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Final Report

Technical Audit

A review of technical quality of the Sub-Projects in
the first cycle of implementation

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Contents

Abbreviations

ACM	Asbestos Cement Material, (bonded asbestos)
BOQ	Bill of Quantities
CDD	Community Driven Development
CF	Community Facilitator
DRD	Department of Rural Development
ECOP	Environmental Code of Practice
EMP	Environmental Management Plan
GFWS	Gravity Fed Water Supply
HDPE	High-density polyethylene, (water pipe)
IRC	International Rescue Committee
MLF&RD	The Ministry of Livestock, Fisheries and Rural Development
MOE	Ministry of Education
NCDDP	Myanmar National Community Driven Development Project
NGO	Non Governmental Organization
SP	Sub-Project
TF	Technical Facilitator
TTA	Township Technical Advisor
uPVC	Unplasticized PVC, abbreviated to PVC in ECOP, (water pipe)
UV	Ultra-Violet
VPSC	Village Project Support Committee
VTPSC	Village Tract Project Support Committee

1. Introduction and Background Information

1.1 Background Information

Myanmar National Community Driven Development Project (NCDDP) is a multi-year, multi-state community development project implemented by The Ministry of Livestock, Fisheries and Rural Development (MLF&RD) of the Union Government of Myanmar supported by a Grant of US$ 80 million from the World Bank. The project has five components, implemented over a period of approximately six years.

- **Component 1**: Community Block Grants (US$52.2 million), to finance three annual cycles of on average US$27,000 to about 640 village tracts in 15 townships for priority community level infrastructure.
- **Component 2:** Facilitation and Capacity Development (US$14.2 million), to finance technical assistance and institutional support at the union and township levels.
- **Component 3:** Knowledge and Learning (US$1.8 million), to support community representatives and government staff through learning from community based approaches implemented.
- **Component 4:** Implementation Support (US$11.8 million), to support project management at the union and township levels
- **Component 5:** Emergency Contingency Response, to allow for the rapid reallocation of grant proceeds from other components in order to provide preparedness and rapid response support to disaster, emergency and/or catastrophic events

In component 1, Community Block Grants, the first Sub-Project (SP) cycle has been completed in three townships and NCDDP has commissioned this review of technical quality of the SP's to inform the Multi-Stakeholder Review in Nay Pyi Taw in August 18, 2014 and a subsequent full technical audit which will have a broader scope than this review.

The technical audit took place over three weeks in Myanmar from August 4 to August 22, 2014. The consultant was assisted by two DRD Engineers and undertook technical inspections of 11 selected SP's in Kanpetlet Township and 10 selected SP's in Namhsan Township, meeting with the project stakeholders to discuss project implementation issues at village, village tract and township level. A follow up mission to Kyunsu Township inspected 11 additional SP from October 25 to 28, 2014.

Following the field visits in Kanpetlet and Namhsan a presentation was made on the preliminary findings of the Technical Audit to the Multi-Stakeholder Review in Nay Pyi Taw on August 18, and a learning secession was conducted for the technical teams on the key findings on August 20, 2014. The group discussions and presentations made during the Multi-Stakeholder Review addressed many of the same issues raised in the Technical Audit and provided valuable and

constructive feedback. Informal discussions and follow up meetings were held with the technical teams at central level during this period.

Due to the short time available between the start of the Technical Audit and the presentation of preliminary findings at Multi-Stakeholder Review, only two of the three townships in the first cycle, Kanpetlet and Namhsan, were inspected during the first mission. A second mission took place in October to inspect selected SP in Kyunsu Township.

The structure of the technical audit report follows key tasks as detailed in the terms of reference, addressing the issues of Technical Design Quality, Quality Control/ Quality Assurance, Technical Assistance and Management, Operation and Maintenance and Adherence to Environmental and Social Safeguard. The report provides key findings and recommendations in each of these areas.

The report includes a detailed technical annex with photographs, a brief summary of each SP inspected and the technical findings and recommendations specific to each SP.

Among the areas in which this technical audit review differs from a planned more comprehensive technical audit to be conducted by a larger multidiscipline team is that it does not include an assessment of cost effectiveness of the sub-projects, an economic and labour analysis or a community satisfaction and use of infrastructure survey.

1.2 Acknowledgments

The consultant would like to thank the community representatives of the Villages and Village Tracts of the twenty one sub-projects visited who shared their time, views and experiences of the first cycle of SP implementation. The staff of IRC and Mercy Corps who organized the logistics of the site visits, provided interpreters and translators and provided extensive background information on SP implementation and supervision issues, the Union Level Technical Assistance team who helped with a better overview of the project implementation issues and to the staff of the Department of Rural Development at both Union and Township level for their time and assistance, feedback and comments. Finally, the consultant would like to thank the World Bank staff for providing organizational and professional support.

1.3 Methodology

Audit team and preparation.
The Technical Audit was conducted by an individual consultant contracted by the Department of Rural Development, Ministry of Livestock, Fisheries and Rural Development, and assisted by two DRD Engineers, Aung Khine Zaw and Win Zaw Htun. Relevant project documentation provided by the Bank was reviewed prior to the mission, and question guidelines created for the interviews, site visits and documentation reviews based on the requirements of the TOR.

Site visits and interviews

A purposively selected sample of sub-projects was inspected in each township, subject to time constraints, access difficulties in the rainy season, and to security constraints. The Village Project Support Committee (VPSC) was interviewed at every SP visited together with representatives from Village Tract Project Support (VTPSC) in some villages. The sub-project documentation was reviewed on site following the VPSC interviews, so the design and contract documents could be directly compared to what was actually constructed. Both village level documentation and the Township SP files were reviewed. The SP's were jointly inspected with the VPSC's either before after the interviews.

In Kanpetlet Township two areas were selected for the field visits, a grouping of five SP around Kanpetlet Township which could be accessed by vehicle in the rainy season, and a second more remote group of six SP around Kyin Dway Village Tract which necessitated overnight stays at Kyin Dway village and access to SP's by motorbike and walking. The SP inspected included two roads, four school rehabilitation/extensions, three gravity fed water supply systems and one irrigation SP.

In Namhsan Township access to SP's was restricted not only by rainy season access but also by security considerations. The advice of the Namhsan DRD and Mercy Corps was followed to insure that only sites in secure areas were inspected. However, it was still possible to visit some remote sites and to select SP types not inspected in Kanpetlet so that all major types of SP were covered by the Audit. The SP inspected in Namhsan included two school fences, four roads, one hydro power, one public latrine, a pumped water supply and a community hall.

In Kyunsu SP were selected which could be reached in one day's travel. The SP inspected included four school renovations, two water supplies, two road/footpath constructions, a bridge construction, a jetty construction and a hydro power SP.

Nine percent (9%) of cycle 1 sub-projects in Kanpetlet, Namhsan and Kyunsu were inspected, including some SP in each of the major SP types.

Sub-Project Types and Number inspected.

Sub-Project Types	Kanpetlet	Namhsan	Kyunsu	Total	Number Inspected	Percent
Road	53	26	33	112	9	8%
Building	16	43	75	134	11	8%
Water Supply	12	39	19	70	7	10%
Electricity	12	8	3	23	2	9%
Irrigation	2	0	0	2	1	50%
Sanitation, Public Latrines	2	1	1	3	1	33%
Jetty	0	0	12	12	1	8%
Total	**97**	**117**	**143**	**357**	**32**	**9%**

The sites inspected were biased towards those closer to townships and main roads, constrained by travel time, access conditions in the rainy season and security. Because the sub-projects

inspected had better than average access conditions, it is likely that the community and technical facilitators were able to provide better support to these villages. This bias should be acknowledged, but in practical terms it would not possible to visit a random selection of villages even in the dry season, because there will still be time constraints preventing visits to very remote villages and security constraints limiting the areas that are safe to visit.

In Kyunsu, 46 of the more remote SPs did not have any Technical Facilitators because of the travel time to the SPs and because the TFs could not stay overnight. All the 11 villages inspected had TF assigned so this will also reflect on the technical quality of the works inspected.

To illustrate this bias towards SP's that are easily accessible, the average distance between the township and the sub-project for all sites was calculated and compared with the average distance between the township and the sub-project for the sites inspected.

Average Distance from Township to Sub-Projects.

Township	Average distance from Township to SP (Miles/Hours)	
	All SP	Inspected SP
Kanpetlet	49 Miles	31 Miles
Namhsan	20 Miles	8 Miles
Kyunsu	4.62 Hours	2.37 Hours

Note: In Kyunsu most travel was by boat so distance is measure in travel time.

Rating of Sub-Projects

Sub-projects inspected were rated for Technical Design Quality and compliance with Environmental to make comparisons between sub-projects and provide an overview of the technical quality and safeguards issues. In the areas of Quality Control/ Quality Assurance, Technical Assistance and Management and Operation and Maintenance the issues are cross cutting and there is less variance by Sub-Project so individual SP ratings were not necessary.

The Environmental and Social Safeguards Screening forms are clear-cut. A SP either complies with the safeguards or it does not. In cycle 1, SP were limited to those that do not require an Environmental Management Plan (EMP) so there was no case where compliance with the EMP needed to be checked.

The Environmental Codes of Practice (ECOP) checklists cover a range of issues which overlap with Technical Design Quality issues and there is much variance in how well these mitigation measures were applied in practice. Technical Design Quality and ECOP compliance are dealt with in the same sections in the body of this report because of this overlap.

Sub-Project rating on a scale of 1 to 5

Score	Rating	Example for Technical Design Quality (including ECOP Compliance)	Example for Environmental and Social Safeguards
5	Excellent	SP meets all technical standards	Complies with E&S Safeguards and EMP
4	Good	Good quality. Improvements recommended	Complies with E&S Safeguards, no EMP necessary
3	Acceptable	Good quality. Small improvements or repairs necessary	Minor issues with E&S Safeguards
2	Poor	Major improvements or repairs needed	Does not comply with E&S Safeguards
1	Not acceptable	Not safe	No screening

2. Findings and Recommendations

2.1 Overview of Ratings for Technical Design Quality and Safeguards

An overview of the ratings for technical design quality and Environmental and Social Safeguards is shown in the following table. A detailed analysis of these ratings is provided under the sub headings for each main sub-project type below. Sub-Project reference numbers (R1 to R32) used in the main report follows those used in the technical annex to facilitate cross reference, and they are in the order of SP inspected.

Ref	Township	Village Name	Sub-Project	Technical Quality Rating	E&S Safeguards Rating
R1	Kanpetlet	Ma Kyauk Ahr	Footpath	2	2
R2	Kanpetlet	Saw Laung	Water Supply	4	4
R3	Kanpetlet	Par Kun	School Rehabilitation	4	4
R4	Kanpetlet	Saw Chaung	Water Supply	4	4
R5	Kanpetlet	Kant Thar Yon	Linking Road	3	4
R6	Kanpetlet	Maw Chaung	Water Supply	2	4
R7	Kanpetlet	Hpone Twi Khi	Irrigation	3	4
R8	Kanpetlet	Tin Pon Kyinn	School Extension	4	4
R9	Kanpetlet	Auk Hle	School Extension	4	4
R10	Kanpetlet	Hoke Pon Kyin	School Extension	4	4
R11	Kanpetlet	Pan Taung	Water Supply	3	4
R12	Namhsan	Kyauk Hpyu Ywar Ma	School Fence	4	4
R13	Namhsan	Nam Len	Community Hall	4	4
R14	Namhsan	Ahr Ram (Pa Laung)	Public latrine	3	4
R15	Namhsan	Ho Nam	Hydro	2	4

Ref	Township	Village Name	Sub-Project	Technical Quality Rating	E&S Safeguards Rating
R16	Namhsan	Za Yang (North)	School Fence	4	4
R17	Namhsan	Za Yang Ywar Ma	Concrete Road	4	**2**
R18	Namhsan	Ngun Hseng	Water Tank	3	**2**
R19	Namhsan	Man Pang	Side Drain	4	4
R20	Namhsan	Ho Chit - Sa Khan Thar	Concrete Footpath	4	4
R21	Namhsan	Li Lu	Concrete Bridge	4	4
R22	Kyunsu	Zay Ka Mi	School	4	4
R23	Kyunsu	Pan Taung	Water Supply	2	4
R24	Kyunsu	Shwedu/Taungpuu	School	3	4
R25	Kyunsu	Mawng Hlaw Auk	Bridge	4	4
R26	Kyunsu	Yataung Adwin	School	4	4
R27	Kyunsu	Min Goke	Water Tank	4	4
R28	Kyunsu	Leik Kvei	Hydro Power	2.5	4
R29	Kyunsu	Htein Chaung	Concrete Road	4	4
R30	Kyunsu	Ma Yan Chaung	School	3	4
R31	Kyunsu	Lin Ma Lo	Jetty	5	4
R32	Kyunsu	Ma San Pa	Concrete Footpath	4	4

2.2 Technical Design Quality

The Technical Quality of the designs was variable even within the different categories of SP, and is dealt with in detail in the sub-section for each SP type below. Improvements are recommended in preparation of the designs and drawings and particularly in detailing. In the first cycle all SP were rehabilitations or extensions of existing works. The technical design details were influenced by the quality of the works being rehabilitated. In future cycles it will be necessary for the CDD Project to establish its own technical quality standards. Standard drawings should be prepared using the experience of the first cycle SP to help share experiences and develop an common understanding of the technical quality should be achieved by all CDD SP. It is the project management's responsibility to develop and communicate this standard to ensure it is understood by all technical and community facilitation teams and by the communities.

2.2.1 Road Sub-Projects

The road SP inspected ranged from concrete village roads wide enough for vehicular access to an improved forest track. All road SPs were upgrading of existing roads or access ways.

Ref	Township	Village Name	Sub-Project	Technical Quality Rating
R1	Kanpetlet	Ma Kyauk Ahr	Footpath	**2**
R5	Kanpetlet	Kant Thar Yon	Linking Road	3
R17	Namhsan	Za Yang Ywar Ma	Concrete Road	4
R19	Namhsan	Man Pang	Side Drain	4

Ref	Township	Village Name	Sub-Project	Technical Quality Rating
R20	Namhsan	Ho Chit - Sa Khan Thar	Concrete Footpath	4
R21	Namhsan	Li Lu	Concrete Bridge	4
R25	Kyunsu	Mawng Hlaw Auk	Bridge	4
R29	Kyunsu	Htein Chaung	Concrete Road	4
R32	Kyunsu	Ma San Pa	Concrete Footpath	4

Road Construction or Rehabilitation Sub-Projects present challenges for Community Driven Development because the communities place priority on opening access over durability of infrastructure investments and their ability to maintain roads after completion. They also present major challenges for Environmental Safeguards and compliance with the ECOP. Road projects are expensive so compromises are made in the design to fit within the available budgets.

The high rating from the Technical Audit, which found that seven of the nine road SP were of good quality, is because these particular road projects were small concrete works inside existing villages (four concrete roads/paths, two concrete/timber bridges and concrete side drains). These investments are durable, low maintenance and are good examples of the types of road projects a CDD project should support.

