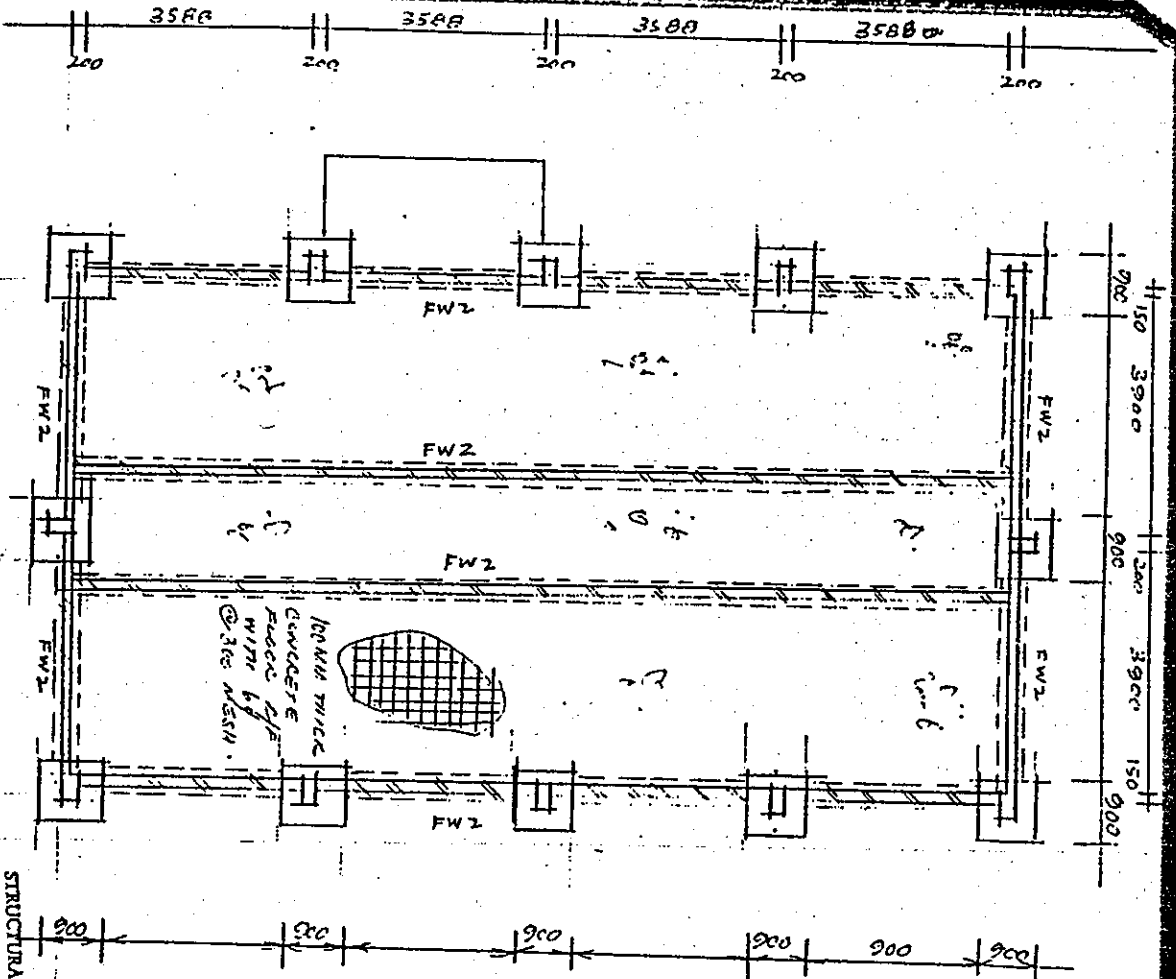
STRUCTURAL DESIGN AND CERTIFIED FOR
SOUND STRUCTURE BY DEVENDRA C. PATEL
B.A. (CIVIL) AUCKLAND, N.Z., M.AE. (AUSTRALIA)

