



MINISTRY OF EDUCATION

Te Tāhuhu o te Mātauranga

ICT INFRASTRUCTURE IN SCHOOLS

Including the School Network Upgrade Project (SNUP)

Operations Manual

Version v1.0

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FOREWORD

ICT infrastructure in schools is a crucial asset for the Ministry of Education (MoE). There are specific requirements that govern how ICT infrastructure in schools should be managed.

The School Network Upgrade Project (SNUP) is a Ministry project currently in progress that subsidises and manages the upgrade of schools' internal cabling infrastructure. SNUP provides schools with high quality data infrastructure to an approved Ministry standard, allowing for future network expansion and for the use of ultra-fast broadband (UFB) in teaching and learning programmes.

This Operations Manual has been created to assist the Ministry and its suppliers with the ongoing process and administrative tasks associated with installing ICT infrastructure in schools. Its primary purpose is to provide some background on the SNUP process and guidance on how the installation of ICT infrastructure in schools should be managed.

Part one contains an overview of the history and background of SNUP.

Part two contains information and general activities that are not specific to any one ICT installation project delivery phase.

Part three contains the breakdown of each ICT installation project phase, with specific actions and outcomes.

For up to date information on the status of the project, visit the Ministry of Education website, <http://www.minedu.govt.nz>, and search for 'School Network Upgrade Project'

OUTCOME STATEMENT

This Operations Manual will assist provision of a robust school network infrastructure to enable full use of ultra-fast broadband and to maximise teaching and learning opportunities.

1 OVERVIEW – SCHOOL NETWORK UPGRADE PROJECT

1.1 Background

The Government has an objective to provide 97.7% of schools and 99.9% of learners with access to ultra-fast broadband capability by June 2016. The Government has a strategic objective to ensure that schools can take full advantage of twenty-first century learning methods, and that learners are well-prepared to work with new technologies.

Much of this will be enabled through the Network for Learning (N4L) project which will deliver a range of cost-effective managed services such as high-definition video conferencing, electronic assessment, online moderation, learning management, school administration, and cyber safety.

For the full benefits of the Network for Learning project to be realised, it is vital that schools have access to internal and external networks that fully utilise UFB speeds. This includes fibre running past the school (as provided by the UFB initiative managed by Crown Fibre Holdings Limited (CFH)), a school connection to the fibre (as provided by the Ministry's Schools Connection Project) and an upgraded internal network that can distribute broadband speeds to the devices and wireless access points around the school (as provided by SNUP).

The business case for the Network for Learning project recognises this dependency when it states that SNUP is a necessary asset. SNUP began in 2004, prior to the national roll-out of ultra-fast broadband.

The Ministry has established the Technology in Schools programme (containing SNUP, Schools Connection Project and Network for Learning) as one of its main mechanisms for achieving the Government's strategic goals.

The Ministry adopted the centralised management of school upgrades (represented by the SNUP approach) because the decentralised management of networks by schools did not provide sufficient incentive for them to adopt ultra-fast broadband to a level of quality sufficient to meet government objectives. SNUP has set sector and government expectations that there will be consistency in the quality of school networks.

1.2 SNUP background overview

SNUP (cabling-only) installation

The SNUP project provided high quality ICT infrastructure to schools, delivering modern internal ICT network cabling to enable high quality and high speed internet access. It also upgraded electrical systems throughout the school to support the ICT infrastructure installation, and supplied other hardware as necessary to take full advantage of the Government's investment in ultra-fast fibre.

SNUP Lite

In the aftermath of the Christchurch earthquakes and the subsequent lessons learned, a number of schools had and still have major improvement work being undertaken, such as seismic strengthening. SNUP Lite installations were designed to ensure these schools had full connectivity before this building improvement work was finished, with the design allowing schools to remove the new wireless equipment and re-install it as required once building or remediation work is complete.

This option did not include the upgrade or replacement of existing data cabling as this is undertaken as part of the separate school building improvement projects.

Although SNUP Lite was developed to assist Christchurch schools through their various transitions after the earthquake, it was deployed at a national level as required.

1.3 The SNUP project

The SNUP project is a successful work in progress, providing high quality ICT infrastructure to schools. The project is due to finish in December 2015. As at 30 June 2014 1,643 schools had received an upgrade. The remaining 759 schools were in the programme and at various stages of their installation.

Table 1 provides a history of the various stages in the project since inception.

Table 1: History of school upgrades

Year	Milestone	Total Upgrades
Foundation work		
2003 – 04	Publication of standards for the design and installation of network cabling and switching in schools. These standards are revised by the SNUP project as technology evolves.	-
2004	Survey of all school networks completed. This provided information on the state of networks and ranked them against a range of criteria, including the new network standards.	-
Stage 1 (SNUP 1)		
2005	Pilot run. Identification and upgrade of 35 schools deemed most in need.	35
2006 – 07	Stage 1 <i>complete</i> – 325 schools.	360
Stage 2 (SNUP 2)		
2007 – 08	Stage 2 <i>complete</i> – 91 schools.	451
2009	Stage 2 extension <i>complete</i> – 12 schools.	463
Stage 3 (SNUP 3)		
2010 – 11	Stage 3 (3.1) <i>complete</i> – 100 schools.	563
2010 – 12	Stage 3 extension <i>completed</i> . SNUP 3.2 – 124 schools SNUP 3.3 – 119 schools	806
Stage 4 (SNUP 4)		
2011 – 13	Stage 4 in progress – 244 schools (35 complete)	1,050
Stage 5 (SNUP 5)		
2012 – 2014	Stage 5 in progress -	
Stage 6 (SNUP 6)		
2014 – 2015	Stage 6 now in progress	

The project has reliable planning and purchasing models to ensure upgrade work is appropriate and cost-effective. These are reviewed on an ongoing basis.