Kant Thar Yon Linking Road is an earth road in a village that was improved and widened by two feet. Side drains were constructed but the road has no camber and no culverts so water drains along the road and is eroding the earth surface. It needs to be upgraded to a permanent road with a stone or gravel surface, cambered so the runoff reaches the side drains and three culverts are required before it can be considered a complete SP. Because the road is inside a village, it is likely to be maintained by the community. While additional works are necessary, the works completed were an improvement on the existing road and did not cause any additional issues with the environment, so the road is still conceded a good SP. This type of village road can be addressed by CDD projects but the design of the road should be for complete works, where complete road works is defined as concrete, gravel or stone surfaced road with a road camber, side drains, erosion and landside protection and water drainage structures. Earth roads without any surfacing should not be used for cars and trucks, so there should be no need to widen the road.

Ma Kyauk Ahr Footpath is a track through a protected forest. Two months after completion there have been landslides and erosion issues which cannot be addressed because the community is not permitted to cut trees in the area and consequently cannot cut back the side slopes or construct erosion protection embankments. This is an example of the type of road sub-project that should be avoided. It should not pass the environmental screening stage if the technical issues cannot be addressed. The ECOP forms were completed but in practice the recommended mitigation measures were not followed.

The township project reports and the presentations during the Multi-Stakeholder Review noted that there are road sub-projects in hilly areas, particularly Namhsan Township, where the ECOP requirements for erosion and landslide protection cannot be met. The April-June Quarterly Report for Namhsan give examples of roads SP (Heik Tan, Man Kan and Man Paing) being blocked by landslides or erosion only a short time after completion. Project staff reported that the

damage has now been cleared and the roads reopened. Landslides are potentially dangerous and likely to continue to effect SP constructed in mountainous areas. If the experience of cycle 1 is that road subprojects in mountainous areas cannot meet the ECOP requirements then these types of road SP should be avoided in subsequent phases.

There was discussion during the Multi-Stakeholder Review on multi-year SP where a section of road constructed in one year is continued the following year. The majority opinion during this discussions was that such projects could be approved providing each section of road reached an intermediately goal which in itself could be evaluated as a complete sub-project. A good example of where this worked well would be the concrete footpaths in Sa Khan Thar Village where several lines are complete but they plan one additional line and drainage improvements in the next cycle. Experience in other countries is that multi-year funding has been used for overly ambitious SP to overcome budgeting constraints and resulted in poor quality or incomplete road works. The consultant recommends that the risk of unsatisfactory CDD road projects is minimized by having strict criteria to avoid known issues. If multi-year SP's are allowed, then strictly applying the criteria that the SP must be for complete road works and that the ECOP must be applied at every stage should help to avoid these known issues.

Recommendations

- CDD road SP should be small permanent works linking villages, such as concrete footpaths, concrete side roads, culverts, small bridges or concrete side drains.
- Road construction SP designs should be for complete roads, including road surfacing, erosion protection, landslide protection, side drains and water drainage structures.
- Long road or footpaths in rural areas should be avoided because of issues with the community's ability to meet the maintenance requirements and the difficulty in applying the ECOP requirements.
- Roads which cannot meet the ECOP requirements should not be approved.

2.2.2 Building Sub-Projects

The building sub-projects were for the rehabilitation or extension of schools and community halls, and for the construction of school fences.

Ref	Township	Village Name	Sub-Project	Technical Quality Rating
R3	Kanpetlet	Par Kun	School Rehabilitation	4
R8	Kanpetlet	Tin Pon Kyinn	School Extension	4
R9	Kanpetlet	Auk Hle	School Extension	4
R10	Kanpetlet	Hoke Pon Kyin	School Extension	4
R12	Namhsan	Kyauk Hpyu Ywar Ma	School Fence	4
R13	Namhsan	Nam Len	Community Hall	4
R16	Namhsan	Za Yang (North)	School Fence	4
R22	Kyunsu	Zay Ka Mi	School	4
R24	Kyunsu	Shwedu/Taungpuu	School	3
R26	Kyunsu	Yataung Adwin	School	4

Ref	Township	Village Name	Sub-Project	Technical Quality Rating
R30	Kyunsu	Ma Yan Chaung	School	3

All the buildings SP inspected were of good quality because they were simple constructions using village level technology communities use to construct their own houses. Improvements are recommended in the detailed annex for each sub-project inspected but these are small improvements, such as improving the quality of painting, the fixing of gutters, including door locks in the schools or providing additional inputs like school furniture for the new classrooms.

Limiting SP to village level technology has the advantage that the works can be constructed without much technical assistance. However if improvements are to be made, such as constructing disaster resilient schools in coastal typhoon prone areas, then the CDD project would have to move beyond this simple technology and provide greater technical inputs.

The painting workmanship standard was very bad in most of the Schools inspected. The issues appeared to start from the design stage where insufficient materials were included in the BOQ. Steps should be taken to improve this by learning from the lessons of cycle 1, including sufficient materials in the BOQ, and advising communities on hiring skilled painters.

Kyauk Hpyu Ywar Ma Village School is in a mountainous village close to steep slopes and a road, so the school fence can be justified as a village investment on the grounds of safety for the pre-school and primary school children. In Za Yang Village the school fence was chosen because it benefited all the community in a village that consisted of dispersed sub-villages, but its impact on poverty is not as significant as other SP choices.

Shwedu/Taungpuu Village School had no single important issue to correct, but in general the overall quality of construction and finishing was lower than the other schools inspected, with a long list of minor issues to improve.

Ma Yan Chaung School veranda construction is of good technical quality but un-insulated electric wires were installed under the newly constructed veranda roof and this should not be allowed in any public building.

No Asbestos Cement Materials (ACM) was used in any of the constructions inspected. Asbestos cement ceiling and roof tiles are readily available in Myanmar and can be very difficult to identify in the field. Training of technical staff should include asbestos awareness to avoid potential risks of accidental use.

Recommendations

- Building designs should be detailed enough to include the required fittings for doors and windows.
- Larger Building SP which may be undertaken in later cycles will require much greater technical inputs in the design. This should be prepared for by improving the projects standard designs which can be used as a guide for the township level technical facilitators.

- There is a need to improve the quality of painting, starting from the SP design which must include sufficient materials to do this properly.
- Un-insulated electric wires should not be used in public buildings.
- Training of technical staff should include Asbestos Awareness to avoid potential risks of accidental use of ACM.

2.2.3 Water Sub-Projects

The Water Supply Sub-Projects inspected where either the rehabilitation of Gravity Fed Water Supplies (GFWS) or Pumped Water Supply.

Ref	Township	Village Name	Sub-Project	Technical Quality Rating
R2	Kanpetlet	Saw Laung	Water Supply	4
R4	Kanpetlet	Saw Chaung	Water Supply	4
R6	Kanpetlet	Maw Chaung	Water Supply	**2**
R11	Kanpetlet	Pan Taung	Water Supply	3
R18	Namhsan	Ngun Hseng	Water Tank	3
R23	Kyunsu	Pan Taung	Water Supply	2
R27	Kyunsu	Min Goke	Water Tank	4

The quality of the first two water supply SP inspected was good as they provided new tap-stands to existing systems, delivering a safe water supply to the communities. The technical Audit has concerns about the quality of materials used in all water SP, but as these are rehabilitations of existing systems it is recognized that many construction details are outside the control of the technical teams.

Maw Chaung Village GFWS rehabilitation included an intake, filter, reservoir and some pipe replacements, but it did not include water tap-stands in the village because there were insufficient funds available in the budget to complete all the required works. Water is currently delivered to the village though un-attached pipes, as shown in the photographs in the detailed annex of this report (Ref R6). This is not considered a SP with of good Technical Design Quality because it does not deliver a safe durable water supply to the community. The quality of construction of the reservoir which was included in the SP should also be improved. The drawings had insufficient details of fittings and no overflow was constructed.

Pan Taung Village water system is incomplete, as only a new reservoir was constructed. Additional water pipes from other donors will be required to make it functional. The technical quality of what was constructed was good, but looked at as a complete SP it is currently non-functional. Ngun Hseng village water system is fully functional but the technical design inputs were not sufficient. The system relies on one person to operate pumps and distribute water by opening and closing valves when it should be automated.

Pan Taung Village water supply does not have a protected water intake so the water cannot be considered safe for drinking. The quality of construction work could be improved, and the area

around the water tank needs to be protected from flooding, but the system has the potential to be a successful and very useful SP with some improvements.

The materials used for water supply distributions and the standard of design observed in the two townships is not as high as the standard used regionally, and does not meet the standard that was anticipated by the ECOP. All water supply systems used uPVC piping instead of HDPE pipes, no galvanized pipes or valves were used in exposed areas, pipes were not buried the recommended depth and no protection boxes were constructed around valves and fittings. The ECOP recommends that uPVC is not used in places where it is exposed to sunlight because UV rays cause the uPVC to become brittle. It is also possible to protect the exposed uPVC by painted it, as recommended in this report. The Project needs to address these issues by issuing clear technical guidelines for water systems and if necessary amending the ECOP to reflect these standards.

Given the design issues observed in existing systems, training of the Technical Teams in GFWS construction is recommended, to improve the standard of design and so that better advice can be given to communities. In CDD projects the technical staff will have different backgrounds and experience and opportunities to share this experience and learn from successful SP should be explored.

The water supply systems did not have any significant environmental impact as they were rehabilitations of existing systems and waste water was diverted to agriculture areas. Small improvements are needed in erosion protection as noted in the detailed technical annex.

Recommendations

- Clear technical guidelines and standards should be issued for the design of water supply systems and the ECOP should be amended if necessary to reflect these guidelines. These guidelines should include standard designs and template BOQ.
- Training should be arranged for Technical Teams in GFWS construction, to improve the standard of design and so that better advice can be given to communities.
- Exposed uPVC pipes should be painted to prevent UV damage.
- VPSC plans should include approximate budgets and SP allocations should be based on the actual cost.

2.2.4 Irrigation Sub-Projects

Ref	Township	Village Name	Sub-Project	Technical Quality Rating
R7	Kanpetlet	Hpone Twi Khi	Irrigation	3

A Technical Design quality rating of good quality but requiring additional works was given to Hpone Twi Khi Irrigation SP because repair works are required to one section of the rehabilitated canal. This section was temporarily repaired with wood but it should be permanently repaired with stone and mortar in the dry season. Also the VPSC should have been

advised to construct a small spillway to allow excess water to overflow the canal in a controlled way.

The Irrigation system delivers multiple benefits and should be considered a successful SP even though additional works are required. The water is also used to power a low head hydro electricity generator for the village and the wall of the canal is used as an access path by villagers living further upstream.

Recommendations

- The SP should be repaired at the end of the rainy season permanently fixing the short damaged section at the start of the canal wall.
- Future designs should include a spillway so that excess water can be released in a controlled manner.

2.2.5 Electricity Sub-Projects

No	Township	Village Name	Sub-Project	Technical Quality Rating
R15	Namhsan	Ho Nam	Hydro	2
R28	Kyunsu	Leik Kvei	Hydro Power	2.5

The foundation of the reservoir tank for Ho Nam Hydro hydro-electricity SP has been eroded away by water over-topping the tank. The tank is on a steep hill side and is unsafe, posing a risk to the operators of the hydro generator lower down the hill. The tank should have an overflow large enough to take excess water safely away from the structure and repair works are urgently needed to reinforce the foundation.

Better design and supervision of the works could have avoided this issue.

The Leik Kvei hydro power SP requires additional concrete supports to the pipe supplying the turbine. This falls between a rating of 2 and 3 because the additional works are required but they are not major works and it should be within the capacity of the VPSC to make these improvements.

Recommendations

- Repair works should be carried out urgently to the eroded foundation of the reservoir tank.
- The reservoir tank should have a larger overflow to control flood waters safely.
- The water pipe supplying the turbine in Leik Kvei needs to have concrete supports.

2.2.6 Sanitation and Public Latrines Sub-Projects

No	Township	Village Name	Sub-Project	Technical Quality Rating
R14	Namhsan	Ahr Ram (Pa Laung)	Public latrine	3

Ahr Ram Public Latrine was properly designed but modifications made by the VPSC during construction to separate the male and female toilets into separate blocks resulted in the male toilets have some design compromises. The male toilet is constructed on top of the septic tanks because of limited available space. It has a small manhole, so it can be pumped out, but the access is too small for cleaning or repair. The effluent pipe from the septic tank is very small and drains into an open drain beside the community hall. There were no major issues with the female toilet which followed the original design in layout.

As was the case with water SP, the uPVC pipe work is exposed and unpainted and will be damaged by sunlight. It is not securely fixed in many places. The ECOP recommends using metal pipes for all exposed areas, but as the latrine has already been constructed, it should be sufficient to fix the pipes securely and paint them to protect against UV light.

There was an opportunity for better technical facilitation in making these design changes.

Designs of public latrines constructed in Kanpetlet Township were reviewed, but because of road conditions it was not possible to visit the SPs. These latrines were constructed with an unlined soakage pit instead of a septic tank, similar to the design of a DRD standard household latrine. Latrine designs like this were used for schools in Northern Lao by MOE in 2007, and after one year it was found that a large percentage of the pits collapsed, so the designs were modified to use brick or concrete soakage pits. It is recommended that the CDD Project discontinue using unlined earth soak pits for public latrines. The ECOP is clear that all public latrines must have a septic tank, so if the ECOP was followed these designs would not have been approved

Recommendations

- All exposed uPVC pipes should be painted to protect them from UV damage.
- The septic tank overflow should be modified so that it drains to a soakage area.
- Better designs and specifications are required for public latrines with agreement between the ECOP and the DRD/Project specifications.

2.2.7 Jetty Sub-Projects

No	Township	Village Name	Sub-Project	Technical Quality Rating
R31	Kyunsu	Lin Ma Lo	Jetty	5

Lin Ma Lo Jetty construction was awarded first prize for the best SP at the Multi-Stakeholder Review in Nay Pyi Taw. The SP clearly contributed to improving the livelihood of the village, it had a large community contribution and is of good technical quality.

Recommendations

- None

2.3 Quality Control/ Quality Assurance

Quality checklists
Quality checklists covering all SP types were in use in both Townships. The checklists are simple and without details of work items, but they meet the minimum requirement of having a technically qualified person sign that the SP meets the technical specifications of the contract including design, specifications and BOQ and are appropriate for small rural infrastructure projects implemented by communities. Some TFs filled out the Quality Checklists and ECOP forms together on the same day while others completed relevant sections after each field visits. To encourage TF to complete the quality checklists after each field visit it would be useful if the checklists were organized by important construction milestones.

Larger more complex constructions (like the MOE approved standard school design used by DRD) would benefit from checklists tailored specifically to the design and including measurement criteria. In the first cycle of implementation all SPs were for rehabilitation works but as the CDD project progresses more complex constructions are likely to become more common.

Contract Management Forms
The Technical Facilitators have forms for managing contracts, forms for progress payments, rectification of defects and certification of completion works. During the SP documentation review missing forms or unsigned forms were noted in a few cases but these were an exception, possibly due to forms being misplaced during audits, and in general all the SP files were complete and consistent in the three townships.

Construction Site Log Books (Site Books)
There was no record of technical supervision/facilitation in the majority of SP inspected, so in many cases is not possible to check if defects were reported by the TF and rectified by communities or contractors. Discussion of SP implementation issues highlighted some examples where corrections were made.

All technical instructions and advice issued to contractors or communities by the Technical Facilitators (TF) should be in writing so there is a record in the event of disputes and so that the work of the TF can be monitored and supervised. The written record is checked during subsequent inspections to make sure the instructions and advice was followed and provides important continuity when different technical teams or individuals carry out SP inspections. The records are also checked during technical supervision missions to gain an understanding of the technical issues and check the quality of technical supervision/facilitation.