CP

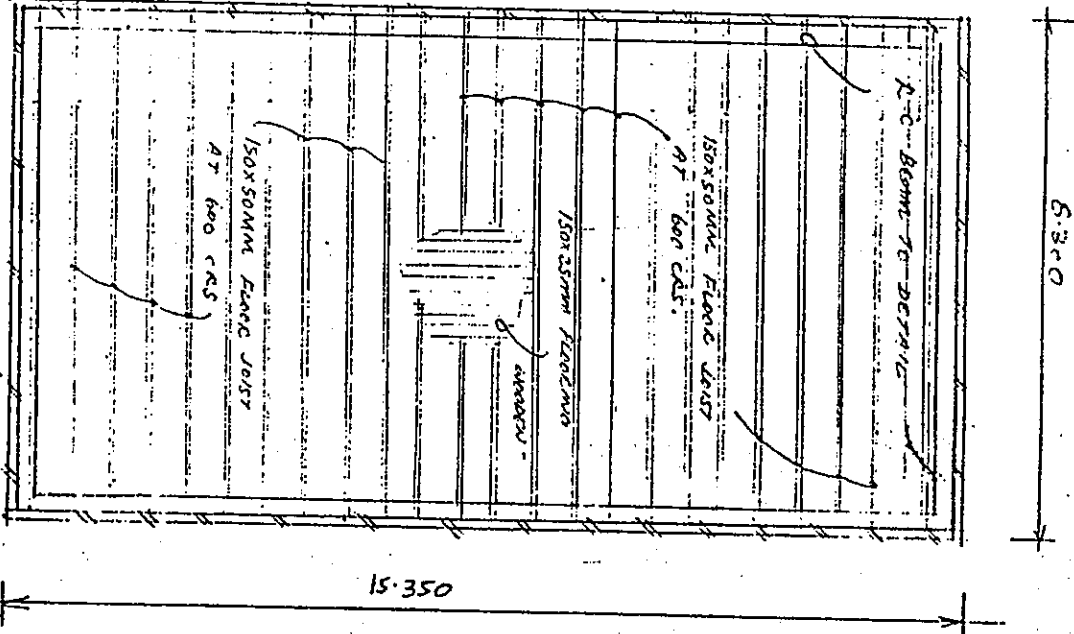
92

PD

hell

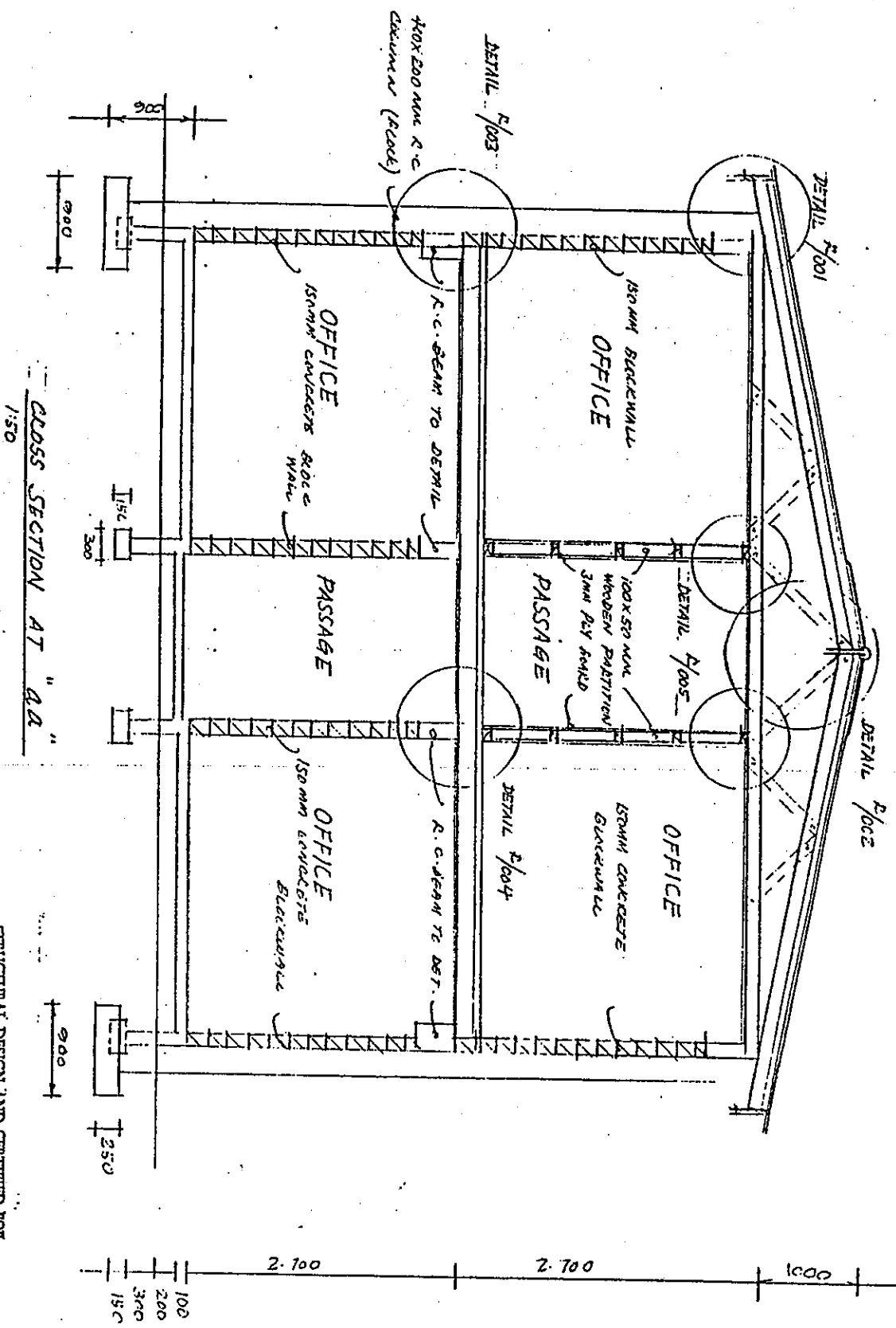


STRUCTURAL DESIGN AND CERTIFIED FOR
 SOUND STRUCTURE BY DEVENDRA C. PATIL
 B.E. (CIVIL) AUCLAND, N.Z. MAE (AUSTRALIA)