1.4 Scope of a SNUP upgrade

The scope of work is the upgrade of ICT infrastructure within the school precinct. It does not cover the connection of fibre from the road to the school (this is covered by the Schools Connection Project).

A typical school network upgrade starts in a server room where the core network switch is usually located. Fibre backbone cables run from the core switch to an edge switch in each building. From there, copper network cabling connects the edge switch to data outlets. SNUP currently provides four data outlets per classroom. If required, a double three-pin power outlet is installed alongside each new data outlet.

The Ministry ensures technical standards applied to the work are nationally consistent, and since 2012 has ensured new wireless guidelines are applied. Wireless was then officially introduced into the SNUP project in June 2013.

Table 2: Current SNUP scope technical inclusions/deliverables and exclusions

Included	Excluded
<ul style="list-style-type: none"> • Project management of the upgrade • Professionally designed and implemented cabling installation with a 20-year performance warranty • Data outlets • Dual 3-pin power outlets alongside data outlet where required • Managed Ethernet switches • Connectivity for wireless access points and electronic whiteboards • Servers (where required) • Uninterruptable power supplies (where required) • Network documentation • Handover of the ongoing operating management services and infrastructure maintenance • Provision of wireless access (hardware, where required) 	<ul style="list-style-type: none"> • Fibre connection from the road to the school (<i>in scope for the Schools Connection project</i>) • Any building works required by the school for the upgrade to proceed • High-voltage power upgrades and mains switchboard work • Desktop or laptop computers • Software • Backup solutions • Ongoing operating management services and infrastructure maintenance • Provision of wireless access (management) • Future replacement of infrastructure

2 GENERAL

2.1 Operations Manual: scope, objectives, and interpretation

2.1.1 Scope

This Operations Manual covers the essential aspects of process and administrative tasks involved in an ICT infrastructure project. It does not intend to cover specific contract management or post-SNUP file management responsibilities other than to provide an overview and, where appropriate, points for the user of this manual to consider or implement.

It should be noted that ICT infrastructure in schools is a crucial asset for the Ministry and as such needs to be managed by specialist project managers familiar with the Ministry ICT Standards and requirements and who are able to demonstrate experience having worked in the SNUP project.

2.1.2 Objectives

The purpose of this Operations Manual is to:

- a) Inform what and how ICT cabling work was carried out under SNUP
- b) Capture current process on installation of ICT infrastructure; and
- c) Identify process for how future ICT cabling work is to be done in schools.

2.1.3 Glossary of terms

For the purposes of this Operations Manual the following glossary of terms shall apply.

Table 3: Glossary of terms

ICT	Information and Communications Technology
Installer	A person that places or fixes equipment or machinery in position ready for use. The party(s) responsible for the supply, installation, testing and warranty of cabling systems
Integrator	A person that integrates wireless solutions with an existing ICT cabling infrastructure, ready for use. The party(s) responsible for the supply, installation, testing and warranty of wireless systems
MoE/Ministry	Ministry of Education
NDP	Network Design Plan
Practical completion	The stage in the execution of the works under the contract where the Contract Works are complete
Project closure	The stage in the execution of the works under the contract where Contract Works has been closed and all appropriate documentation (including warranties) has been provided to either the school or the Ministry of Education representative.
Project Manager (PM)	Person or organisation responsible for delivering individual SNUP project to completion
QA	Quality assurance
SNUP	School Network Upgrade Project
UFB	Ultra fast Broadband

2.2 Supporting information

2.2.1 Cabling supplier and installer database

The use of the Ministry's recommended suppliers and certified installers ensures a school's network upgrade meets cabling and switching manufacturers' standards (as well as the Ministry's network standards), delivering a high quality network infrastructure.

The Ministry has pre-approved a group of individuals and companies to supply and install ICT cabling products in schools. These suppliers have confirmed their compliance with the Ministry Standards and requirements. These companies must be used by schools for ICT cabling regardless of whether the network is being upgraded by SNUP or independently from the project. Product warranties are usually invalidated if they are installed by a company that is not recognised as certified by the supplier.

An installer company must have at least one representative who has attended the Ministry of Education's ICT Standards training course on site every day.

For further information see:

<http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/Initiatives/ICTInSchools/ICTInitiativesAndProgrammes/ICTInfrastructure.aspx>

2.3 Project Delivery

2.3.1 General description

Successful delivery of each SNUP project requires delivery of the approved Network Design Plan, the supply, installation, and commissioning services of the school ICT network, and the administrative tasks and coordination that occur across all parties involved in the process to avoid unnecessary costs and delays.