In one SP inspected the TF used the VPSC guest book to issue his instructions/advice in writing. It is recommended that this practice is adopted for all SP. A dedicated technical section can be added to the existing book.

Technical Specifications
Standard Technical specifications for Buildings, Roads and Structures have been prepared and distributed to the townships. These standards are too complex for the simple CDD rehabilitation SP of Cycle 1, but will become more useful for larger contracted works in the future. They were not used in the design of the SPs inspected.

A sample set of DRD designs with BOQ were also distributed. The technical teams reported in the Multi-Stakeholder Review that the DRD sample designs and BOQ were very helpful, saving time in design and preparation of SP. These designs are a mixture of templates for different types of SP and sample designs in PDF format for actual projects. Template designs and template BOQ which can be adjusted to specific requirements are needed for all SP types. It is recommended that the DRD package of designs and BOQ be further developed with the experience of Cycle 1 SP implementation into a set of template standard designs for CDD SP.

The technical teams reported that they had insufficient time to prepare complete drawings for SP in cycle 1. The teams were instructed to make simple sketches, and these sketches often lacked sufficient technical details for implementation and supervision. Many mistakes were noted including contradictions in key dimensions, and missing items from the BOQ. In Namhsan the engineer responsible for the estimation could not visit all the SP sites in the time available so he received site survey reports from the CFs on the requirements. In Kanpetlet the engineer reported that he visited most of the sites but that the survey and design work was rushed so that it could be complete on time. The simple design documentation and lack of detailed specifications makes it difficult to verify that constructions followed specifications. However the materials in the BOQ were the same as those purchased and delivered to the SP, and the TF sighed that the SP were of acceptable quality in the quality checklist.

In the second cycle the technical teams will be better prepared for the design phase with more staff and many SP similar to cycle 1.

Materials

The materials used in the SP were limited by what was available in local markets and were largely consistent with the BOQ. The construction material shops inspected had limited stocks of materials so communities needed to palace orders and issues were reported with the materials supplied differing from what was ordered. There were also cases observed where required items were omitted from the design BOQ, but the procurement process was flexible enough to allow change where the issues were identified before procurement was finalized.

The VPSC's reported that the TF's helped them identify materials of suitable quality for the SP. In many SPs they also reported that the Mason (Skilled labour) went with the procurement teams to check the quality of construction materials before purchase and delivery to site. The Township technical teams reported that there were issues where VPSC ordered materials from outside the township and materials as delivered did not conform to the specifications, but this was not noted in the SP inspected.

Recommendations

- More complex SP designs, such as the MOE approved standard design for a School Construction, would benefit from a more detailed Quality Checklist specifically for the design.
- To encourage TF to complete the quality checklists after each field visit it would be useful if the checklists were organized by important construction milestones.

- All technical instructions and advice to contractors and communities should be issued in writing in a Construction Site Long Book (Site Book). This "Site Book" can be one section of the existing VPSC guest book.
- Standard drawings BOQ templates and specifications should be prepared based on the experience of the first cycle and updated after each SP cycle.

2.4 Technical Assistance, Supervision and Infrastructure Management

Technical Assistance

The technical support for the cycle 1 SP was primarily from the NGO's contracted for Township technical support. The site surveys and designs were completed by the Township Technical Advisor (TTA) and in some cases the TTA did not have sufficient time to visit the SPs for the site survey. During implementation the Technical Facilitators (TF) conducted site visits to all SP, with most VPSC reporting at least a visit before, during and on completion of the SP. However the number of TF was insufficient for the number of SPs during this critical period. The VPSCs also reported that the received technical support from the DRD infrastructure counterpart during the implementation period.

The package of materials prepared for the townships level included the following documents, designs and estimates.

- O&M: Planning and Implementation of O&M with corresponding training materials for (1) Buildings, (2) Roads, (3) Water, (4) Electricity and (5)Sanitation.
- Contract Administration Documents for contractors (Sample invoice, payment request, progress payment forms, defects rectified forms etc.).
- Substantial completion certificate, final completion and handover certificate.
- Checklists for complying with ECOP for all major SP types and ECOP training materials.
- Quality Checklists for Buildings, Roads and Water sub-projects.
- Standard Specifications for Buildings, Roads and Structures.
- DRD standard designs
    - Road Designs (Drawings and Estimate)
    - Bridges and culverts (Drawings and Estimate)
    - Buildings (Drawings and Estimate)
    - Water Supply (Drawings)
    - Electrification (Estimates)
    - Sanitation (Drawings)
    - Road and Bridge designs (Drawings and Estimate)
- MOE Standard School Design Drawings

The Technical teams reported that the DRD standard drawings and estimates were most useful to them in preparing the SP designs. These drawings are mostly in PDF format and are difficult to modify for specific SP, which is why the TTA frequently used simple sketches instead of drawings for the actual contract documents. When the PDF files were copied directly in village documents the dimensions on the drawings often differed from what was constructed in the village and leading to confusion between the drawings, BOQ and requirements of the SP.

Typically only the architectural layout drawing was included, so most of the required technical details was missing from the SP design documents available to the VPSC, contractors and builders. In this case the BOQ becomes the most important document for managing the supervision of the constrictions but there were frequent errors in the BOQ also.

The standard of technical detail in the DRD drawings is variable and should be improved. The MOE Standard School Design Drawings is an example of a complete drawings set with all the required details.

It is recommended that these drawings, estimates and specifications be consolidated into single format which can be used and modified by the Townships. The first step in this process should be collecting examples of good SP designs from Cycle 1 so that the designs are focused on what is needed in the townships.

Selecting the best format for the designs so that they can be edited easily at township level is difficult because the industry standard is AutoCAD which is prohibitively expensive and requires experienced professionals to use properly. During the technical learning session the Technical Audit Consultant suggested using a shareware 2D drawings software package which is very easy to use but can still save drawings in a format that can be imported into AutoCAD, providing an upgrade path should the project hire an Architect to consolidate the designs in the future. A copy of this drawing package was provided to Union TA for testing by the DRD Engineers after the learning session.

Feedback during the technical learning session suggested that the cost estimates must be based on local cost of materials at township levels. There should be a survey of material cost at the local markets before the start of each cycle of implementation and the cost estimates in the BOQ should be based on this survey. However it is labour intensive to update each BOQ for local material costs because it involves going back and recalculating the unit rates of each major construction items like brickwork, concrete, plaster, door and windows. The DRD engineers have a Government approved "Yellow Book" to help with these calculations. The Technical Audit Consultants recommends automating the calculations in an excel spreadsheet so that the BOQ for standard projects are generated automatically when the material cost is updated. An example of how this is done for a school construction was provided after the technical Learning Session but the worksheet is in metric so it would needed to be updated to the rates used in the Yellow Book using imperial measurements.

In the first cycle some water supply and road projects were incomplete in that the SP designs did not meet the full requirements of the ECOP or Technical Specifications because of budget constraints. This includes the water SP where only part of a water supply system was repaired but the critical water taps for delivery of safe water to the community were not included in the SP. The Procurement Section of the Operational Manual states that any project that does not meet the required technical and quality specifications is not eligible for funding. The facilitators need to make this clear to the communities during project preparation. Approximate budgets for SP and O&M costs should be prepared for each SP type in the village plans so the communities are fully informed of the associated costs.

The Townships DRD Offices require some additional technical equipment for survey and design of SP. The only tools that were observed were profile boards used for road construction. The following list of needed materials was developed through discussion at the technical learning session.

Tools required at Township DRD Office

- Automatic levels (required for any new gravity water supply system and for irrigation works)
- Plastic tubes or line levels (roads and buildings)
- 5 m and 100 m tape measures (for buildings, road, irrigation and water supply)
- Vernier Calipers (for construction material survey)
- A Schmidt type concrete rebound hammer to test concrete quality.

Supervision

There were insufficient Technical facilitators for the number of SP implemented in cycle 1. One TF in Namhsan reported that he supervised forty SP and he was able to inspect each SP every six weeks. With this level of technical support, it is not possible for the TF to be at the SP sites while critical works are carried out. In the first cycle many of the SPs were simple rehabilitations or extensions while in future cycles more complex SP, requiring better technical support, are expected. In Kyunsu the Technical facilitators were unable to visit all SPs because of the travel time to remote villages. There were 46 SP with no TF in Cycle 1.

The current staffing level and number of SP per township is given in the table below. Namhsan has difficulty getting technical staff because it is remote and there are security problems in the region. Community Facilitators with technical backgrounds reported that they assisted with the supervision in this Township.

Township	TTA	TFs	Sub-Projects	No of SP / TF
Kanpetlet	1	4	97	24
Namhsan	1	3	117	39
Kyunsu	1	4	149*	37

* Only 103 of these SPs had a TF visit during implementation.

Each SP type should have a list of milestones when the TF must be present to check the works. There will be six or more milestones for a medium sized SP taking eight weeks to implement. Calculating the exact number of visits from the milestones is not simple because in practice some sites have more difficulties and require more time than others, but as a general rule for rural infrastructure CDD projects, the TF should visit the site on average once per week during implementation. This should be about 10 to 15 SP per TF, depending on travel distance between SP. Some SPs will be difficult to supervise, and special arrangements can be made on these sites to train the Mason (Chief of the Skilled Workers) or VPSC members on these sites. Many VPSCs reported that the Mason assisted them in checking the quality of construction materials procured, so in practice the communities are already taking advantage of local technical knowledge.

The VPSCs reported that both the TF and DRD staff provided technical assistance during implementation, sometimes travelling together and sometimes separately, but in many cases they knew people by name or face and did not distinguish between groups.

Infrastructure Management

The majority of SP's were completed on schedule in the two townships visited. The implementation period was between one and three months. In Kanpetlet all SP were complete at the time of the technical audit in early August. The documentation reviewed for Namhsan Township listed four incomplete SP's, but at the Multi-Stakeholder Review it was reported that all SP are now complete.

The successful completion of all cycle one sub projects in a period of one to three months is an important achievement of the CDD project. The issue of SP implementation in the main agricultural season when there was a shortage labour was overcome. The good community cooperation and participation evident in the SP inspected must be maintained going forward while the quality of all SP is improved to the required technical standard.

The VPSC reported using a mixture of forced account and contracting for SP implementation. The main reason for using contractors was because labor was difficult to find during the SP implementation period, which coincided with the tea harvest. When discussing future plans for the villages, the VPSCs reported that they would use contractors for SP that required special equipment, like compaction equipment for roads. There was no noticeable difference in the quality of community force account and contracting in the SP inspected.

Recommendations

- On average a TF should visit each the SP once a week during the critical period of construction. This usually means 10 to 15 SP per TF, depending on the travel distances.
- Each SP type should have a list of milestones identified in the implementation plan where the TF is required to visit the site to check the quality of construction.
- DRD Township offices need a minimum level of technical equipment for use by the Technical Support Engineers for survey, design, monitoring and supervision of SPs.
- VPSC plans should include approximate budgets and SP allocations should be based on the actual cost.
- Standard designs, BOQ and specifications should be compiled using the experience of successful projects in Cycle 1. Use these to communicate the minimum standards for SP to project technical staff and VPSC.

2.5 Operation and Maintenance

All SPs inspected had O&M plans including cost estimates for the major items in the first three years of operation, whether these costs were to be met by community or the responsible government department and signed commitments from community members to contribute either cash or labour for the maintenance requirements. These O&M plans included a planned schedule for the maintenance activities. These plans followed the standard formats prepared for each major sub-project type (buildings, roads, water, electricity and sanitation) and with

corresponding training materials showing good and bad practice. These plans were understood by the O&M committee members who had participated in making the plans.

Because the SPs were just completed, most did not require any maintenance at this stage. Only two of the twenty one SPs inspected reported carrying out maintenance on the new works and there was no case of Government maintenance observed. Maintenance activities were observed on one SP where a broken section of a canal had been repaired and minor maintenance was reported for one earthen road where road drains had been cleared of small blockages. In the first case broken canal section was a technical defect in implementation identified when the irrigation canal was first used, and in the second case the blockage should be considered normal usage. The SPs were rehabilitations of existing works, so additional Government inputs or staff or equipment were not required to make them functional.

When discussing the SP's maintenance requirements with the VPSCs, it was clear that although they understood what was written in the O&M plan, they often had separate plans for maintenance activities not reflected in these plans. Most planned to carry out maintenance activities at the end of the rainy season, not at the times written in their maintenance plans. Many sub-projects, including some water supply sub-projects, some schools and the electricity sub-project had existing O&M committees which had not been incorporated into the O&M planning. There should be no need for a school fence O&M committee in a school which has a schools parent's committee responsible for school maintenance.

The pumped water supply SP had user contributed funds in a bank account which it uses to pay the cost of electricity for the pumps. The hydro-electricity SP had monthly user fees and a villager is paid to operate and maintain the hydro-generator. The O&M plans should be tailored to the specific needs of the SP type. Some high maintenance SP types will require fund raising mechanisms.

Recommendations

- The training materials for the O&M plans should have sample budgets and maintenance schedules that are realistic for each SP type.
- Projects with high maintenance requirements like water supplier or village electricity should have an agreed mechanism for collecting funds or fees for maintenance and repairs. Examples of user regulations should be shared with the communities and mechanisms agreed before SP approval.
- The community and technical facilitators should be trained take existing O&M systems into account when establishing O&M regulations for the SP.
- SP should be durable to minimize O&M requirements. Standards should be set at Union level and technical teams trained in these standards.

2.6 Environmental and Social Safeguard

The Environmental and Social Safeguards forms (Form 8. Safeguards Screening Form) was used in all SP inspected. Environmental and Social issued were noted in three SP as noted below.

Ref	Township	Village Name	Sub-Project	E&S Safeguards Rating	Remark
R1	Kanpetlet	Ma Kyauk Ahr	Footpath	2	Should have an EMP
R17	Namhsan	Za Yang Ywar Ma	Concrete Road	2	Different payment to Male and Female workers
R18	Namhsan	Ngun Hseng	Water Tank	2	Different payment to Male and Female workers

Environmental Safeguards

Ma Kyauk Ahr Footpath is a two mile track linking the village to the township, used by all the villagers. The middle school students use the track to walk to school. The footpath was constructed through a forested area. The VPSC reported that it was not possible to implement the ECOP requirements for slope protection because the forest is a protected area and they are not permitted to cut trees. The footpath has landslide and erosion problems only a few months after completion. The VPSC reported that they will repair the footpath in the dry season, but no repair work has been done to date, and without slope and embankment protection, the erosion and landslides will reoccur in the following rainy season.

The Safeguards Screening form section E1 Natural environment asks *"Are there any environmentally sensitive areas … that could be adversely affected by the sub-project?"* and *Natural forests* are listed as one of the examples. The community reported that the forest is protected, so the answer to this question should be *YES*, and an Environmental Management Plan would be required, detailing the issues and the mitigation measures. If it is not possible to implement these mitigation measures, then the SP should not be approved. In the first cycle, any SP requiring an EMP should not have been approved.

In Kyunsu many villages do not have official land title deeds so the villages are technically on government owned land. The safeguards screening questions related to forests could be open to interpretation where the villages are close to or in forested areas. However, none of the SP inspected in Kyunsu has adverse impacts on the environment.