FIRST FLOOR FOUNDATION 1:100

53



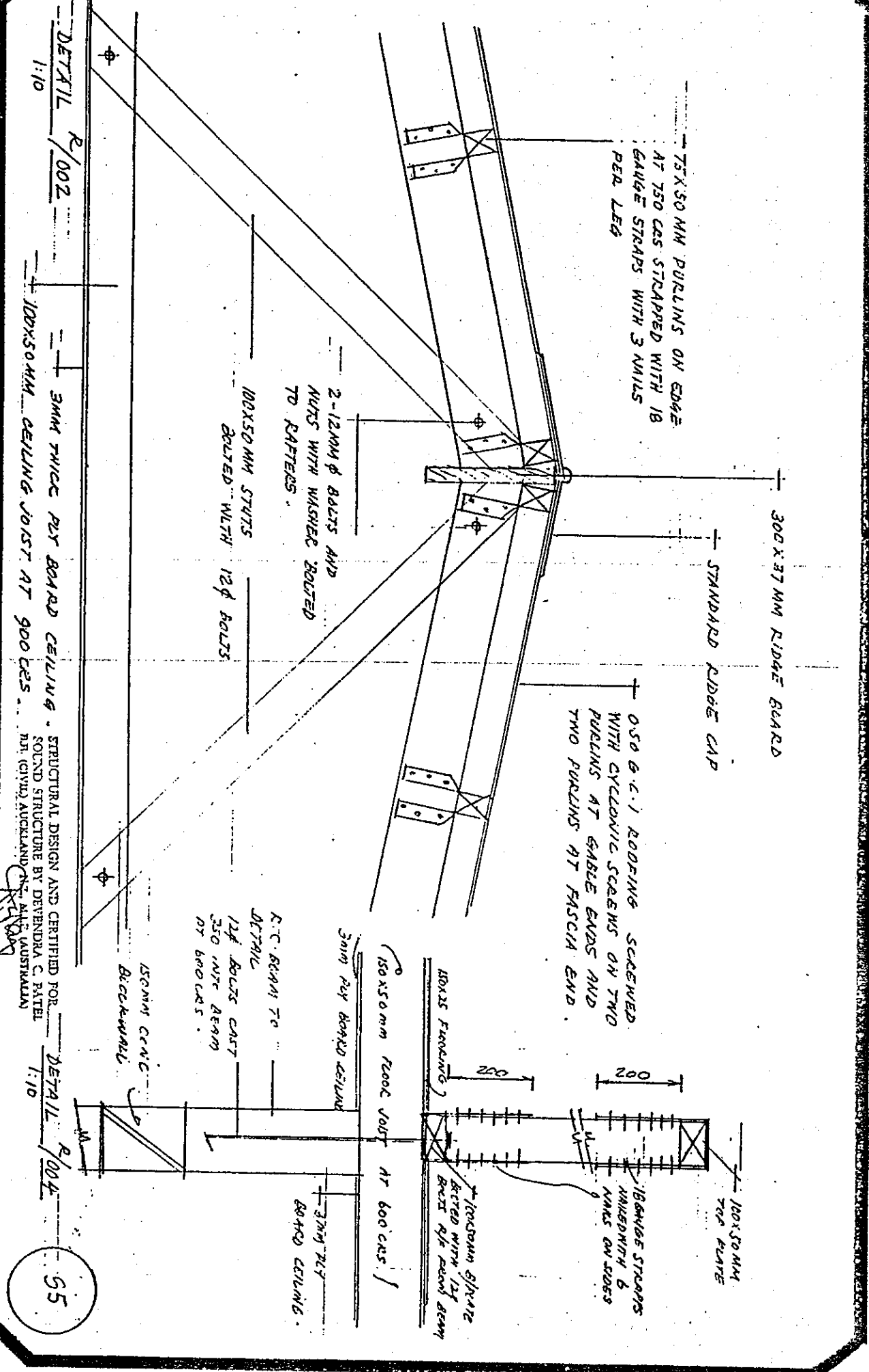
CROSS SECTION AT "AA"
1:50

STRUCTURAL DESIGN AND CERTIFIED FOR
SOUND STRUCTURE BY DEVENDRA C. PATEL
B.E. (CIVIL), WICKLAND, N.Z., M.B.E. (AUSTRALIAN)

[Handwritten signature]

54

[Handwritten initials]



75x50 MM PURLINS ON EDGE
AT 750 C.C.S. STRAPPED WITH 18
GAUGE STRAPS WITH 3 NAILS
PER LEG

300x37 MM RIDGE BOARD

STANDARD RIDGE CAP

0.50 G.C.I. ROOFING SCREWED
WITH CYCLONIC SCREWS ON TWO
PURLINS AT GABLE ENDS AND
TWO PURLINS AT FASCIA END.

2-12MM Ø BOLTS AND
NUTS WITH WASHER BOLTED
TO RAFTERS.

100x50 MM STUMPS
BOLTED WITH 12d BOLTS

R.C. RAFTERS TO
DETAIL

12d BOLTS CAST
350 INT. BEAM
AT 600 C.C.S.

150MM C.N.C.
BACKWALL

100x50mm FLOOR JOIST AT 600 C.C.S.