2.3.2 Project participants

Typically there are five main participants that have specific tasks and responsibilities within the project. They are:

- a) The Ministry of Education. Generally the ICT cabling project instigator and primary funder of ICT cabling in educational facilities
- b) Project Manager. Generally a specialist external contractor engaged by the Ministry to provide project management functions
- c) Installers. Ministry approved and manufacturer certified individuals or companies who undertake installation of ICT cabling in educational facilities
- d) Integrators. Ministry approved and manufacturer certified individuals or companies who undertake installation of wireless solutions in educational facilities
- e) Schools. The secondary funder and beneficiary of the ICT cabling. Generally refers to the Principal, Proprietor, or their nominated IT representative

There are other participants that may be engaged from time to time, for example product suppliers, electricians, or specialist advisors such as engineers.

2.3.3 Ministry of Education tasks and responsibilities

Action	Outcome
Manages overall ICT infrastructure programme	In conjunction with the Project Manager, ensuring all installation work is done by industry-accredited and manufacturer-certified persons, that cabling installers are Ministry accredited, and products and services meet MoE's specifications and standards.
Approves Network Design Plan	NDP meets MoE's specifications and standards
Approves tender evaluations	Costs are within budgeted allocation
Approves variations	Variations are justified and approved

2.3.4 Project Manager tasks and responsibilities

Action	Outcome
Overall project management, including adherence to NDP, timing and quality	PM accountable for the overall success, quality and timeliness of school upgrades
Manages installers, integrators, suppliers for all aspects of the scope of work	Delivers project to requirements, final documentation including costs, certificates, warranties, as-built plans, and final sign-off.
Submit the job completion certificate signed by the school to MoE's Regional Office at the completion of the installation via an online project management tool. Submit any other documentation as agreed as required.	Appropriate and relevant documentation stored in a stable and accessible online facility
Obtain maximum long-term product installation and performance warranties	Coordinate and manage the warranty process for SNUP projects till the end of 2017, activate the claim, engage the installer (original or backup) and manage the issue to resolution

2.3.5 Installer/ Integrator tasks and responsibilities

Action	Outcome
Contributes to Network Design Plan	Clearly understands work required to ensure smooth installation and seamless integration with a schools existing network.

2.3.6 School tasks and responsibilities

Action	Outcome
Accepts timeframes for work to be completed	Requests from Ministry, Project Manager, or Installers/ Integrators are completed within specified timeframes
Accepts Network Design Plan	
Ensures they receive copy of certificates, warranties, as-built plans, and final NDP for records	Accurate records kept of all work and warranties
Coordinate any warranty requests through the PM for first 2 years	Maintain relationship with PM. Minimise time taken to resolve any issues

2.4 Project Administration

2.4.1 General description

Project administration supports each ICT infrastructure project through the maintenance of detailed project records for QA and an audit trail, including financials, documentation covering decisions for work plans, sub-contractors, costs and timings.

2.4.2 Ministry of Education tasks and responsibilities

Action	Outcome
Stores and manages documentation according to MoE Policies	Audit trail maintained Accurate records kept
Organise all travel and accommodation related to undertaking the project work.	Travel arranged in advance and following MoE guidelines to minimise cost to MoE

2.4.3 Project Manager tasks and responsibilities

Action	Outcome
Organise all travel and accommodation related to undertaking the audit and installation work.	Travel arranged in advance and following MoE guidelines to minimise cost to MoE
Use version control methodology on all drawings	Supplies documentation including costs, certificates, warranties, as-built plans and final NDP to MoE in .pdf, and .dwg format
Ensure that final draft audit designs are sent as a set of sheets in .pdf format to the MoE for approval.	Provide electronic copies of all plans and documentation to MoE
Work with each school to include their current ICT support organisation to take part, at their own cost, in the system integration and system administration training so that the school may continue to be supported post-installation.	Ongoing ICT support of school remains current
Facilitate the introduction of an ICT support organisation, where none currently exists, so that the school may continue to be supported post-installation.	Ongoing ICT support of school remains current

2.4.4 Installer/ Integrator tasks and responsibilities

Action	Outcome
Ensure workmanship is to manufacturer and Ministry standards	Minimises instances of rework required
Supply required warranties	Provides necessary level of ongoing risk mitigation for school and Ministry
Organise all travel and accommodation related to undertaking the project work.	

2.4.5 School tasks and responsibilities

Action	Outcome
Ensure access to site for audits and installation is provided with minimal delay to Project Manager and Installers	ICT cabling process is completed efficiently and within timeframe

2.4.6 Other party tasks and responsibilities

Action	Outcome
Product suppliers – Ensure installation is completed to	Provides necessary level of ongoing risk mitigation for

Ministry specified certifiable standard	school and Ministry
Product suppliers – Issue long term product installation and performance warranties	Provides necessary level of ongoing risk mitigation for school and Ministry
Organise all travel and accommodation related to undertaking the project work.	

2.5 Contract Administration

2.5.1 General description

The key focus of contract administration is to actively manage the submission and approval of any variations to a scope of works. This ensures shared understanding of the agreed changes between all stakeholders.