Social Safeguards

The VPSCs in Za Yang Ywar Ma and Ngun Hseng both reported paying different wages to unskilled male and female worker. The Safeguards Screening form says that where villagers are employed in the SP, the Block Grants should be used to determine the daily wage and the Operations manual states that projects which do not provide equal pay for equal work for women and men are not eligible for funding. In all other SP the VPSCs reported that they used these standard rates, and shared work between households so that both male and female workers participated in the SP.

In Za Yang Ywar VPSC no clear reason was given why female workers were paid less than the standard rate, while in Ngun Hseng the problem was that they could not find sufficient labour, particularly male laborers, so they offered higher wages to those who did participate

The VPSCs reported that there were voluntary land donations in one SP. The Voluntary Donation of Land and Assets Agreement Forms were used to document the donations, and no compensation payment was reported. Most SP did not require land or asset donations because they were rehabilitations of existing works.

Recommendation

- Additional training is required for all levels (Township, Village Tract and Village) in implementation of safeguards procedures and the ECOP. This training should use real examples of SP that have safeguards issues. If it is not possible to meet the safeguards requirements and ECOP guidelines then the SP should not be selected for implementation.
- It is recommended that in all cases male and female worker are paid the same daily rate for the same work. Where there is a labour shortage workers can be paid unit rates for work completed, or different categories of work can be created with different skill/difficulty levels and different rates for these levels.

2.7 Summary of Main Findings and Recommendations

No	Finding- Technical Design Quality	Recommendation
1	Some road SP did not met the requirements of the ECOP.	Projects which cannot meet the technical and Quality Specifications or the ECOP requirements should not be approved.
2	The Rehabilitated Water Supply Systems inspected during the Technical Audit were of inferior design to the standards used regionally and did not meet the requirements of the ECOP.	Clear technical guidelines and standards should be issued for the design of water supply systems and the ECOP should be amended if necessary to reflect these guidelines. These guidelines should include standard designs and template BOQ. Exposed uPVC pipes should be painted to prevent UV damage.
3	The design of many GFWS did not appear to have good technical foundations.	Training should be arranged for Technical Teams in GFWS construction, to improve the standard of design and so that better advice can be given to communities
4	The Public latrine designs used in some SP and the DRD specifications are different from the ECOP requirements.	Better designs and specifications are required for public latrines with agreement between the ECOP and the DRD/Project specifications.
5	Un-insulated electric wires were installed in a newly renovated school.	Un-insulated electric wires should not be used in public buildings.

No	Finding- Technical Design Quality	Recommendation
6	Asbestos materials were not used in any SP inspected, but they are widely available in Myanmar.	To avoid future problems, training of technical staff should include Asbestos Awareness to avoid potential risks of accidental use of ACM.

No	Finding- Infrastructure Management	Recommendation
7	Most of the Infrastructure projects inspected were of good quality. The communities and project teams did a good job given the time, and staffing constraints.	The good community cooperation and participation evident in the SP inspected must be maintained going forward while the quality of all SP is improved to the required technical standard.
8	There are too many SP for the technical teams to inspect and give advice to communities at critical points during the constructions. This limits technical quality to what the communities can achieve by themselves.	On average a TF should visit each the SP once a week during the critical period of construction. This usually means 10 to 15 SP per TF. If it is not possible to reduce the workload to 15 SP, then builders should receive training in required quality standards.
9	The SP budget is sometimes too small for the planned activity, particularly in Village Tracts with six or more villages. Some SP are incomplete because there was insufficient budget allocated for a proper design.	VPSC plans should include approximate budgets and SP allocations should be based on the actual cost.
10	SP designs vary considerably in durability and expected operational life reflecting design choices made to complete SP within the allocated budget.	SP should be durable to minimize O&M requirements. Standards should be set at Union level and technical teams trained in these standards.
11	Many SP are incomplete, requiring additional works to become fully functional.	All infrastructure SP should result in completed SP that can be evaluated separately from other works.
12	Project design (drawings and specification) should be improved. Simple sketches of required works are insufficient to insure good quality constructions for more complex projects.	Compile standard designs, BOQ and specifications using the experience of successful projects in Cycle 1. Use these to communicate the minimum standards for SP to project staff and VPSC.

No	Finding – QA/QC	Recommendation
13	No detailed records of construction activities or supervision activities were available.	Site Books should be used to record in writing construction activities and technical instructions/advice to Communities, Contractors or Skilled laborers.
14	Quality Checklists were in use for the SP inspected.	Continue to develop the Quality Checklists so they document that SP meet the technical

No	Finding – QA/QC	Recommendation
		specifications at the key milestones of constructions. More complex SP designs, such as the MOE approved standard design for a School Construction, would benefit from a more detailed Quality Checklist specifically for the design. To encourage TF to complete the quality checklists after each field visit it would be useful if the checklists were organized by important construction milestones.

No	Finding – O&M	Recommendation
15	O&M plans are not always realistic.	The training materials for the O&M plans should have sample budgets and maintenance schedules that are realistic for each SP type.
16	O&M plans with lists of people pledging future contributions are not suitable for all types of SP.	Projects with high maintenance requirements like water supplier or village electricity should have an agreed mechanism for collecting funds or fees for maintenance and repairs.
17	O&M committees duplicate existing O&M systems in some SP.	The community and technical facilitators should be trained take existing O&M systems into account when establishing O&M regulations for the SP.

No	Finding – E&S Safeguards	Recommendation
18	Most SP was in village areas and had positive impacts of the Environment (improved drainage, erosion protection etc.) All SP should be improved. One SP had negative environmental impacts.	SP outside village areas (roads, irrigation) must get special attention during screening. TF should be trained using real examples of SP which are problematic.
19	Implementing SP in the harvest season created an artificial labour shortage and has resulted in some inequalities in payment to men and women. Market labour costs are higher than the SP labour rates during harvest.	Implement SP earlier in the year, taking into account the seasonal calendar. An alternative to paying fixed wages is to pay for unit work completed.

3. Conclusions

The Technical Audit found that while every Sub-Project needed improvements, the overall quality of sub-projects implemented was acceptable. Of the thirty two sub-projects inspected, only five had technical quality issues (16%) that needed immediate repairs or interventions. One reason why this was achieved was that the sub-projects in the first cycle were limited to a closed list of sub-project types, mostly small rehabilitation works using village level technology, and to sub-projects that did not require an Environmental Management Plan, substantially reducing risks by avoiding sub-project types that are known from international experience to present issues in CDD Projects.

Road SPs present the greatest challenges for meeting the Environmental and Social Safeguards, implementing the ECOP, for maintenance and for sustainability. The implementation teams reported that the ECOP cannot be implemented for many roads in mountainous areas. The successful road SPs seen in the Technical Audit, including village concrete roads and concrete footpaths, road side drains and road structures, should be taken as examples of what should be replicated in future SP, while the failures and problematic road sub-projects, with landslides, erosion and environmental issues, can be used as lessons learned and SP types that must be avoided.

In most cases the Village Tracts elected to give one SP to each village and they allocated the resources accordingly. In some cases this resulted in SPs that were under resourced and incomplete. An example is made in this report of a village where the intake and reservoir of a GFWS was rehabilitated, but there were insufficient funds for rehabilitation of village water stands. Four of the twenty-one SP inspected require additional funds to become fully complete. Better rules and procedures are required to insure the resources are available for complete SP and better planning decisions are made by the communities.

O&M planning forms and training materials were used for all SP inspected, but there was often a discrepancy between the standardized plans and the realities of the SP. O&M plans need to be tailor to different types of SP with mechanism for fundraising or user fees for high maintenance SP. More work should be done by the CF and TF to make the plans realistic for each individual sub-project.

There was insufficient technical support at village level in the first cycle of implementation. This was due to the difficulty in finding qualified TA to work in remote areas and to the fact that most villages had a SP in the first cycle instead of taking turns. There were too many SPs for the number of TF. There was also insufficient staff for the survey and design stage. This needs to be rectified before the start of subsequent cycles and in the expansion to new areas.

The standard designs used should be developed into a package of template designs in a format suitable for the CDD sub-projects. They must be editable and printable at township level, with corresponding cost estimates that can be easily updated using township level materials costs. Specifications should be tailored to these standard designs.

Technical findings of field visits

1. Introduction

The field visits for the technical audit took place from August 4 to August 17, 2014 for Kanpetlet and Namhsan Townships and from October 25 to 28 for Kyunsu Township. The consultant was assisted by two DRD Engineers Aung Khine Zaw and Win Zaw Htun, and undertook technical inspections of 11 selected SP's in Kanpetlet Township, 10 selected SP's in Namhsan Township and 11 selected SP's in Kyunsu Township, meeting with the project stakeholders to discuss project implementation issues at village, village tract and township level.

A selected sample of sub-projects was inspected in each township, subject to time constraints, access difficulties in the rainy season, and to security constraints. The Village Project Support Committee (VPSC) was interviewed at every SP visited together with representatives from Village Tract Project Support (VTPSC) in some villages. The sub-project documentation was reviewed on site following the VPSC interviews, so the design and contract documents could be directly compared to what was actually constructed. Both village level documentation and the Township SP files were reviewed. The SP's were jointly inspected with the VPSC's after the interviews.

2. List of Sub-Projects inspected

The following table lists the sub-project in the order inspected, with the reference numbers used in the main body of technical Audit report and the paragraph number of the detailed technical report. Annex 2 provides additional demographic data for the villages and the distance between the Township and the village.

Ref.	Paragraph	Township	Village Tract	Village Name	Sub-Project Type
R1	3.1	Kanpetlet	Kyet Chan	Ma Kyauk Ahr	Footpath
R2	3.2	Kanpetlet	Kant Thar Yon	Saw Laung	Water Supply
R3	3.3	Kanpetlet	Kant Thar Yon	Par Kun	School Rehabilitation
R4	3.4	Kanpetlet	Kant Thar Yon	Saw Chaung	Water Supply
R5	3.5	Kanpetlet	Kant Thar Yon	Kant Thar Yon	Linking Road
R6	3.6	Kanpetlet	Hman Taung	Maw Chaung	Water Supply
R7	3.7	Kanpetlet	Kyin Dway	Hpone Twi Khi	Irrigation
R8	3.8	Kanpetlet	Lon Ein Nu	Tin Pon Kyinn	School Extension
R9	3.9	Kanpetlet	Kyin Dway	Auk Hle	School Extension
R10	3.10	Kanpetlet	Kyin Dway	Hoke Pon Kyin	School Extension
R11	3.11	Kanpetlet	Pu Saw	Pan Taung	Water Supply
R12	3.12	Namhsan	Kyauk Hpyu	Kyauk Hpyu Ywar Ma	School Fence
R13	3.13	Namhsan	Nam Len	Nam Len	Community Hall
R14	3.14	Namhsan	Ahr Ram	Ahr Ram (Pa Laung)	Public latrine
R15	3.15	Namhsan	Ahr Ram	Ho Nam	Hydro
R16	3.16	Namhsan	Za Yang	Za Yang (North)	School Fence

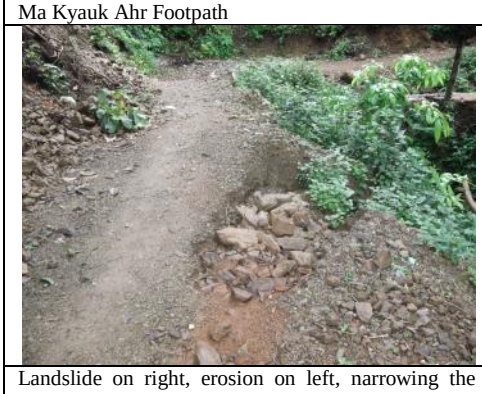
Ref.	Paragraph	Township	Village Tract	Village Name	Sub-Project Type
R17	3.17	Namhsan	Za Yang	Za Yang Ywar Ma	Concrete Road
R18	3.18	Namhsan	Ngun Hseng	Ngun Hseng	Water Tank
R19	3.19	Namhsan	Hpa Yar Gyi	Man Pang	Road Side Drain
R20	3.20	Namhsan	Man Kan	Ho Chit @ Sa Khan Thar	Concrete Footpath
R21	3.21	Namhsan	Li Lu	Li Lu	Bridge
R22	3.22	Kyunsu	Zay Ka Mi	Zay Ka Mi	School Renovation
R23	3.23	Kyunsu	Zay Ka Mi	Pan Taung	Water Supply
R24	3.24	Kyunsu	Zay Ka Mi	Shwedu/Taungpuu	School
R25	3.25	Kyunsu	Mawng Hiaw	Mawng Hlaw Auk	Bridge
R26	3.26	Kyunsu	Mawng Hiaw	Yataung Adwin	School
R27	3.27	Kyunsu	Min Goke	Min Goke	Water Tank
R28	3.28	Kyunsu	Kat Ta Lu	Leik Kvei	Hydro Power
R29	3.29	Kyunsu	Kat Ta Lu	Htein Chaung	Concrete Road
R30	3.30	Kyunsu	Ka Pa	Ma Yan Chaung	School
R31	3.31	Kyunsu	Ma Ai	Lin Ma Lo	Jetty
R32	3.32	Kyunsu	Ma Ai	Ma San Pa	Concrete Footpath

3. Detailed Sites Visit Report with Specific Technical Recommendations

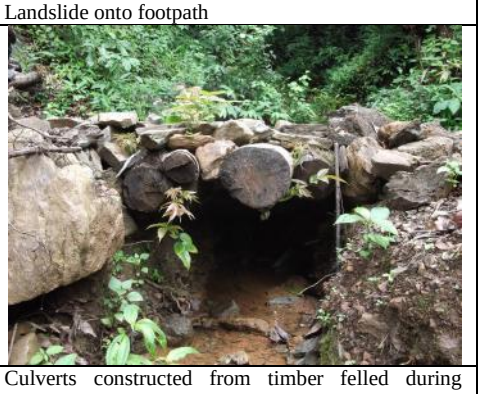
3.1 Ma Kyauk Ahr Footpath Rehabilitation, Kyet Chan Village Tract, Kanpetlet Township.

Ma Kyauk Ahr Footpath

Landslide onto footpath



Landslide on right, erosion on left, narrowing the effective with of the footpath.



Culverts constructed from timber felled during footpath construction.

General:

The two mile footpath connects the village of Ma Kyauk Ahr with the township center, reducing travel time by about 30 minutes. It is used by all the villagers including middle school students

who attend school at the township. Motorbikes use the main road which is longer but better for road traffic. Four culverts were constructed using timber felled while constructing the footpath.

The footpath is in a forest reserve and the villagers are not allowed to cut timber in the area. They reported that they could not cut back the side slopes to protect against landslides because this would require felling more trees. The path now has problems with both landslides and erosion as observed during the inspection and reported by the VPSC.

The maintenance plan showed that maintenance works should be carried out in June to August. The VPSC said that they planned to maintain the path after the rainy season (November). If the communities have different plans from the written O&M plan, then this suggests the O&M plan was made without informed discussion with the community.

Construction quality:
The footpath has insufficient drainage and landslide protection, and this cannot be easily rectified because of the restrictions in cutting timber in the protected forest. There are no side drains, no road camber and no erosion protection. The construction met the design requirements of the sub-project but is not of satisfactory quality.