3mm ply board ceiling

100x50 MM
TOP PLATE

18MM GAUGE STRAPS
NAILED WITH 6
NAILS ON SIDES

100x50mm STUMP
BOLTED WITH 12d
BOLTS AT RAFTERS

DETAIL R/002

1:10

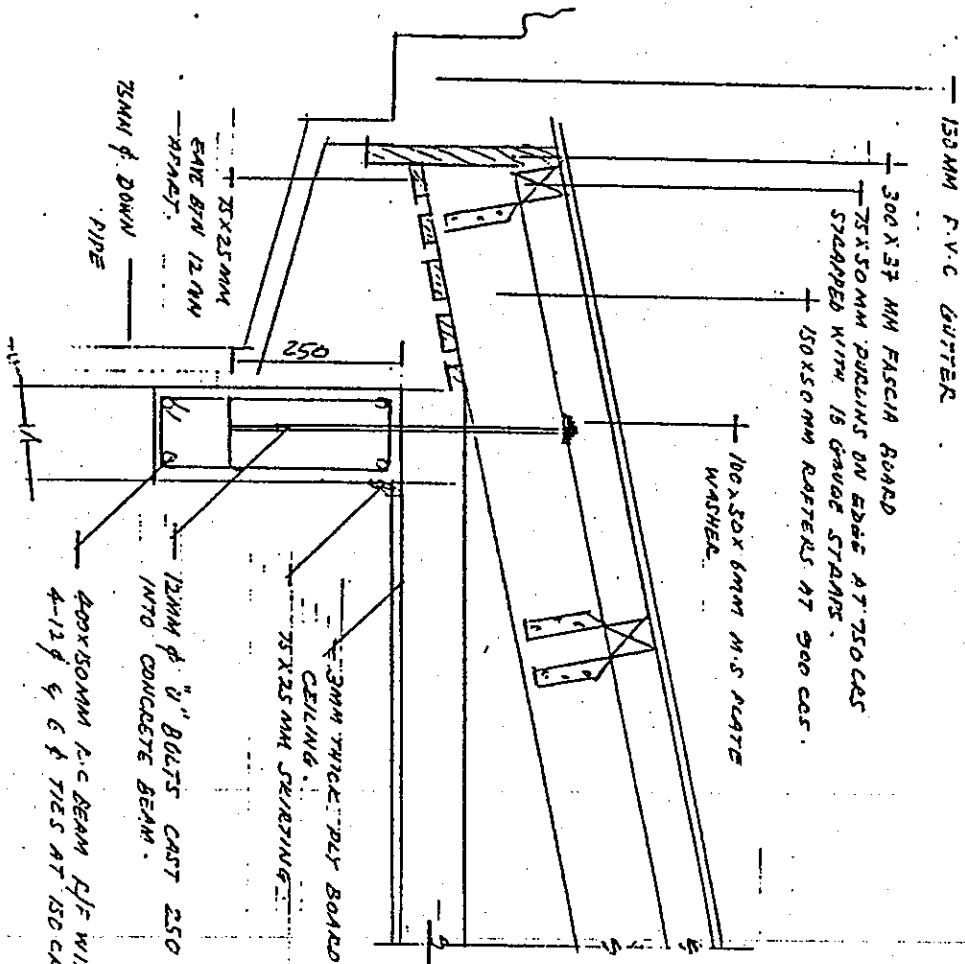
3MM PLY BOARD CEILING
100x50 MM CEILING JOIST AT 900 C.C.S.