2.5.2 Ministry of Education tasks and responsibilities

Action	Outcome
Approve variations	Schools receive suitable upgrade for their needs, where necessary
Agree a simple payment regime for upgrades	
Pay progress and final payments to the project manager and suppliers on invoice	Ensures contractors are correctly paid in a timely way to ensure relationships remain positive

2.5.3 Project Manager tasks and responsibilities

Action	Outcome
Recommend variations and submits to Ministry for approval	Balance budgetary needs of Ministry vs. long term ICT needs of schools
Present all invoices to MoE for payment in accordance with Schedule	Follows due process to ensure timely payment of installers

2.5.4 Installer/Integrator tasks and responsibilities

Action	Outcome
Submit variations and invoices to project manager	Follows due process to ensure timely payment of installers
Invoice MoE	Follows due process to ensure timely payment of installers

2.5.5 School tasks and responsibilities

Action	Outcome
Approve designs	Understands and approves of upgrade work to be progressed
Payments to PM on final approvals	Follows due process to ensure timely payment of installers

2.6 Quality Assurance

2.6.1 General description

The key focus of this process is to ensure the project deliverables are as per the defined quality requirements outlined in the Scope of Works. It covers a scheduled network installation audit regime for every school upgrade, to identify and report variations from the required industry and MoE standards, and ensure they are remediated by the installer or integrator.

2.6.2 Ministry of Education tasks and responsibilities

Action	Outcome
Set QA schedule for each school upgrade	Regular QA scheduling undertaken to minimise exposure to risk

2.6.3 Project Manager tasks and responsibilities

Action	Outcome
Assist MoE or its nominated representative to inspect and test selected installations to demonstrate to the satisfaction of MoE that the installation satisfies the requirements of MoE's ICT Infrastructure Standards.	
Undertake scheduled network installation audits	
Identify and report variations from the required industry and Ministry standards	Ensure variations are remediated by the installer / integrator.

2.6.4 Installer/ Integrator tasks and responsibilities

Action	Outcome
Remedy any issues raised by QA	

2.6.5 School tasks and responsibilities

Action	Outcome
Raise any QA concerns with Project Manager	

2.6.6 Other party tasks and responsibilities

Action	Outcome
Manufacturers - provide QA and sign off of installation	

3 PROJECT DELIVERY PHASES

3.1 SNUP – current state (2014)

Standard SNUP installation

The SNUP project is responsible for providing high quality ICT infrastructure to schools, delivering modern internal ICT network cabling to enable high quality and high speed internet access. It upgrades electrical systems throughout the school to support the ICT infrastructure installation, and supplies other hardware as necessary to take full advantage of the Government's investment in ultra-fast fibre. A typical installation consists of a hybrid approach; however there are times when a wireless-only installation is required.

SNUP hybrid installation

In most cases schools have required hybrid networks where access is provided by both wired cabling (Ethernet) and wireless technologies. A wired cabling solution ensures that schools have the required infrastructure to meet the schools needs in the foreseeable future, including the capacity to support wireless as schools begin to transition to Bring Your Own Device (BYOD) in the modern learning environments.

A SNUP installation typically includes a hybrid mix of wired cabling and wireless solutions to best fit individual schools needs.

SNUP wireless-only installation

A SNUP wireless installation occurs as a special circumstance only, where schools have major school building improvement work being undertaken such as seismic strengthening. In many cases these school building improvement projects are forecast to be undertaken and completed in the future. SNUP wireless installations are designed to ensure these schools have full connectivity while the build project is being planned or during the construction period, with a key feature of this approach being it allows schools to remove the new wireless equipment and re-install it as required once building work is complete.

SNUP wireless does not include the upgrade or replacement of existing data cabling in the affected buildings as this is undertaken as part of the school building improvement projects.

Servers and power supplies are generally kept in use and eventually replaced by the school as part of the normal depreciation cycle.

3.2 ICT infrastructure project phases

Each individual ICT infrastructure project is broken down into four distinct phases.

Initiation	Decisions made concerning who is to carry out the project, and which party (or parties) will be involved.
Planning	A complete audit of a school's existing network infrastructure and designs for upgrading to Ministry standards. This involves identifying the expectations that all of the involved parties have with regard to the project result and delivery of a Network Design Plan.
Delivery	The physical upgrade work carried out as per the Network Design Plan and specifications
Closure	Everything necessary to bring the project to a successful completion. Final processes performed to conclude all activities across all involved parties to formally complete the project, phase, or contractual obligations. Lessons learned are identified and documented (future projects may use these lessons and avoid project failure)

3.3 Initiation Phase

3.3.1 Introduction

This phase covers activities that take place to get an ICT infrastructure project established and underway.

Table 4: Initiation process flow

Activity	Organisation	Who	Action	Outcome
Select school for ICT infrastructure work	Ministry		Send Invitation Pack which includes cover letter, Information Booklet*, Acknowledgement to Audit form, Network Design Questionnaire	School notified of invitation
	Ministry		Contact school via phone and email to confirm receipt of Invitation Pack, respond to questions, and negotiate date for return of signed form	School completes necessary forms to allow scheduling to take place
Acknowledgement of Audit	School	Principal Proprietor	Accepts Acknowledgement to Audit, completes and signs Acknowledgement to Audit letter and returns to Ministry	Acknowledgement to Audit received in writing
	Ministry		Receives signed Acknowledgement to Audit	Uploaded to FileNet and emailed to PM along with CAD drawings for school
	Ministry		Provide school size, address, and contact details to Project Manager	Project Manager prepares for Audit
	School	School IT manager or representative	Completes Network Design Questionnaire	Collates relevant information such as upgrade / renovation plans and timing constraints in preparation for School Audit procedure
Preparation for Audit	Project Manager		Upload to Project Management Portal all relevant documents	
	Project Manager		Analysis whether combination of school location and size require full or partial attendance by Installer for audit purposes	Notify relevant installers if required for full audit
	Project Manager		Ensure cabling installers are registered, certified/ qualified and are manufacturer certified	Suitably qualified people are undertaking work