Environmental and Social Safeguards:
The Safeguards Screening Form was completed but did not flag any environmental issues despite the fact that the footpath is in a protected forest. If the safeguards screening criteria were flowed then this sub-project should have had an EMP and would not have been eligible for Cycle 1. If measures to protect from erosion and landslides could not be implemented because of restrictions on cutting timber then the sub-project should not have been approved.

No erosion or landslide protection measures were included in the sub-project, so the ECOP procedures were not followed in the design and implementation.

No social safeguards issues were noted.

Recommendations:
- Additional training is required for all levels (Township, Village Tract and Village) in implementation of safeguards procedures and the ECOP. This training should use real examples of SP that have safeguards issues. If there is no possibility of meeting the safeguards and ECOP guidelines then the SP should not be selected for implementation.
- Maintenance plans should be realistic in terms of requirements and the time period for implementation.

3.2 Saw Laung Water Supply, Kant Thar Yon Village Tract, Kanpetlet Township.

	
One of six new water tap stands constructed	Small compact platforms are preferred. The black pipe is privately owned and is to fill water containers a nearby house. It is connected to the tap as needed.

General:
The SP was for the rehabilitation of an existing system originally constructed by the Government and UNDP. The new works included the construction of 6 water stands, repair of a water intake and repair of pipes. A fence was constructed around the intake to protect it. The VPSC reported that the water is not clean in the rainy season so they boil it before using for drinking. The VPSC purchased the materials required for the SP and found a Mason (local builder) from outside their village to do the construction. The TF helped with identifying construction materials of acceptable quality, and the Mason also helped check quality of materials purchased. The TF visited the SP twice during construction.

There is no formal collection of water fees. Five households are responsible for maintenance of each tap stand, and if repairs of the intake are needed they will be organized by the whole village.

Construction quality:
The tap stands inspected were of good quality. The pipes were properly buried. The intake was not easily accessible in the rainy season and was not inspected.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The screening forms were completed correctly. The SP included a fence to protect the intake. Water wastage was minimal and drained was to agriculture areas.

Recommendations:
- The water tap stands should have a fence to keep animals away from the stands.
- Improvements in designs and materials should be considered (see general recommendations on water supply systems)

3.3 Par Kun School Rehabilitation, Kant Thar Yon Village Tract, Kanpetlet Township.

	
Front view of school	Gutter is fixed with light gauge wire.
	
Ceiling repaired and repainted.	Roof over water tank

General:
The SP was for the rehabilitation of an existing school. The roof was replaced with good quality color bond sheeting. The new timbers were hardwoods. The painting was amateurish with insufficient coats and paint spilled everyplace. Paint is expensive and the amount allowed for paint in the BOQ (95,500 MMK) was insufficient for a school this size. Additional paint was purchased for the ceiling and the back of the school was painted in dark wood stain. The guttering across the front of the school is attached using metal brackets and light gauge wire which does not look durable enough for a permanent structure.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The screening forms were completed correctly.

Recommendations:
- The Technical teams should learn from the experience of Cycle 1 and insure that Cycle 2 SP's have sufficient paint in the BOQ for the works required and that it is not wasted by inexperienced painters.

3.4 Saw Chaung Water Supply, Kant Thar Yon Village Tract, Kanpetlet Township.

	
One of six water tap stands	A second stand. All the stands seen during the field visits were very small compared with the standards used in other countries.
	
Valve to isolate the supply of water to the tap stand is partially buried and not protected.	Reservoir is shared with a construction company on a three year agreement (two years remaining).

General:
The SP was for the rehabilitation of an existing water supply system. A new reservoir, six water tap stands, one intake and one filter tank were provided. The reservoir is shared with a construction company through a three year agreement with the village, one year of which has been completed. The VPSC reported that there is now a water shortage in the village. The community members interviewed said that their arrangement made to share water must be honored, but they want to negotiate with the company so that the water is shared on a timed basis, with a half day for the village and a half day for the company. They believed that the arrangement is temporary only and the company will leave in two years. The consultant's observation is that the company is constructing permanent reinforced concrete buildings beside the reservoir and is unlikely to plan on leaving. However, given the level of investment they are making in the area, they should have the resources and ability to develop an alternative water source.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- The Township DRD and should meet with the villagers and construction company to clarify that the water supply system is for the village use, and arrangements to share water are temporary. The company should be given advance notice that they must make arrangements to develop an alternative source of water for their own use if they remain after the temporary agreement expires.

3.5 Kant Thar Yon Linking Road, Kant Thar Yon Village Tract, Kanpetlet Township.

	
Kant Thar Yon village road	Water is draining along the road instead of into the drain.
	
VPSC reported that culverts are needed at three locations.	No road camber

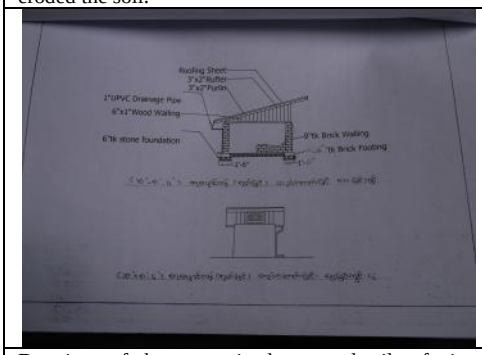
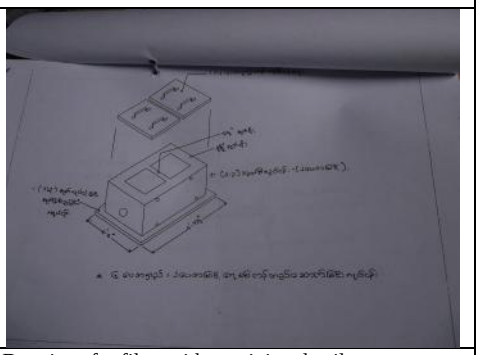
General:
The SP was for the widening an existing village road by 2 feet (60 cm). The work was completed 11 days, with 90 villagers working for 5 days and 40 villagers working for 6 days. The construction did not include any culverts although the VPSC reported that three culverts are needed. Side drains were constructed but the road has no camber so water flows along the road as seen in the photographs above.

The road is in the village and is easily maintained. The VPSC reported that they have repaired small landslides after rains as soon as they have happened. The O&M plan is to repair the road in July, but the VPSC reported that they plan to repair the road at the end of the rainy season.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted and the road rehabilitation improved the existing environmental conditions. However improvements are necessary to the drainage to meet the requirements of the ECOP for controlling soil erosion and sediment.

Recommendations:
- Further work is required to upgrade the road to a permanent village road, including the installation of culverts, constructing permanent side drains and surfacing the road.
- The sub-base should have a 6% camber to get the rain runoff into the drains.

3.6 Maw Chaung Water Supply, Hman Taung Village Tract, Kanpetlet Township.

	
Newly constructed reservoir. The tank is overflowing (it has no overflow pipe).	The water outlets (black pipe to the school, blue pipe to the village) are not protected and can be easily broken.
	
In the village the old pipes are exposed along the road where water flowing along the road drains has eroded the soil.	No water tap stands were provided in the village, so the villagers take water from a disconnected pipe.
	
Drawings of the reservoir show no details of pipe fixtures or overflow. The uPVC pipe shown in the drawing if for a gutter which was not constructed.	Drawings for filter with no piping details.

General:

The SP constructed a new intake, filter and reservoir, and replaced some broken sections of pipe line. No tap stands were provided. The system was constructed using local labour and skilled workers from the village. The water quality is very good

The SP is technical unsatisfactory because no tap stands were constructed as part of the SP, the old pipe lines are exposed and easily broken and it does not provide a safe protected water source for the village. The constructed reservoir does not have protected fittings and has no overflow. Drawings of the reservoir do not show the details of the fittings, so the SP may be constructed according to the design, but the design is not satisfactory because it is not a complete system providing lasting benefits to the community.

The O&M committee (3 people) reported that they go to check the intake if the water flow reduces. They have an agreed maintenance plans and commitments for the provision of labour or funds for needed repairs.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The recommended ECOP measures for pipes laying (use of metal fixtures, burying the pipes 50 cm below ground level, laying pipes in straight lines with constant slope) were not followed.

Recommendations:
- The SP should be completed through the provision of at least two tap stands in the village.
- The exposed pipes and fittings should be buried or protected with brick boxes and lids.
- Future water supply SP should be designed to provide a complete fully functional safe water supply.
- ECOP guidelines should be followed in the design and construction of SP.

3.7 Hpone Twi Khi Irrigation, Kyin Dway Village Tract, Kanpetlet Township.

	
The critical section of the canal constructed from stone and mortar.	The canal overflow is not controlled. A specially reinforced section should have been constructed to take the overflow and prevent erosion.
	
The canal has been repaired at the start point.	A low head hydro power plant provides electricity for the village.

General:
The SP constructed a reinforced canal section along a rock section of the river bank to channel irrigation water towards the village. The SP provides is classified as an irrigation project providing irrigation water for village farms but it is also used to power a village low head hydro

electricity generator (an old hydro generator was repaired) and the reinforced canal section is used by neighboring villages as pathway.

The village had cement left over on completion of the designed section of 250 ft, so the community decided to extend the reinforced wall an additional 150 ft using voluntary labour and by collected additional sand and stone from the river.

The design could have been improved with increased technical inputs. The canal should have had a lower reinforced section to allow overflow to be controlled, and the level of the canal should have been checked. The TF need additional equipment (automatic levels) and more time to provide better technical support.

Ongoing maintenance of the canal was noted during the field inspection. They have an O&M plan and spoke of plans for additional works on the canal in the dry season.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The recommended ECOP measures to prevent erosion were followed and a screen preventing debris entering the canal was constructed from timber.

Recommendations:

- The canal needs to be checked and repaired in the dry season. The temporary timber section should be replaced with stone and mortar and other minor leaks noted during the inspection must be fixed.

3.8 Tin Pon Kyinn School Extension, Lon Ein Nu Village Tract, Kanpetlet Township.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>View from the school entrance. The one room extension is at the far side of this photo. Note the entrance steps which should be made safer.</td><td>The entrance to the one room extension. The front of the school is painted green.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>The original school is painted with wood stain contrasting with the extension.</td><td>An inside view showing that some windows are new and some were reused.</td></tr>
</table>

General:
The SP constructed a one room extension to a small village primary school. The works are simple and within the technical capabilities of the villagers. Improvements could be made by painting the extension and by including furniture in the SP design so the room could be used without waiting for the communities to make additional contributions.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The school had water and sanitation facilities and minor additional drainage was constructed around the rear of the school building, so the recommended ECOP measures for small buildings were followed to the extent applicable to a small extension.

Recommendations:
- Furniture must be provided by the community for the extension.
- The entrance to the old school should have has safe steps like those provided for the new extension.
- The school extension should be painted in the same style of the old building.

3.9 Auk Hle School Extension, Kyin Dway Village Tract, Kanpetlet Township.

	
View of the primary school from the road.	Front view of school with more attractive painting.
	
The walls, floor, roof, doors and windows of the extension are constructed from teak.	Rear view of school showing incomplete gutters.

General:
The SP constructed a one room extension to a small village primary school. The quality of the finish is better than Tin Pon Kyinn School. The extension has no furniture so full use of the extra space must wait for additional inputs from the community. The villagers reported that the School Director was not happy with the color of the school but the villagers liked the finish.

The design details and BOQ did not include locks for the doors. These are essential to secure the teaching materials in a school.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The school had water and sanitation facilities but no hand washing basins.

Recommendations:
- Furniture must be provided by the community for the extension.
- The doors should be provided with latches for locks.

3.10 Hoke Pon Kyin School Extension, Kyin Dway Village Tract, Kanpetlet Township.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Front view of the school. The extension is at the far end of the picture.</td><td>A new entrance step was constructed by the community.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Good quality timber was used for the new windows.</td><td>The fixing of the gutter is not secure.</td></tr>
</table>

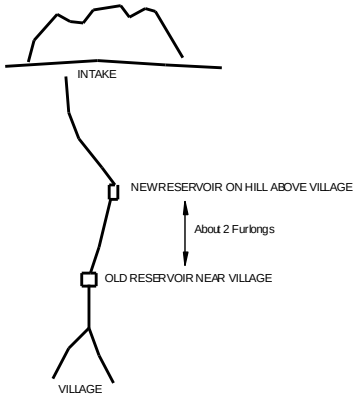
General:
The SP constructed a one room extension to a small village primary school. The quality of the works was good, with improvements recommended in painting and fixing of the gutter. No furniture was provided by the SP.

The VPSC reported that they had collected 150,000 MMK for painting the schools and to provide additional school furniture.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The school had water and sanitation facilities but no hand washing basins.

Recommendations:
- Furniture must be provided by the community for the extension.
- The gutter should be securely attached to the brackets provided.

3.11 Pan Taung Water Supply, Pu Saw Village Tract, Kanpetlet Township.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Existing water reservoir showing the pipe coming from the new reservoir.</td><td>Existing water tap stand</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Sketch of system showing location of the new reservoir</td><td>The reservoir overflow is connected to the pipe leading to the village tap stands in the existing system. If the tap is closed, the water will flow through the overflow, bypassing the tap.</td></tr>
</table>

General:
The SP constructed a new water reservoir on an existing gravity fed water supply higher up the mountain than the existing reservoir. (We did not climb the hill to see the new construction). The VPSC reported that the new reservoir is for agricultural purposes but there did not appear to be any reason for a new reservoir if the water is to be used for agriculture. A reservoir is designed to store water overnight so that there will be sufficient water to efficiently meet the peak demand in the morning. The design and purpose of the SP was not fully understood. The VPSC reported that planed to add more pipes in the future.

The VPSC reported that they have a functioning O&M system and have been able to maintain the existing system for eight years. Sometimes animals have broken the pipes, and sometimes debris has blocked pipes. They can carry out minor repairs but have limited access to spare parts. They have used bamboo to repair broken uPVC pipes.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- Training should be provided to TF on Gravity Fed Water System design so they can give better advice to communities. Different TF will have skills in different areas, and any opportunities for cross training should be encouraged.

3.12 Kyauk Hpyu Ywar Ma School Fence, Kyauk Hpyu Village Tract, Namhsan Township.

	
New School Fence	The gate was also included in the SP
	
The fence needs to be extended across the rear of the school, or access to this area should be blocked.	The bricks used are made locally and are not good quality, but are adequate for making a school fence.

General:
The SP constructed a new fence around the primary and pre-primary school. The school is in a mountainous area with restricted space, adjacent to a road and steep gradient falls. The fence is for the security and safety of the children in the school. The quality of construction is excellent. A small drainage canal should have been added between the road and the fence, and the fence should have extended across the rear of the school.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. Improvements can be made through the provision of roadside drainage and by blocking access to unsafe areas for small children at the rear of the school.

Recommendations:
- Add small drainage along the road to prevent erosion along the edge of the fence.
- Block student access to steep inclines at rear of school.

3.13 Nam Len Community Hall, Nam Len Village Tract, Namhsan Township.

	
Welcome ceremony	Inside the new community hall
	
Concrete drains were constructed around the hall.	Upstairs is used as a pre-school.

General:
The SP constructed a community hall in the space underneath a pre-school, with a concrete floor and brick walls. The existing windows were reused in the new construction with new window frames installed. Concrete drainage was provided around the building. The building was constructed by the community with no outside skilled labors. They reported having difficulty getting three quotations for materials because the suppliers refused to sign the quotations.