STRUCTURAL DESIGN AND CERTIFIED FOR
SOUND STRUCTURE BY DEVENDRA C. PATEL
P.L. (CIVIL) AUSTRALIAN

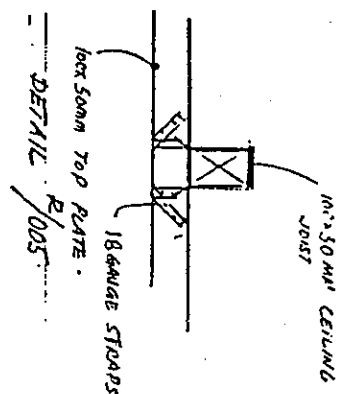
DETAIL R/004

1:10

55

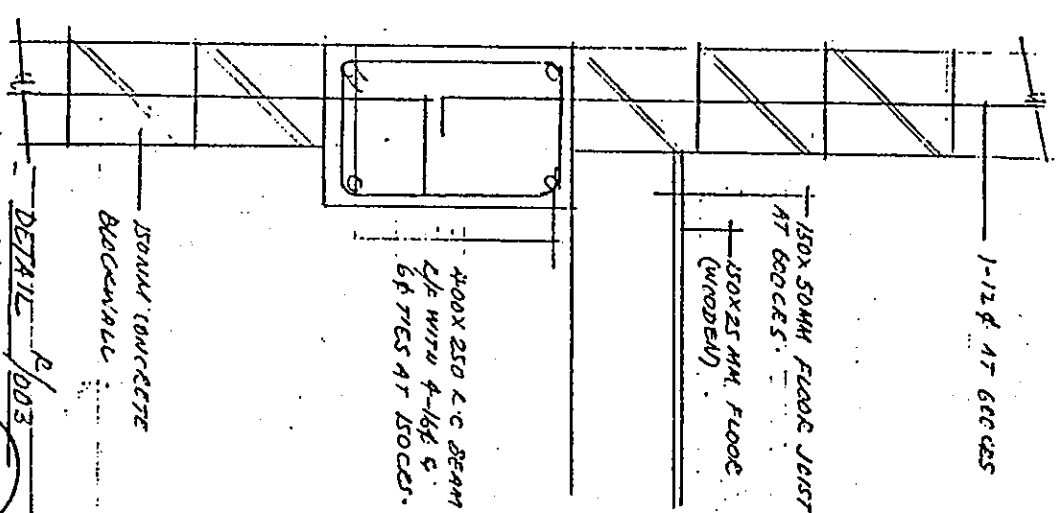


DETAIL R/001
1:10



DETAIL R/005

180 X 50 MM ROOF JOIST

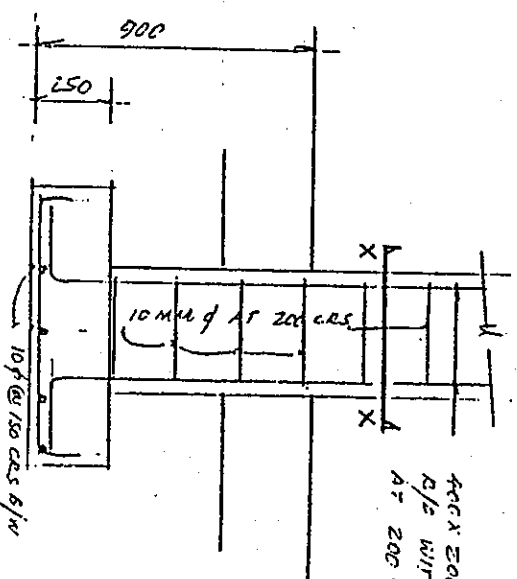


DETAIL R/003
1:10

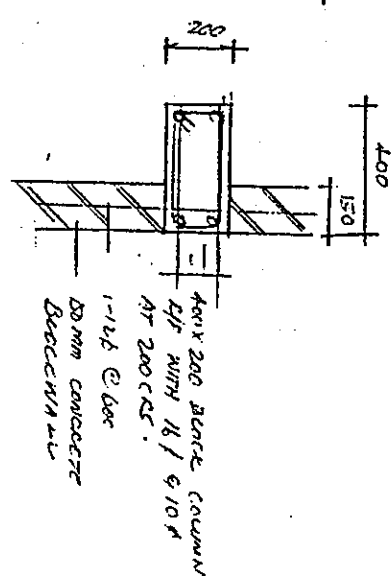
STRUCTURAL DESIGN AND CERTIFIED FOR SOUND STRUCTURE BY DEVENDRA G. PATEL P.E. (CIVIL) ADELAND, N.J., AILE (AUSTRALIA)

Signature

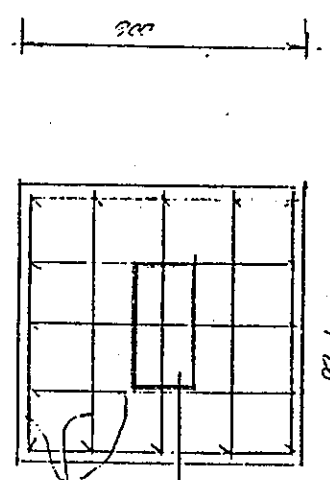
56



400x200 R.C. BRICK COLUMN
 R/S WITH A-11 & 10 @ 7ES
 AT 200 C.C.S.



400x200 BRICK COLUMN
 R/S WITH 10 @ 100
 AT 200 C.C.S.
 1-12 @ 600
 150MM CONCRETE
 BRICK MASONRY



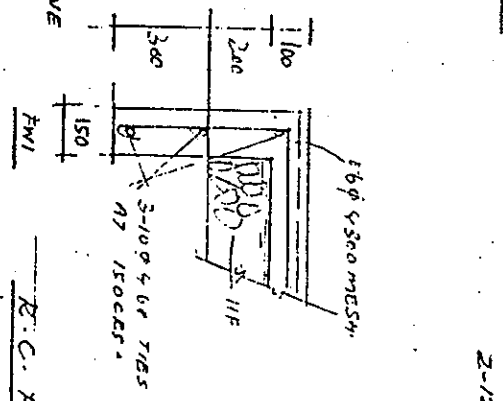
BRICK COLUMN DETAIL
 UP TO BASE BEAM LEVEL
 1:20