* There are SNUP specific documents that can be utilised to support any ICT infrastructure project

	Project Manager		Ensures installers are Police vetted	Submit installers to Ministry for Police vetting if required
	Project Manager		Ensure that the installer has engaged with its sub-contractors (electrical, trunking and wireless product installers, civil works and pits providers) as necessary	Confirmation received and recorded on PM Portal

3.4 Planning Phase

3.4.1 Introduction

Table 5: Planning process flow

Activity	Organisation	Who	Action	Outcome
Undertake school network site audit	Project Manager		Review school survey questionnaire	
	Project Manager		Review school plans and constructions details to the extent available	
	Project Manager		Liaise and coordinate with the schools regarding obtaining access to schools for audit	
	Project Manager		Include the cabling installer and wireless integrator in the audit process.	
	Project Manager		Coordinate any site visits Organise travel and accommodation	
	Installer Integrator		Organise travel and accommodation	
	School		Provide physical access to school	
	School	School IT manager or representative	Confirm relevant information such as upgrade / renovation plans and timing constraints	
	School	School IT manager or representative	Supply all relevant school network data e.g. IP addresses	
	Project Manager		Collate all relevant school network data e.g. IP addresses	
	Project Manager		Audit the school against Ministry standards and project scope including: - current state - data cabling - wireless - power distribution system - server set-up and server room, including UPS - Ethernet switching - cabinet and trunking requirements - pathways internal and external	
	Project Manager		Verify existing warranties (if any)	
	Installer / Integrator		Provide proposed costs for travel and accommodation	
	Project Manager		Upload Audit documentation to PM Portal	
	Project Manager		Send invoice to Ministry	
Ministry		Pay Invoice for Audit		
Project Manager		Establish school short/medium requirements		

Create Network Design Plan	Project Manager		Design data cabling and power system upgrades	
	Project Manager		Produce the design to upgrade any associated low voltage power system to meet MoE standards	
	Project Manager		Collaborate with cabling installer and wireless integrator to reach agreed design.	NDP may be a combination of new infrastructure and upgrade to the existing network infrastructure
	Project Manager		Seek clarification of NDP from Ministry as required	Minimise rework to NDP at QA stage
	Project Manager		Liaise with the Ethernet switching contractor for the delivery, installation, and commissioning of Ethernet switches for each upgrade	Switches shall be covered for failure by a same-day courier-dispatched replacement for a 5-year manufacturer warranty period
	Project Manager		Identify requirement for a UPS/storage server (where required) and engage a systems integrator to integrate the server with existing personal computers and Internet connection	The server hardware shall be covered by the Manufacturers' Warranty.
	Project Manager		Share the audit outcomes (designs) with schools through an iterative process to produce an agreement.	Set expectations and ensure buy-in from school
	School	School IT manager or representative	Check design/NDP with project manager	
	Integrator		Review project order including NDP and Access Point/Wireless Access Point	
	Installer		Familiarise self with NDP	
	Project Manager		Ensure the installer and integrator have a thorough understanding of and accept the NDP	Preparation for installation
	Installer / Integrator		Accept and support NDP	PM has agreement and support of NDP
Project Manager		Specify changes required to existing network to support the new WLAN solution		

	Installer / Integrator		Provide detailed pricing estimates including non-rate carded elements, such as travel, accommodation, quantities of stock etc	
	Project Manager		Collate a detailed final upgrade price based on the installer's and integrator's estimated numbers of hours to complete their work, and using their pre-agreed rate cards, product suppliers' rate cards, and non-rate carded elements.	
	Project Manager		Ensure NDPs are signed by the schools; that they accept the plan and the estimated total cost of installation.	
	School	Principal / Proprietor and School IT manager or representative	Negotiate final changes with project manager	
	Project Manager		Document full scope of required upgrade in the NDP	Produce a network infrastructure design that meets Ministry requirements and standards.
	Project Manager		Submit NDP budget estimates to MoE for each upgrade for approval	
	Ministry		Approve NDP	
	Ministry		Approve budget	
	Ministry		Approve go-ahead to Project Manager	
	Project Manager		Confirm go-ahead to Ministry/ Advise School	
	School	Principal / Proprietor	Accept NDP and cost	
	School	Principal / Proprietor	Accept change freeze on network	
	Ministry		Set acceptance testing criteria	