The TF reported that he visited the project three times, once before construction, once during construction and once after completion. He was responsible for 40 villages and can complete one round of all villages every six weeks.

They have an O&M plan with signatures of people willing to donate time and money. They anticipate a need to paint the walls and decorate the community center but do not expect any other maintenance costs. They reported that they have a village fund of 400,000 MMK which will be used for painting. When asked about the roof of the building they agreed that the roof would have to be replaced in the future, and they also discussed the possibility of constructing a new pre-school.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted and the ECOP advice was followed in providing drainage.

Recommendations:
- The building, particularly the doors and windows, should be painted.

3.14 Ahr Ram (Pa Laung) Public Latrine, Ahr Ram Village Tract, Namhsan Township.

	
Latrine construction for males, with water tank on top and urinals at the back.	Female latrine includes a washbasin but the water is not yet connected.
	
Latrine interior with piped water supply.	Septic tank for female latrine. The formwork was not disposed of away from the site.
	
The septic tank for the male latrine is under the construction.	Overflow for septic tank (small hole in picture) is into drainage

General:
The SP is for the construction of a public latrine at a community meeting hall inside a temple. The design was for a single latrine block with separate room for men and women, but the VPSC instead constructed separate latrine blocks for men and women. Because of restricted space, the latrine for men is constructed on top of the septic tank which will make it difficult to clean (a manhole is provided as shown in the picture above, but this is too small for physical access). The septic tank overflow from the men's latrine is to running water instead of a soak pit.

The latrines were constructed through direct contracting. A local community member agreed to take responsibility as the "contractor" and he organized the construction by hiring skilled laborers from outside the community. The work was completed quickly and efficiently and the VPSC was satisfied with the quality of the works.

The latrines are managed by the monks who keep the doors locked until they are needed. They are used every time there is a meeting at the community center or a ceremony at the temple. They are cleaned by the users and the village youth group who clean the temple grounds. They had been open to the public on three days in the previous month.

The uPVC piping is not painted and not secured properly. One pipe is held down by rocks. The issues with the design (poor access to the septic tank, drainage to water) happened because the

design was modified by the VPSC, splitting the construction into two units for male and female, without technical input from the project.

ECOP

ECOP advice was partially followed. Most importantly the latrines have septic tanks. A summary of the ECOP mitigation measures and actions taken is given below.

Sub-Project Type	**Environmental Prevention/Mitigation Measures**	**Remark**
1. Public latrines/toilets	(a) All toilets must have a septic tank to provide primary treatment of fecal waste. (b) PVC pipe used to connect pour-flush toilet to a septic tank must be buried underground or covered over (with cement) for protection and to prevent exposure to sunlight. (c) Metal pipe is a preferred choice to be used as the gas vent pipe on septic tanks. Never use PVC pipe as it is unable to withstand long-term exposure to sunlight. (d) Septic tanks must have a vent pipe to prevent the buildup of gas inside the chamber and shall have a 'manhole' that provides access inside the tank if needed. (e) A toilet should be at least 20 meters from water sources (well, spring, river).	(a) Provided (b) PVC pipe is exposed and unprotected. (c) PVC pipe was used. (d) Manhole access is provided, but on one latrine is too small for physical access. (e) There are no surface water sources near the latrine (only piped water). However one septic tank is draining into running water instead of a soak pit.

uPVC piping becomes brittle after exposure to sunlight (after about two years, depending on thickness) but this can be prevented by painting the pipes. The vent pipes are uPVC and attached between the septic tanks and the latrines.

Environmental and Social Safeguards:

No environmental or social safeguards issues were noted.

Recommendations:

- All exposed uPVC pipes should be painted to shield it from ultraviolet light. They should be securely fixed to prevent physical damage.
- A trap and soak pit should be provided for the septic tank runoff. The open drain should be covered.

3.15 Ho Nam Hydro, Ahr Ram Village Tract, Namhsan Township.

	
Water intake. The VPSC plan to construct a fence to prevent animals from falling into the reservoir.	Erosion under the tank from overtopping of the reservoir.
	
Turbine with water flow closed and timber cover removed.	The tank filled up quickly when the water flow was closed at the turbine. The community recognized that this is dangerous.
	
The old metal pipe was replaced with uPVC. This should be painted to protect it from UV light degradation.	Diversion taking water to the small hydro power unit.

General:
The SP is for the rehabilitation of a small hydro-power system. The size of the intake reservoir was increased, a new uPVC pipe and a new turbine was installed. The electricity grid in the village was expanded to cover all households.

The turbine is of a type that is not available locally, so it was purchased in Mandalay by a representative of the VPSC from a sole supplier. Other necessary items for the project were purchased in Namhsan with three quotes. The construction of the reservoir was very difficult because of rocks and the required labour was underestimated in the SP design. In addition to the SP paid labour, each household donated 9 person-days extra without charge.

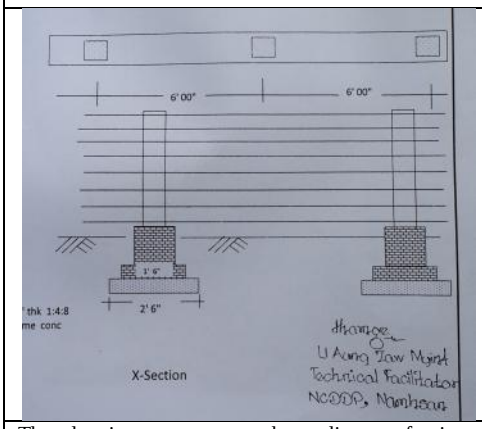
There is an erosion problem under the reservoir as shown in the photographs above. When the water tap is closed at the turbine, the reservoir fills up very quickly and can overtop. The hill has collapsed under one corner of the tank. This needs to be repaired urgently, and a larger spillway constructed so the water is released safely during times of heavy flow. The erosion problem with the reservoir is a design mistake that needs to be corrected, rather than an environmental issue. The diversion canal has a gate that can be opened so no water reaches the reservoir.

The generator runs for 5 hours per day and longer during festivals. The VPSC reported that no funds were collected by the O&M committee for maintenance activities, but instead they had a separate "Electricity Committee" with three members for maintenance (turning on and off the generator each day, greasing the turbine once a week, etc.) and they charged for 500 MMK per electric lamp per month, with each household limited to a maximum of three lamps and one video/music player.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The applicable ECOP mitigation measures were followed.

Recommendations:
- URGENT. The reservoir should be repaired, with an overflow large enough to prevent overtopping.
- All exposed uPVC pipes should be painted to shield them from ultraviolet light.

3.16 Za Yang (North) School Fence, Za Yang Village Tract, Namhsan Township

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Barbed wire school fence</td><td>The fence has a continuous foundation which is not required across the rear of the building. Money could have been saved to make the fence longer.</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>The drawings appear to show discreet footings (bottom).</td><td>The fence must be extended around a newly constructed building.</td></tr>
</table>

General:
The SP is for the replaced a bamboo middle school fence with a permanent barbed wire fence. The VPSC said that the existing bamboo fence needed to be repaired or replaced annually and the community had chosen this SP because it was difficult to keep repairing the fence and the school was communal property in a dispersed village. The other SP priorities were roads and bridges

linking the different sub-villages. It was difficult to organize village meetings because it is a two hour walk to the school from outlying communities.

The quality of the work was very good. The work was done by a contractor during school holidays and supervised by a teacher who lives in the school and checked the work every day. The VPSC reported that technical supervisors came to inspect the work around four times during the construction but it was not always the same person. The cost of the SP was less than the budgeted amount because they reused the existing school gate.

The school has a student parents committee responsible for maintenance of the school, so the separate O&M committee for the school fence is redundant. The school has a school maintenance fund which was used in 2014 for constructing toilets and replacing uPVC pipes. They reported that they will need to collect additional funds to extend the fence around a newly constructed building.

The following issues were noted for consideration in the design of future SP.

- The barbed wire could pose a danger to children playing and other fencing materials are preferable.
- The foundation of the fence is continuous. Photographs taken by the VPSC during the construction show that there are deep foundations under each fence pole and shallow foundations in between. This might be justified in the front section along the school entrance path, but is unnecessary elsewhere and the money saved could have been spent to increase the length of the fence.
- The fence did not appear to be justified on safety grounds. There is no adjacent road or very steep gradients as was the case in Kyauk Hpyu Ywar Ma School (3.12).

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The applicable ECOP mitigation measures were followed.

Recommendations:

- It is recommended that chicken wire fencing, called "chain link fence" by the Myanmar Engineers, is used instead of a barbed wire in schools.

3.17 Za Yang Ywar Ma Concrete Road, Za Yang Village Tract, Namhsan Township

	
Unreinforced concrete road constructed from the main road in the village to the health center.	A manhole cover is needed on this small drain.

	
Some sections had good side drainage; other sections need to be improved.	The entrance is sometimes used by heavy vehicles turning and should have been made from reinforced concrete.
	
This short section needs to be improved. The sides of the road should be planted with grass or covered with concrete.	There is no-place for vehicles to turn at the Health center.

General:
The SP is for the construction of a mass concrete road from the village main road to a health center. The Health Center is used by two village tracts. Health Center records show that the number of beneficiaries is about 2,000 people. The road is un-reinforced, except for the joints between the slabs. The quality of the work was good, with some improvements in drainage and small extensions to reduce erosion recommended. A turning area for vehicles visiting the Health Center would be a useful improvement.

The VPSC reported that the village road is very narrow, so the entrance to the new road section is sometimes used by heavy vehicles for turning, and they are concerned that this section might be damaged. They also pointed out one location where the drainage needed to be lengthened to take the road runoff further away from the road.

The road will have low maintenance requirements. Some damage may occur if vehicles drive off the edges of the road, to pass other vehicles or for turning. The entrance of the road might be damaged by turning heavy vehicles. The project has an O&M plan with a maintenance budget but no maintenance activities have taken place to date.

Environmental and Social Safeguards:
No environmental safeguards issues were noted. There are a few small sections that could be improved with grass planting of an extension of the concrete.

The VPSC reported that skilled workers were paid 6,000 MMK per month, unskilled male workers were paid 4,000 MMK per month and unskilled female workers were paid 3,000 MMK per month. They did not expect the unskilled male and unskilled female workers to do the same work.

Recommendations:
- The road side erosion protection should be improved in some areas.
- A manhole cover should be installed at the location shown in the photo above.

- Male and female workers should be paid the same for the same work, as was the case in the majority of SP.
- Reinforced concrete roads should be considered instead of mass concrete roads where occasional heavy road traffic is expected. In rural areas bamboo reinforcement should be considered. In Lao PDR bamboo reinforced concrete floors are used in school construction, and in Cambodia bamboo is used to reinforce small rural roads and footpaths.

3.18 Ngun Hseng Water Tank, Ngun Hseng Village Tract, Namhsan Township

	
Combined reservoir and water stand.	A second reservoir
	
The SP is for rehabilitation of the existing water system with a mixture of old and new pipes.	uPVC pipes are laid in the road drains (old pipes).

General:
The SP is for the construction of four water reservoirs with taps in an existing pumped water system. The SP included a new electric pump, six tap and 12,000 ft of pipe. One of the reservoirs was constructed by a contractor, and the VPSC was happy with his work, but he was not interested in constructing additional tanks, so these were completed by the community. The procurement committee had difficulty purchasing sand and gravel because there was only one supplier and he could not meet the demands of all his customers.

The design of the water supply system is non-standard, and requires daily adjustment of water flow and water usage to make sure water reaches all sections of the village.

The water supply system is maintained by a village elder who does not accept any payment. The cost of the electricity for the water pump was 4,000 to 5,000 per month before the SP, but is expected to increase with the additional pipe line. The community has an existing O&M fund from 2011 when they collected a lump sum of 100,000 MMK per household. Some of this money remains in the bank and they use the interest to pay for the electricity. These existing O&M arrangements were not taken into consideration when designing the SP O&M.

The VPSC reported that the uPVC pipe was buried six inches, rather than the 20 inches recommended in the ECOP. As shown the photographs, many of the uPVC pipes are exposed to the sun but it was not always possible to distinguish between old and new pipes during the inspection.

Environmental and Social Safeguards:
No environmental safeguards issues were noted.

The VPSC reported that skilled workers were paid 6,000 MMK per day, unskilled male workers were paid 5,500 MMK per day and unskilled women were paid 4,000 MMK per day. The total number of workers was between 4 and 7 per day. The community also provided free food for workers as an additional incentive. The VPSC reported that male workers were paid more than female because the SP was being implemented in the tea harvesting season when workers can earn much more on tea plantations and they had difficulty getting labors.

The project involved voluntary land donations for the construction of four water tanks, and this was documented properly in the SP records.

Recommendations:
- In all cases male and female works should be paid the same for the same work. If necessary workers can be paid by task completed, avoiding the issue of different market rates for male and female labour.
- All exposed uPVC pipes should be buried or painted to protect them from UV radiation.

3.19 Man Pang Road Side Drain, Hpa Yar Gyi Village Tract, Namhsan Township

	
Road side drainage in village.	The runoff from the drains is diverted away from the road.
	
Entrances were constructed over the drain for vehicular traffic.	A section of the drain in front of a house.

General:
The SP is for the construction of road side drains along the main road of the village. Site drains are important in hilly regions to prevent erosion and protect earth roads. The drains took 45 days to complete because of rains. They were short cement, so some sections of the drains still need to be plastered. The runoff water drains to vegetation on both sides of the road.

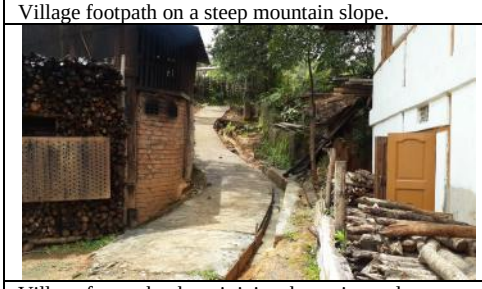
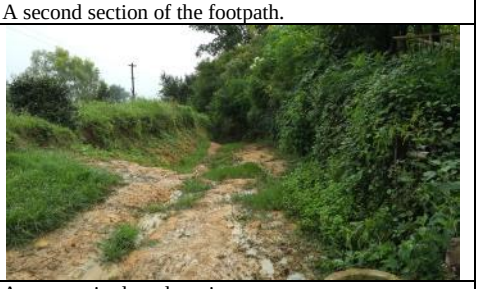
They may use the next cycle of funding to surface the road if they do not get funding from DRD. They constructed the drains using village labour, but would use a contractor for the road surfacing because they do not have compaction equipment or experience.

They have a written O&M plan with nine people agreeing to donate labour for maintenance.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The side drains make a positive impact on the environment.

Recommendations:
- The plastering of the drains should be completed and the road surfaced.

3.20 Ho Chit @ Sa Khan Thar Concrete Footpath, Man Kan Village Tract, Namhsan Township

	
Village footpath on a steep mountain slope.	A second section of the footpath.
	
Village footpath where it joins the main road.	An-unrepaired road section

General:
The SP is for the construction of concrete footpaths. Three different paths were rehabilitated, two in the village and one to the school. One path remains to be completed. The village is situated on a mountain side, and before construction of the paths access from the village main road to people's houses was very difficult, particularly for old people. In the next cycle their priority is to improve the earthen side drains with brick and to add one more sections of footpath.