400x200 R.C. BRICK
 COLUMN

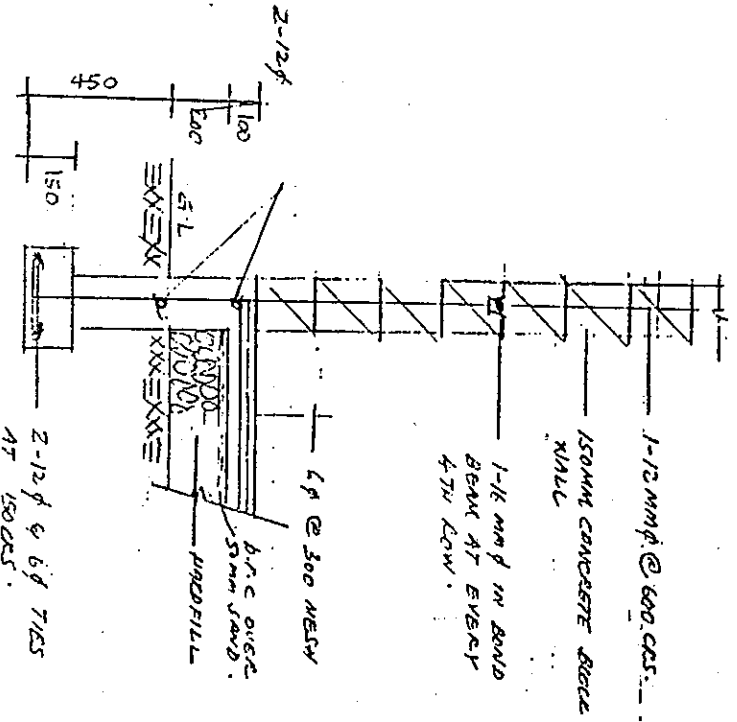
10mm dia REIN C.C.S. R/S

NOTE: ALL ADDS TO BS
 300 INTO SOAP STONE

PAD DETAIL
 1:20



R.C. FOOTING DETAIL
 1:20



1-12 mm dia @ 600 C.C.S.
 150MM CONCRETE BRICK
 WALL
 1-12 mm dia IN BOND
 BEAM AT EVERY
 4TH ROW.
 1-12 @ 600
 150MM CONCRETE
 BRICK MASONRY

2-12 @ 6 @ 7ES
 AT 150 C.C.S.

ENGINEER'S SIGNATURE AND STAMP
 FOUND STRUCTURE BY DEVENDRA G. RAJTEL
 EN (CIVIL) AUDELAND, N.Z., N.Z. (AUSTRALIAN)

Handwritten signature

添付資料 7-2-6 追加工事発注書

20th December, 1988

BEGG CONSTRUCTION LIMITED
Danive Road, Valelevu
Suva

Att.: Mr. Alim Begg

Dear Sir,

Re: THE STORAGE HOUSE WORK OF THE PILOT INFRASTRUCTURE IMPROVEMENT WORKS
FOR THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT

According to your estimated cost for the following additional work on above mentioned project, JICA will order this work to your company.

Scope of Works

1. Extention of entrance area and slab design
2. Aluminium witco windows
3. Aluminium double door 1,800x2,100
4. Quarry tiles

Period for Works

20th December, 1988 - 13th January, 1989

Estimation Cost

1. Extention of entrance area and slab design	3,500.00
2. Aluminium witco windows	4,926.00
3. Aluminium double door 1,800x2,100	900.00
4. Quarry tiles	674.00
TOTAL	\$10,000.00

Yours faithfully,


S. MIZUGUCHI

Assistant Resident Representative
JICA Office
Suva

添付資料 7-2-7 前途金の請求書

昭和63年10月31日

国際協力事業団
フィジー事務所
吉田 芳夫 所長 殿

フィジー国稲作研究開発計画
パイロットインフラ整備事業
施工管理担当 坂梨 良介 (印)

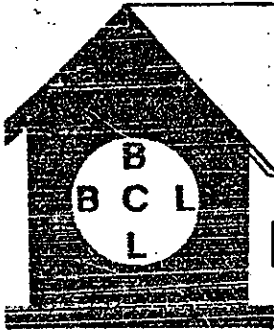
件名：フィジー国稲作研究開発計画パイロットインフラ整備事業
の圃場管理棟工事における前途金支払いに関して

標記プロジェクトの圃場管理棟工事に関し、施工業者の BEGG CONSTRUCTION LTD.
より契約書第11項に基づく、前途金の支払い請求が10月31日付でありました。

よって前途金として、契約金額の20%に当たる下記の金額の支払いをお願い致します。

前途金金額 : F\$10,000.00

以下に施工業者からの請求書を添付しました。



BEGG CONSTRUCTION LTD.