3.5 Delivery Phase

3.5.1 Introduction

Table 6: Delivery process flow

Activity	Organisation	Who	Action	Outcome
Delivery Phase preparation	Project Manager		Ensure cabling installers have in place as necessary the following in-house or sub-contracted services providers: i. Electrical contractors registered and licensed under the current Electricity Act who shall issue a Certificate of Compliance for the completed work; ii. A trunking products installer; iii. A communications pit installer; iv. A wireless products installer; v. A civil works contractor.	
	Ministry		Set acceptance testing criteria	
	Installer		Engage electrical contractor, trunking installer, and civil works contractor if work not being done by cabling installer	
	Project Manager		Ensure that all wireless integration work is done by manufacturer-certified persons, and meets Ministry and industry specifications and standards.	
	Project Manager		Ensure sub-contractors are Police vetted by Ministry	
	Installer		Ensure that at all times there is a Ministry-standard trained employee on site	
	Project Manager		Liaise with schools and coordinate any site visits	
	School	School IT manager or representative	Provide point of contact for PM	
Delivery of products for the school upgrade	Project Manager		Forecast stock requirements	
	Project Manager		Provide Wireless Project Order	
	Project Manager		Ordering and coordinating the supply and delivery of suppliers' products to each school against in-place Ministry contracts	
	Project Manager		Supply of UPS, storage, network server and integrator as necessary	
	Ministry		Supply of switches, cabinets, patch cords	
	Project Manager		Ensure timely product supply	
	School	School IT manager or representative	Provide details of network data to PM	
	Project Manager		Provide all network data to integrator	

Cabling installation	School		Provide physical access to school	
	Installer		Electrical works as per school's NDP plan Installation of trunking products as per school's NDP plan Ground works as per school's NDP plan Installation of pits as per school's NDP plan	Install services from self and sub-contractors as per the NDP
	Project Manager		Monitor the management of the supply and consumption of cable by the cable installers and centrally procured by MoE	
	Installer		Ensure workmanship is to Ministry standards and electrical certification standards	
	Project Manager		Manage the timing and quality of the work done by cabling installer staff and their sub-contractors (if any)	
	Project Manager		Confirm progress with Ministry and school	
	Installer		Ensure the data cabling installer provides manufacturer performance certification and the electrician provides compliance certification for each installation	
	Manufacturer		Provide QA and sign off installation	
	Installer		Document installation including final as-built plans	
	Installer		Submit a copy of the data cabling performance warranty certificate and electrical certification for each installation to the project manager at the completion of the cabling works	
	Project Manager		Provide QA and sign off installation	
	Installer		Submit all invoices to PM for pre-approval	
	Project Manager		Approve invoices and submit to Ministry	
	Ministry		Approve variations	
	Ministry		Pay the installer on invoice	
Wireless Integration services	School	School IT manager or representative	Supply network data to PM	
	Project Manager		Provide all network data to integrator	
	Integrator		Install services from self- and sub-contractors as per the NDP	

	Project Manager		Managing the timing and quality of the work done by wireless integrators and their sub-contractors (if any)	
	Project Manager		Confirm progress with Ministry and school	
	Integrator		Provide quality assurance on installation	
	School		Provide 2+ people to be trained in wireless network operation	
	Integrator		Provide training in wireless network operation to nominated school representative	
	Integrator		Submit all invoices to PM for pre-approval	
	Project Manager		Approve invoices and submit to Ministry	
	Ministry		Approve variations	
	Ministry		Pay the integrator on invoice	
Certification	Project Manager		Ensure all suppliers have provided warranties and guarantees	
	Project Manager		Confirm completion of installation with Ministry and school	
	School		Confirm completion of installation with PM	
	Project Manager		Provide copies of the Handover Documentation and Operating Manuals to the school.	
	Project Manager		Provide Practical Completion Certificate and documentation to Ministry	
	Ministry		Upload Practical Completion Certificate and documentation to FileNet	All cabling installation work is done by manufacturer-certified persons, and meets Ministry and industry specifications, requirements, and standards.

3.6 Closure Phase

3.6.1 Introduction

Once delivery and practical completion of the project has finished, the closure phase covers the administrative tasks required to close the project and archive the data.