When asked about difficulties in implementation the VPSC reported that there were delays in withdrawing money for construction (up to 15 days) because of the need to have a meeting at Village Tract level for approval and other villages were not ready for this meeting.

The VPSC reported that they had five visits from the technical facilitator during the construction and three visits from DRD during the two months of construction.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- Side drains should be constructed from brick to prevent erosion.

3.21 Li Lu Concrete Bridge, Li Lu Village Tract, Namhsan Township

	
Village bridge.	A photograph taken by the M&E VPSC member during construction.
	
Riprap protection of the stream bank. This may not last long but it should not affect the bridge.	Side view of bridge

General:
The SP is for the construction of concrete bridge in the village to replace a twenty year old wooden structure and construct stone riprap walls along the stream through the village.

The design and cost estimate for these works was very different from the actual costs of construction. The amount spent was less than half the budgeted amount. Local stone was used instead of bricks for lining the canal. There were errors in the drawing dimensions and no steel details were shown and no formwork was included in the BOQ.

The bridge is expected to be maintenance free. The riprap on the sides of the stream will be eroded as water seeps under the protected works and will require yearly maintenance. The VPSC have a six-month guarantee on the works from the contractor and have some materials remaining in storage.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- It is necessary to repair the riprap along each side of the stream at the end of the rainy season every year.

3.22 Zay Ka Mi School Renovation, Zay Ka Mi Village Tract, Kyunsu Township

	
Front view of renovated School	Inside was not plastered. The new room (extension) is on the right of the column shown.
	
Outside back and sides not plastered	Painting only to tops of windows

General:
Zay Ka Mai School renovation constructed a new floor, veranda, walls, doors and windows and extended the building by one room. The existing columns and roof structure was reused. The DRD Engineer reported that during the first construction supervision visit they found that the foundation of the old columns was not sufficient and new foundations were constructed with the agreement of the community.

Zay Ka Mai School renovation was the only SP inspected that had drawings made with drafting software. There was sufficient detail for the small works.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The school compound has a water supply and latrines, but may need additional latrines for the extended building. They currently have 2 toilet rooms for 280 students. They reported that if the number of students is sufficient to justify it, they can request a budget for additional latrines from MOE.

Recommendations:
- The school building should be plastered and painted inside and outside to protect the brickwork from the weather.

3.23 Pan Taung Water Supply, Zay Ka Mi Village Tract, Kyunsu Township

	
Village water tank supplied though a low head water pipe.	Inside view of the tank
	
The inside of the platform is flooded and not plastered properly	Unprotected intake cannot be relied on to provide clean water. This pond is about 6 ft deep.
	
Plastering quality should be improved	Unsanitary surroundings of the water tank.

General:
The SP laid a water pipe from a natural spring (the intake shown above) to the village. The pipe line follows the natural drainage, and the head difference between the intake and the water tank constructed in the village was reported to be only two feet. The intake is not protected and has no filter, so the water supply is not of drinking water quality standard. Because the head is low, the pipeline must follow natural drainage, and the location (surrounding area) where the water tank is constructed is subject to flooding. There was standing water at the time of the visit as shown in the photos above.

Prior to the construction of the tank, the villagers needed 30 minutes to walk to the water source.

The building covering the tank was neatly constructed and is protected by a fence as shown in the first photograph. The building construction was a community contribution to the SP not included in the design. The quality of the concrete work and plastering was not very good. The floor does not drain properly and the plastering inside the tank and along the platform edge should be improved. The tank area was kept clean and users are required to collect water and take it home for use to prevent pollution of the natural water flow in the area.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The land to construct the water tank was the property of a villager who attended the meeting with the consultant, and the land with the

natural spring belonged to his wife who was also a member of the VPSC. They said they donated the land as a "good deed" for the village. Voluntary donation forms were signed.

Recommendations:

- Soil should be filled to form a three foot wide bund around the water tank, separating it from the naturally flooded areas.
- The intake should be protected and an intake filter constructed.

3.24 Shwedu/Taungpuu School, Zay Ka Mi Village Tract, Kyunsu Township

	
Front view of school	Additional work is required to cut soil at rear of building where the new room was added.
	
Plaster is broken because it is not bonded to the timber structure.	Water tank showing gutter to collect rain water from roof.

General:

The school renovation and extension included plastering above window level, installing a new ceiling, constructing a water tank with wooden gutters, plastering the outside back of the building and adding one new room to use as a school office. The school has existing latrines but there is no convenient water source in the area so they added the water tank to collect rain water. The school fence is being constructed from Government budget, they have concrete poles installed but need wire mesh.

The plastering at the rear of the school was broken and cracked where they plastered over the timber columns. The school has a timber gutter that looks to be well built, but no down pipe to take the water to the water tank. The floor of the existing school has holes that should have been patched at the same time as constructing the concrete floor of the extension (the VPSC said they forgot to do this). The windows in the extension were badly fitted, and were tied closed with string at the time of the inspection. A skilled carpenter should he hired to install the windows properly.

The ECOP does not have many guidelines on constructing safe building environments in hilly areas, covering site benching, drainage, erosion control measures or safety (entrance, school play area, road, fence etc.). These are particularly important in Namhsan but also in the other townships, and even in Kyunsu as seen in this school. These cannot be added before Cycle 2, but they can be included in the training materials for ECOP. Some ideas of what these should include

were shared with the Township DRD Engineers and Infrastructure Specialists at the training on Quality Management and Implementing the E&S Safeguards.

Additional earthwork and drainage is required behind the school to move the slope a safe distance from the building and to prevent erosion. The entrance to the school is up a steep hill with steps cut into the soil. These steps should be reinforced with stone or timber and the sides planted with grass to make the entrance safe in the rainy season.

The VPSC reported that managing the finances was very difficult because workers needed to be paid every week and they did not always have enough petty cash.

The priority for the next cycle of funding will be water supply and electrification, but they will decide exactly at a mass village meeting. They are planning a 20m pumped well to supply water to the school.

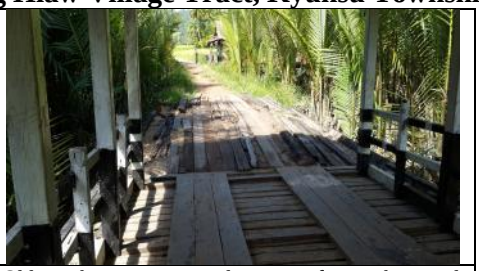
The school has both a Parents Teachers Committee to maintain the school, and an O&M committee for the school renovation. The VPSC said the two committees would work together. They have written plans but have not collected any funds for O&M or carried out any maintenance activities. The major renovation activity identified was repairing the floor of the existing school using Government funds.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- Improve the entrance to the school to make it safe for children in the rain.
- Widen the path at the rear of the school and improve the stability of the slope by constructing drainage across the top.
- Complete the school fence.
- Paint ceiling and inside walls.
- Repair the floor in the old sections of the building.
- In future constructions avoid having a thin layer of plaster over timber to prevent cracking as seen in the photos.
- Improve water collection by adding a permanent downpipe.
- Repair the windows which are not fitted properly.

3.25 Mawng Hlaw Auk Bridge, Mawng Hiaw Village Tract, Kyunsu Township

Rehabilitated bridge. The timber used is the same type used in boat construction.



Old timbers were used to reinforce the road approaches.

	
Old bridge before rehabilitation	An additional support was constructed in the stream. The foundations were constructed at low tide using timber piles.

General:
The timber bridge was rehabilitated with two new concrete columns added, concrete beams and new timber decking. The villagers donated their labour and food for workers without change for the construction so that they could use the money saved to construct the building over the bridge. They said this building will extend the life of the timber decking. Only skilled labors were paid.

The bridge is in a village with only light traffic, so it should last as long as the timber and the head walls about 20 or 30 years. They have an O&M team and they plan to do some additional plastering of the headwalls during neap tides in December, but have not collected any money yet.

The VPSC finance and procurement members reported that managing the funds was difficult because there were differences in amounts they needed to reconcile.

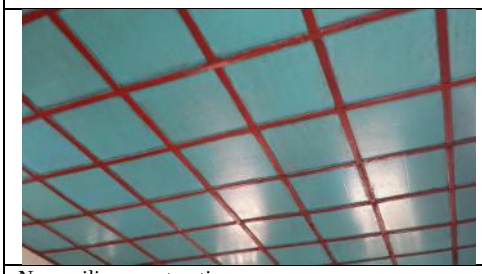
In Kyunsu there were two copies of all contract documents and forms, one copy kept in the village and the other in the Township files. The version in the Township files was complete, but some forms in the village files were incomplete or not signed. In this SP the ECOP screening form kept in the village was mostly blank and unsigned.

All VPSC members and villagers at the meeting with the consultant were male. The VPSC members said there were two weddings in the village that day so many people were not home.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- Follow up with the VPSC to make sure they are ready to conduct the required O&M during the low tides in December.

3.26 Yataung Adwin School, Mawng Hiaw Village Tract, Kyunsu Township

	
School extension	Steep embankment along edge of playground at entrance to the new classroom.
	
New ceiling construction	Inside the new classroom.

General:
The SP was for the construction of a new classroom (school extension). The quality of the works was generally good. The painting quality was better than in other buildings, and when asked the chairperson of the VPSC said he did all the painting himself.

There are 40 students learning in the new classroom (grade 6) and the school has a total of 325 students.

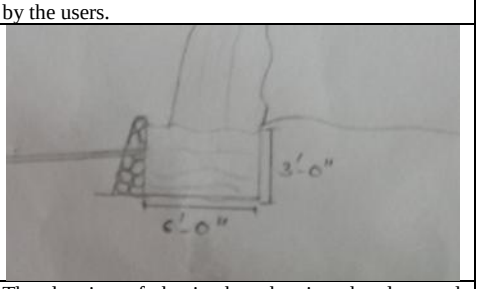
There is a steep embankment between the two school buildings in the compound. The VPSC were asked how this should be made safe for children, and after discussion agreed that a retaining wall should be built.

The retaining wall of the new classroom is not plastered on the outside.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- Construct a retaining wall between the two school compounds (front area of school) with a small fence to make the area safe for children playing.
- Plaster the lower sides of the school building retaining wall.

3.27 Min Goke Water Tank, Min Goke Village Tract, Kyunsu Township

	
The new water tank.	Each house has a private water connection, paid for by the users.
	
Village meeting.	The drawing of the intake, showing the dam and outlet pipe, has insufficient information for construction. No filter is shown.

General:
The new water tank, intake and supply pipe was constructed with household connections added by the villagers. The water supply is connected directly to the village so the water tank is used for storing excess water at night to be used in the morning when demand is highest. If the tank was designed properly this arrangement should not be necessary. The system is functioning as it, so there should be no issue. The drawings used for the construction were not really acceptable, as shown in the photograph above.

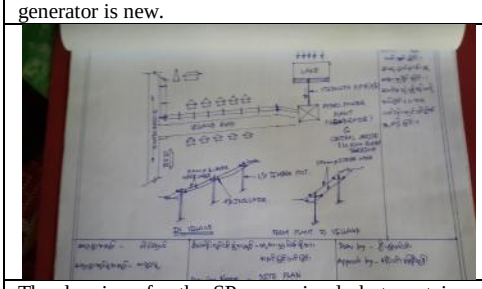
The village meeting had many people and while it demonstrated that the villagers were very happy with the SP, it was difficult to get those who were most involved in the SP implementation to answer the technical questions clearly. During the walk around the village we were able to understand better what was constructed.

There was insufficient time to visit the intake which was a one hour walk from the village.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- The DRD Engineer should confirm that the intake has a slow sand filter, and if not, then one should be constructed.

3.28 Leik Kvei Hydro Power, Kat Ta Lu Village Tract, Kyunsu Township

	
Hydro generator. The old turbine was reused and the generator is new.	The water supply pipe is exposed, not supported securely, and is not straight.
	
The drawings for the SP were simple but contain a lot of detail.	A "street light" installed by the SP.

General:
The SP was for the renovation of a small hydro-power system and the installation of street lights. They replaced an old broken 5 KVA generator with a 20 KVA generator, constructed a new generator house, installed a new pipe for the water supply, repaired the intake and installed street lights.

The main village "street" as shown in the map above is a track in a plantation forest. The community explained that poisonous snakes are common in the area, so they need the lights for safety reasons, particularly for the children who might otherwise step on snakes in the dark. One of the future projects planned for the village is to construct a concrete path which should be much safer.

A contractor was used for the generator installation and generator house construction because they VPSC had no experience on how to do this work themselves. They are happy with the work of the contractor, but future SP will be implemented by force account because it will be mostly village labour. Technical Facilitators visited the SP two or three times during the construction. They also asked the "Electricity Department" for advice on the quality of materials to purchase. The design omitted the concrete foundation for the street lighting poles required in the ECOP.

About 20% of the project cost was donations from the community, mostly in the form of labour for the intake renovation.

The "Year 1 Positive List of Sub-Projects" lists pico hydro (<10 kW) as an allowed SP. In the design a small generator was specified but the VPSC purchased a 20 kW after testing the smaller generator and discussion with the contractor and supplier.

There are 25 households in the village, and the power is also supplied to the school, staff house, street lights and monastery. This is a small village, so the size of the hydro plant should be within the range of SP allowed. If each house has a few lights (3 lights x 40 W) and a few houses have a DVD Player (20 W) and TV (200 W), the maximum village requirement should be about 10 KW with current usage. The larger generator provides a guarantee for future.

The user fee is 3,000 MMK per house with TV and 1,500 MMK without TV. They pay 35,000 MMK per month to the generator operator and run the generator 24 hours a day. Planned activities for O&M include the construction concrete supports for the water pipe and additional street lights and they will fund these activities through voluntary donation.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The land for the generator house was donated and the voluntary donation forms completed.

Recommendations:
- It is important to construct solid supports for the PVC pipe. The project should monitor the O&M activities to make sure this is completed.
- The 10 kW limit for hydro power schemes in the first cycle should be reexamined as it appears small for the village size. If there is good justification for this limit then these reasons should be explained in the training of the facilitators.

3.29 Htein Chaung Concrete Road, Kat Ta Lu Village Tract, Kyunsu Township

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Village road. The O&M team reported that the side drains were cleaned using voluntary labour, mostly from VPSC members themselves.</td><td>The road leads to a small building used in ceremonies where the cremated remains of the dead are buried or kept in tombs.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Cremated remains are kept in small tombs.</td><td>The road construction is simple, without chamber and with large expansion joints.</td></tr>
</table>

General:
The road construction is a simple concrete path, 480 ft. long, leading to an area where the cremated remains of villagers are buried or entombed. The design was for a 12 ft. wide road, with chamber and large side drains, while the actual construction is a flat road 8 ft. wide, with small side drains. Because of this change in width, there were left over materials which were used to construct a turning area at the end of the road, approximately 80 ft. extra than the planned length of road. The road construction is suitable for a small village with low expected usage.

The procurement team bought all materials from Myeik after comparing the prices locally and taking the transport cost into consideration. A bag of cement is 1,000 MMK cheaper in Myeik,

and the transport cost is 200 or 300 MMK. Three quotes were obtained but it was difficult because shopkeepers did not want to give written quotations.