PHONE: SUVA: 393981, LABASA: 82154

GENERAL BUILDING CONTRACTORS, JOINERY WORKS, TIMBER SUPPLIES.

P.O. BOX 6132
VALELEVU
NASINU.
P.O. BOX 904
LABASA.

31st October, 1988

The Resident Representation
J I C A Office
S U V A

Dear Sir

Re: APPLICATION OF ADVANCE PAYMENT

AS discussed with you on the day of signing of agreement we would like to apply for the payment. The amount will be "20%" of the contract sum.

Your co-operation will be highly appreciated.

Yours faithfully

for 

.....
Alim Begg
Managing Director

c.c. Mr Sakanasi (Engineer)

添付資料 7-2-8 第1回目の支払い請求

昭和63年11月24日

国際協力事業団
フィジー事務所
吉田 芳夫 所長殿

フィジー国稲作研究開発計画
パイロットインフラ整備事業
施工管理担当 坂梨 良介

件名：フィジー国稲作研究開発計画パイロットインフラ整備事業
の圃場管理棟工事における第1回中間払いに関して

標記プロジェクトの圃場管理棟工事に関し、施工業者の BEGG CONSTRUCTION LTD.
より契約書第11項に基づき、第1回中間払いに対する請求が11月16日付で
ありました。

よって第1回中間払いとして、契約金額の20%に当たる下記の金額の支払いを
お願い致します。

第1回中間払い金額 : F\$10,000.00

以下に施工業者からの請求書を添付しました。



BEGG CONSTRUCTION LTD.

PHONE: SUVA: 393981, LABASA: 82154

GENERAL BUILDING CONTRACTORS, JOINERY WORKS, TIMBER SUPPLIES.

P.O. BOX 6132
VALELEVU
NASINU.
P.O. BOX 904
LABASA.

16th ~~DATE~~ November 1983

The Resident Representation
J I C A
S U V A


Dear Sir

RE: Progress Payment for Koronivia Project

As discussed with Mr Sakiasi and according to the agreement we here by request for our progress 20% payment.

Your co-operation will be highly appreciated.

Yours faithfully

for 

.....
A. Begg
Managing Director.

c.c. Mr Sakiasi
(Engineer)

添付資料 7-2-9 第2回目の支払い請求

昭和63年12月19日

国際協力事業団
フィジー事務所
吉田 芳夫 所長 殿

フィジー国稲作研究開発計画
パイロットインフラ整備事業
施工管理担当 岩井 功

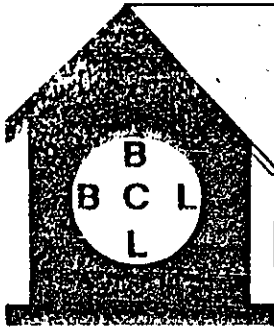
件名：フィジー国稲作研究開発計画パイロットインフラ整備事業
の圃場管理棟工事における第2回中間払いに関して

標記プロジェクトの圃場管理棟工事に関し、施工業者の BEGG CONSTRUCTION LTD.
より契約書第11項に基づき、第2回中間払いに対する請求が12月14日付で
ありました。

よって第2回中間払いとして、契約金額の30%に当たる下記の金額の支払いを
お願い致します。

第2回中間払い金額 : F\$ 15,000.00

以下に施工業者からの請求書を添付しました。



BEGG CONSTRUCTION LTD.

PHONE: SUVA: 393981, LABASA: 82154

GENERAL BUILDING CONTRACTORS, JOINERY WORKS, TIMBER SUPPLIES.

P.O. BOX 6132
VALELEVU
NASINU.
P.O. BOX 904
LABASA.

14th Decembär 1938

The Resident Representatives
J.I.C.A. Office
S U V A

Dear Sir

Re: Progress Payment for Koronivia Job

We would like to apply for the payment of \$15,000.00
as discussed with Mr Iwai.

The job has been well over progress.

Your co-operation will be highly appreciated.

Yours faithfully

.....


A. Begg

Managing Director