Table 7: Closure process flow

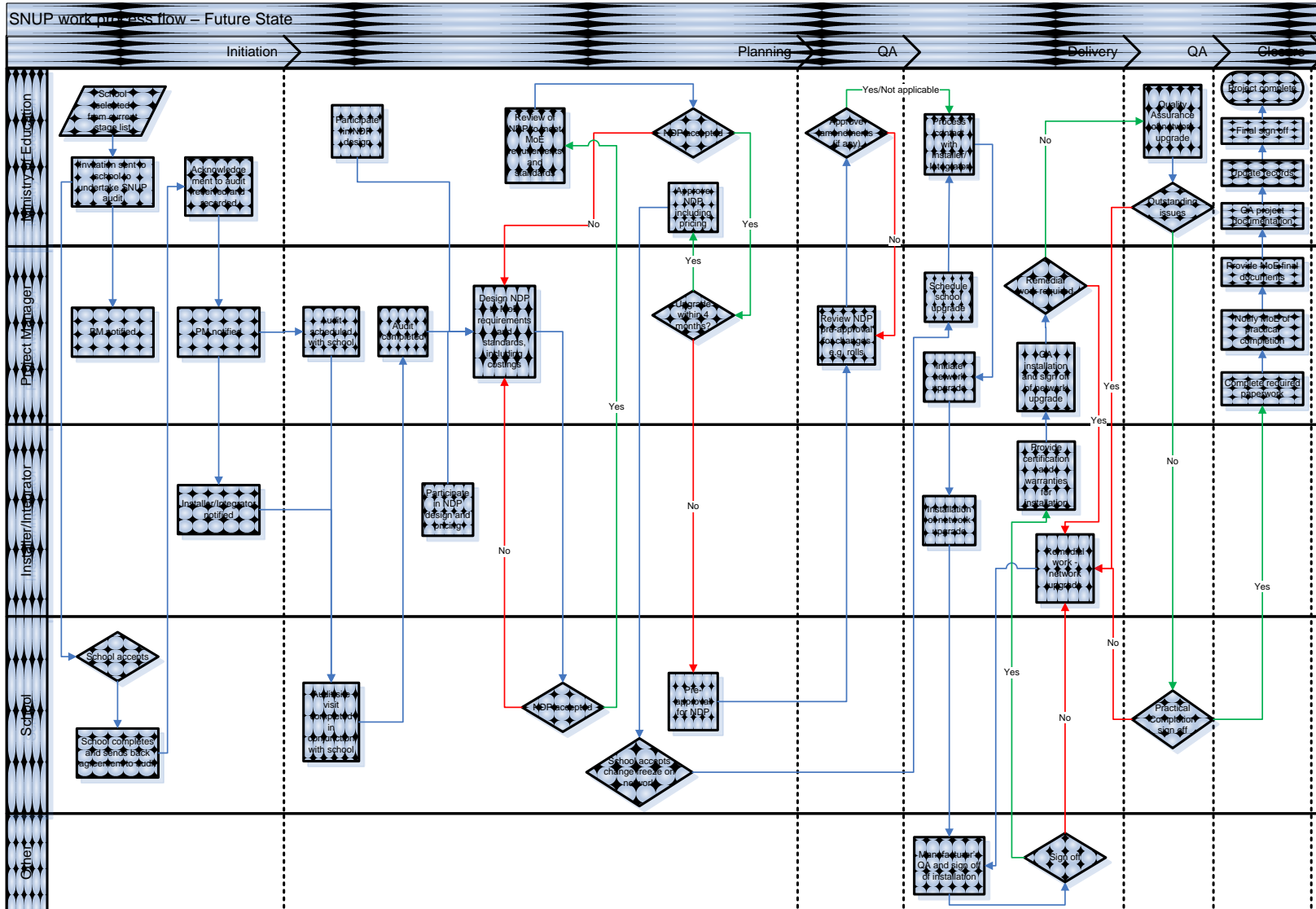
Activity	Organisation	Who	Action	Outcome
Process closure documentation	Project Manager		Collates final documentation including certificates and warranties	
	Project Manager		Submits Project Closure Certificate to Ministry	
	Ministry		QA's completeness of project documentation	
Final invoicing	Installer Integrator		Provide final invoices to PM for approval	
	Project Manager		Approve final supplier invoices	
	Project Manager		Submit final invoices to Ministry	
	Ministry		Pay final invoices	
Project closure	Ministry		Upload documents to FileNet/K2	Up-to-date school infrastructure records are available
	Ministry		Update records	
	Ministry		Final signoff of project	

3.7 Post –SNUP Warranty Structure and Process

3.7.1 General

There is a defect-free warranty period of 24 months during which any problems of workmanship directly associated with the installation will be resolved by the installer. All hardware is covered by the manufacturers' warranties.

APPENDIX A - Process flow chart – SNUP work process flow



APPENDIX B - Invoicing

B1 Overview

B.1.1 Invoice types

The Ministry will receive several invoice types from Project Managers and Installers during the project. They are as follows:

- a) Project management (PM) fees – for each school, one invoice for each milestone phase (or progress claims) as they are completed, as per contract;
- b) Procurement invoices for cabinets and cabling, e.g. actual costs of cabinets;
- c) Procurement invoices for active equipment, e.g. switches, including actual costs;
- d) Asbestos variation invoices – one invoice per school; includes PM fees and the agreed asbestos audit fees from a recommended asbestos auditor;
- e) Installer invoices – These will be pre-approved by the PMs.
- f) Installer variation invoices – These will be direct from the installation company but will be pre-approved by the PM's through the variation process.

The Ministry will process PM invoices on the first day of every month. The Ministry will process installer invoices twice monthly, on the first and fifteenth of every month.

The cut-off point for invoice processing is the close of business prior to processing day. Different days may be negotiated on a case-by-case basis.

The processing of installer invoicing is similar to that of PM fees, except the installer may claim up to 80% of the contract value at installation completion (practical completion). These payments can be claimed in increments of 20%, 30%, 50% or 80%, depending on the size of the job.

B.1.2 Introduction

All prices in this Schedule are GST exclusive.

A Statement of Works will be created by the Project Manager for each school SNUP upgrade. As a minimum it will contain the following:

- a) reference to the Installation Services Agreement
- b) reference to the Network Design Plan
- c) final costs for the works
- d) school details
- e) Project Manager details, including representative phone and email contact details, and address and email for invoices
- f) start and end dates.

The Supplier must supply the Ministry and the Project Manager a detailed invoice before any payment is made. The Project Manager must notify the Ministry whether a Supplier's invoice is approved to be paid before any payment is made.

The Ministry will pay the Supplier on a per-school basis based on the agreed quote and any approved variations to the Statement of Work.