During the debriefing in Myeik with DRD and Mercy Corps, the consultant asked why a SP for a village road leading to an area for religious ceremonies was approved, and if this SP contributed to poverty reduction. They said the SP was discussed with DRD at Union level and approved because it was the community's first priority and they did not think it was related to religion because it is a graveyard used by everybody.

The second priority in this village is a school road and water supply and the third priority is a road to the health center.

All the VPSC members interviewed in this village were female and appeared educated. The men were busy with farming activities.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

Recommendations:
- All SP selected should relate in some way to poverty reduction, education or health.

3.30 Ma Yan Chaung School, Ka Pa Village Tract, Kyunsu Township

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>New veranda construction</td><td>Electricity supply (generator) is from un-insulated wires.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>School before rehabilitation</td><td>New foundations were constructed under the veranda columns.</td></tr>
</table>

General:
The SP constructed a new veranda on the school, with a new roof and concrete posts. The old timbers were reused. The quality of the work was good, and no construction issues were noted.

The VPSC reported that the work was done during the school holidays. They purchased the materials and hired a labor contractor from the village. They got three quotes for all the materials and the community has many people with experience in checking the quality of the materials. Some materials were left over after the construction, which the VPSC sold and returned the

money to the Bank. The technical facilitators visited about three times to check the work. The M&E team did not check the work daily because the contractor is from the village and could be trusted.

They reported that they have no O&M planned activities because they do not anticipate any need. If something needs repair they will look for voluntary donations from the community. The O&M plan includes a budget of 504800 MMK/year for roofing repair.

During the inspection of the veranda it was noted that the electricity supply was from un-insulated wires laid along the underside of the veranda. The VPSC said the electricity is turned on only at night when there are no students.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted.

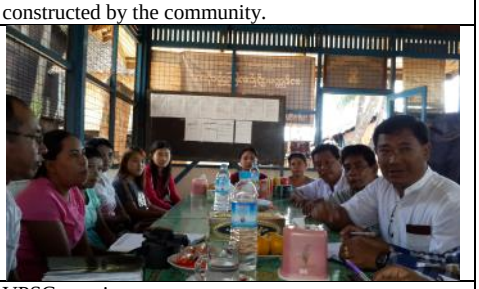
Recommendations:
- The electric wires should be replaced with insulated wires that are child safe.

3.31 Lin Ma Lo Jetty, Ma Ai Village Tract, Kyunsu Township


Photo of the DRD boat moored at the new jetty.


View of the jetty from the boat showing the building constructed by the community.


Side steps used at high tide.


VPSC meeting.

General:
A new jetty was constructed at the location of a smaller older jetty. The new jetty is 177 ft long and 6.5 ft wide. Community contribution of 1.5 million MMK was used to construct a small shelter with a bench on the jetty as shown in the photographs above. The materials were purchased using three quotes. A labour contractor from the mainland was hired to do the work, and he supplied all the tools, including a generator and pump to get water from a well for mixing concrete. The contractor re-checked all the materials required in the BOQ, so all materials were used with none left over. The contractors labors were all from Myeik, they stayed at the temple and the villagers provided them with food.

The VPSC checked the work every day. The Technical Facilitator inspected the SP four times during the construction, the Community Facilitator and DRD Engineer visited twice.

The jetty is on a small island with a single village with 110 households. Most of the island economy is from fishing. They have 2 ferries, 9 large boats and 60 small boats.

The villagers plan to extend the jetty 5 ft during neap tides when the water is lowest. They will use voluntary donations to maintain the jetty, but so far there has been no need for maintenance. The O&M plan lists adding wooden fenders to the jetty and renovating the surface as planned activities.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The jetty was constructed on public land.

Recommendations:
- None.

3.32 Ma San Pa Concrete Footpath, Ma Ai Village Tract, Kyunsu Township

	
View of village footpath. The path is along the edge of the island, with a hill on one side and the sea (behind the houses) on the other.	A second section of the new footpath
	
The new footpath is an extension of an existing path.	Water supply is a problem on the small island in the dry season.

General:
The village is located along the water edge in a small island. The SP extended an existing footpath constructed behind the houses. The plan was to construct 800 ft but they were able to complete 900 ft with the materials purchased. All materials were procured using three quotations. The sand and gravel was delivered to the island by the suppliers and they used their own boats to transport the cement. They reported that there was no community contribution towards the SP. The SP was not large enough to complete the full length of required footpath in the first cycle, but there was full agreement on which sections to complete first.

The TF inspected the works before construction, during and when the works were nearly finished. The DRD Engineer inspected the SP before construction and once during construction. The works were difficult to finish because it was raining during the implementation period (it rained very heavily in the second week of May).

There has been no organized maintenance of the footpath, but the villagers are cleaning the drains and surface of the path near their own houses. The O&M plan list drainage repair and footpath surface maintenance.

The second cycle SP will be to extend the footpath so that it reaches all houses. The third cycle SP will be to improve the water supply.

There may be a problem improving the water supply on the island as planned for the third cycle because of the small size of the island and the closeness of the wells to the sea. If they try deepening the existing hand dug wells as they discussed during the meeting they risk salt water intrusion into the well. Once salt enters a well it must be abandoned. With only two wells producing water in the dry season they cannot afford to take any risk with these wells.

Fishing is the major occupation in the village of about 200 houses, with some gardens and rubber trees. There is only one village on the island. They have 70 fishing boats but no ferry.

Environmental and Social Safeguards:
No environmental or social safeguards issues were noted. The footpath was constructed on public land.

Recommendations:
- There is one privately owned deep well on the island. The water from this well should be tested to see if its quality can be improved and if more public deep wells can be drilled.
- The SP could be improved by constructing brick side drains in some sections of the footpath.

List Sub-Projects inspected , date visited, population data and distance from township

Sr.No.	*TS*	*Village Tract*	*Village Name (English)*	*Sub-Project*	*Date of Inspection*	*H.H*	*Male*	*Female*	*Total Population*	*Approx Distance from Township (KM) or (Hours: Min) for Kyunsu*
1	Kanpetlet	Kyet Chan	Ma Kyauk Ahr	Footpath	Aug 7, 2014	40	119	112	231	6.4
2	Kanpetlet	Kant Thar Yon	Saw Laung	Water Supply	Aug 7, 2014	29	64	83	147	1.6
3	Kanpetlet	Kant Thar Yon	Par Kun	School Rehabilitation	Aug 7, 2014	46	130	136	266	0.2
4	Kanpetlet	Kant Thar Yon	Saw Chaung	Water Supply	Aug 7, 2014	19	29	40	69	3.2
5	Kanpetlet	Kant Thar Yon	Kant Thar Yon	Linking Road	Aug 7, 2014	40	100	95	195	1.6
6	Kanpetlet	Hman Taung	Maw Chaung	Water Supply	Aug 8, 2014	38	114	111	225	64
7	Kanpetlet	Kyin Dway	Hpone Twi Khi	Irrigation	Aug 8, 2014	22	68	70	138	89.6
8	Kanpetlet	Lon Ein Nu	Tin Pon Kyinn	School Extension	Aug 9, 2014	26	52	62	114	99
9	Kanpetlet	Kyin Dway	Auk Hle	School Extension	Aug 9, 2014	31	88	120	208	100.8
10	Kanpetlet	Kyin Dway	Hoke Pon Kyin	School Extension	Aug 9, 2014	19	45	46	91	89.6
11	Kanpetlet	Pu Saw	Pan Taung	Water Supply	Aug 9, 2014	24	64	78	142	92.8
12	Namhsan	Kyauk Hpyu	Kyauk Hpyu Ywar Ma	School Fence	Aug 12, 2014	134	363	378	741	7
13	Namhsan	Nam Len	Nam Len	Community Hall	Aug 13, 2014	244	824	971	1795	25
14	Namhsan	Ahr Ram	Ahr Ram (Pa Laung)	Public latrine	Aug 13, 2014	242	978	773	1751	11
15	Namhsan	Ahr Ram	Ho Nam	Hydro	Aug 14, 2014	26	96	112	208	18
16	Namhsan	Za Yang	Za Yang (North)	School Fence	Aug 14, 2014	321	835	909	1744	4
17	Namhsan	Za Yang	Za Yang Ywar Ma	Road	Aug 14, 2014	386	904	1019	1923	2
18	Namhsan	Ngun Hseng	Ngun Hseng	Water Tank	Aug 14, 2014	221	512	545	1057	5
19	Namhsan	Hpa Yar Gyi	Man Pang	Side Drain	Aug 15, 2014	172	192	187	379	8
20	Namhsan	Man Kan	Ho Chit @ Sa Khan Thar	Concrete Road	Aug 15, 2014	64	220	248	468	13
21	Namhsan	Li Lu	Li Lu	Bridge	Aug 15, 2014	60	132	151	283	34
22	Kyunsu	Zay Ka Mi	Zay Ka Mi	School Renovation	Oct 25, 2014	139	407	398	805	01:45
23	Kyunsu	Zay Ka Mi	Pan Taung	Water Supply	Oct 25, 2014	78	206	200	406	01:55
24	Kyunsu	Zay Ka Mi	Shwedu/Taungpuu	School	Oct 25, 2014	102	212	180	392	01:55
25	Kyunsu	Mawng Hiaw	Mawng Hlaw Auk	Bridge	Oct 26, 2014	165	496	530	1026	02:00
26	Kyunsu	Mawng Hiaw	Yataung Adwin	School	Oct 26, 2014	162	498	525	1023	02:45
27	Kyunsu	Min Goke	Min Goke	Water Tank	Oct 26, 2014	250	761	750	1511	03:00
28	Kyunsu	Kat Ta Lu	Leik Kvei	Hydro Power	Oct 27, 2014	28	62	66	128	02:45
29	Kyunsu	Kat Ta Lu	Htein Chaung	Concrete Road	Oct 27, 2014	146	367	391	758	02:30
30	Kyunsu	Ka Pa	Ma Yan Chaung	School	Oct 27, 2014	248	483	576	1059	01:30
31	Kyunsu	Ma Ai	Lin Ma Lo	Jetty	Oct 28, 2014	90	299	291	590	03:15
32	Kyunsu	Ma Ai	Ma San Pa	Concrete Footpath	Oct 28, 2014	159	497	437	934	02:45

Sources:

(1) Population data of Kanpetlet, based on CFs' data, updated on April-14, 2014

(2) National Community-Driven Development (NCDD) Project, Table 1. Summary Profile of First Cycle Townships, Distance from KPL, data based on CFs/TFs

(3) Namhsan Township, Shan (North), Demographic Data.

(4) Tanintharyi Division, Myeik District, Kyunsu Township (Mode of Travel)

Annex 3

Terms of Reference and Scope of Services

Ministry of Livestock, Fisheries and Rural Development
Department of Rural Development
National Community Driven Development Project
IDA Grant: H813-MM

TERMS OF REFERENCE
Technical Audit Consultant

1. Background

The Union Government of Myanmar has received a Grant of US$ 80 million from the World Bank to implement a Community Driven Development Project. The Ministry of Livestock, Fisheries and Rural Development (MLF&RD) of the Union Government of Myanmar has been mandated to implement a multi-year, multi-state community development project entitled Myanmar National Community Driven Development Project (NCDDP) that will be supported through the grant from the World Bank.

The project has just finished its first community sub-project cycle in three townships. To assess performance to date and consider adaptations ahead of the Project's scheduled expansion from three to nine townships later in 2014, DRD is commissioning an individual consultant to carry out a review of the technical quality of infrastructure constructed under the Project. This review will inform the Multi-Stakeholder Review scheduled to take place in Nay Pyi Taw on 20-21 August, and a subsequent full technical audit, for which procurement is currently underway.

The development objective of the project is to support the Government's strategy to promote the Community Based Rural Development. For detail, please visit www.cdddrdmyanmar.org

2. Implementation Arrangements

The Technical Audit Consultant will work with two national engineers designated by the Department of Rural Development (DRD) of the MLF&RD to carry out the technical review. A first set of field visits is proposed for August 2014, followed by a presentation at the union-level Multi-Stakeholder Review in Nay Pyi Taw.

A second set of field visits is scheduled to take place in September or October 2014, with exact dates to be agreed between DRD and the Consultant.

The Technical Audit Consultant shall provide his/her services to the NCDDP and shall report to the Director of NCDDP. The Consultant shall be contracted for a total of 30 days of work over a period of 3 months.

The Consultant will carry out this assignment through two short-term missions to Myanmar. Missions will include travel to Nay Pyi Taw and Project townships.

3. Detailed Duties

The consultant will:
(i) Review the technical design quality of a purposively selected sample of year 1 sub-projects;
(ii) Assess the adequacy of Quality Control / Quality Assurance (QC/QA) mechanisms for these sub-projects at local, township and central levels;
(iii) Review the quality of Technical Assistance, Supervision and Infrastructure Management;
(iv) Assess the adequacy of sub-project Operations & Maintenance arrangements; and
(v) Verify sub-project adherence to relevant environmental and social safeguard procedures.

The consultant will present preliminary findings at the multi-stakeholder review for year 1 of the Project in August 2014, and will conduct a brief lessons learned and key issues training to technical staff of the Department of Rural Development and to Project Technical Facilitators at a related learning event.

A draft report will be prepared and submitted to DRD by September 15, 2014, and a final report will be submitted by October 15, 2014.

4. Knowledge, Skills and Abilities

- Advanced degree in engineering.
- At least 15 years experience working on infrastructure and/or community based development projects.
- Prior experience evaluating infrastructure in donor (and ideally World Bank) financed projects.
- Prior experience working in South-East Asia, ideally with remote ethnic minorities, desirable.
- Ability to work as part of a team and to meet deadlines.
- Fluency in English.

Annex B: Consultant's Reporting Obligations

Position: Technical Audit Consultant

The consultant will provide his/her service to the National Community Driven Development Project (NCDDP) implemented by the Department of Rural Development (DRD).

Some key tasks

Key deliverables of this assignment include:

(i) **Presentation** of preliminary findings at the multi-stakeholder review for year 1 of the Project on 19-20 August 2014;

(ii) **Brief training** on lessons learned and key issues to technical staff of the Department of Rural Development and to Project Technical Facilitators at a related learning event on 21 August;

(iii) **Report on findings.** A draft report will be prepared and submitted to DRD by September 15, 2014, and a final report will be submitted by October 15, 2014.

Annex C: Cost Estimate of Services, and Schedule of Rates

(1) Remuneration of Staff

Name of Consultant	Rate (per day in USD)	Time spent (number of days)	Sub-Total (USD)
Garvan O'Keeffe	$450 (including all taxes)	30	13,500
			13,500

(2) Reimbursables[6]

	Rate (USD)	Units	Sub-Total	Remark
(a) Airfare to/from Myanmar (economy class, roundtrip Vientiane – Nay Pyi Taw)	$800	2	1,600	
(b) Hotels while in Myanmar	$80	25	2,000	
(c) Per diem while in Myanmar	$20	25	500	
(d) Domestic airfare and other travel costs for Project site visits	$150	15	2,250	
			6,350	

TOTAL COST ____**USD19,850**_____

[6] To include expenses for international travel, local transportation, per diem, communications, reporting costs, visas, inoculations, routine medical examinations, porterage fees, in-and-out expenses, airport taxes, and other such travel related expenses as may be necessary; reimbursable at cost with supporting documents/receipts; except for per diem (which is fixed and includes housing and _____ expenses).