B.1.3 Payments

Payments will include the following for each school as quoted and/or otherwise agreed:

- a) cabling installation
- b) electrical installation
- c) trunking installation
- d) pits installation
- e) wireless product installation
- f) civil works
- g) delivery of relevant documentation
- h) travel and accommodation.

B.1.4 Payments; General

The Supplier is eligible to make one payment claim per month as detailed in this Schedule.

Progress and final payment claims must be invoiced in the format detailed in this Schedule to the Ministry, and submitted for approval to the Ministry's designated project manager for that school. These can be submitted electronically to the project manager's email address.

The Supplier must supply the Ministry a scanned bank account deposit slip at the initiation of the project. If any bank account details change then another deposit slip must be supplied.

The project manager will evaluate all payment claims based on information provided from the Supplier in support of their claims, and pass approved invoices to the Ministry for final approval and payment. The project manager will confirm to the Supplier the Ministry's approval of the Supplier's invoices.

Payment terms are that the Ministry will pay invoices within twenty (20) working days of approval of the invoice by the Ministry.

Table 8: Payment Schedule

School Project Size	Contract Period (Nearest Weeks)	1 st Installer Progress Claim	2 nd Installer Progress Claim	3 rd Installer Progress Claim	Practical Completion Claim	Final Installer Balance Claim	Total Payments
Very small and Small	4 weeks	50%			30%	20%	100%
Medium	8 weeks	30%	30%		20%	20%	100%
Large	12 weeks	30%	30%		20%	20%	100%
Very large and Extra Large	12 weeks +	30%	15%	15%	20%	20%	100%

The project manager will inform the Supplier of the size of the school when first contacting the Supplier. The size of the school is determined by the roll size of the school at the time of the school signing its Agreement to Audit immediately before the project starts.

School sizes are:

Very small – 0-99 students

Small – 100-199 students

Medium – 200-499 students

Large – 500-899 students

Very large – 900-1499 students

Extra large – more than 1500 students.

B.1.5 Progress Claims

The Supplier is eligible to make one payment claim invoice per month, per school (the Supplier has two opportunities in a month to make this claim) to a maximum value of 80% of the total value of the agreed cabling installation price for the school. Each claim must be calculated in relation to the percentage of work complete at the end of that month based on;

- a) the value of equipment delivered to site; and
- b) the value of services completed.

Where progress claims are deemed to be in excess of the actual work completed on site an assessment will be undertaken by the Ministry or its agent and a recommendation will be sent to the Supplier with an acceptable progress claim amount based on:

- c) supporting information provided by the Supplier;

- d) the known or estimated percentage of trenching and ducting completed;
- e) the known or estimated percentage of cables installed;
- f) the known or estimated percentage of data outlets fitted off at the desktop and the cabinet; and
- g) the known or estimated percentage of electrical outlets fitted off at the desktop and the switchboard.

Where a significant dispute arises from the rejection of a payment the clause 'Disputed Invoices' from the Master Agreement is to be applied.

B.1.6 Variations to Schedule of Works

Any equipment or services additional to those included in the Supplier's approved quote must be approved in writing by the Ministry and the School Board prior to invoicing and payment. It is the Supplier's responsibility to indicate any changes required to the draft Network Design Plan before quoting and to include all equipment and services to deliver the Network Design Plan. Foreseeable changes will be accepted at the Ministry's discretion.

Progress and final claims for additional equipment or services must be made as per section 1.4 and 1.5 of this Schedule, where such claims must be detailed separately on the same claim invoice.

B.1.7 Practical Completion Claim

The Supplier will be eligible to issue a practical completion payment claim invoice for up to 80% of the agreed cabling installation price for the school once the following documentation has been received by the Ministry or its agent, and approved as complete:

- a) Site inspection form and verification that all tags have been completed;
- b) Cabling Installation sign-off (Practical Completion) form (see Schedule 5);
- c) Installer Workmanship Declaration (see Schedule 7);
- d) Cabling manufacturer site inspection verification form signed by the cabling manufacturer (to be supplied);
- e) Draft data installation as-builts;
- f) Draft power installation as-builts;
- g) Draft site services as-builts;
- h) Power installation certificate of compliance;
- i) Data installation test results (in original format); and
- j) Site completion photos.

B.1.8 Final Claim

The Supplier will be eligible to issue a final payment claim invoice for the remaining 20% of the Works once the following documentation has been received by the Ministry or the project manager and approved as complete:

- a) Final Claim sign-off form (see Schedule 6);
- b) 2-year cabling installation warranty from the Supplier to the school;
- c) 20-year cabling manufacturers performance warranty;
- d) Final data installation as-builts in AutoCAD format;
- e) Final power installation as-builts in AutoCAD format;
- f) Final site services as-builts or AutoCAD format; and
- g) Delivery of operation and maintenance manual to school.

B2 - Invoice Example

COMPANY LOGO

TAX INVOICE/STATEMENT

FROM: Company
Physical Address

Mob:
Tel:
Fax

INVOICE NUMBER:
GST REG NUMBER:
DATE:
REF: Contract nnn-nnnn

TO: SNUP Team Leader
School Network Upgrade Project
Ministry of Education, 45-47 Pipitea Street, Thorndon
Private Bag 1666, Wellington

DESCRIPTION	QTY	UNIT	UNIT PRICE	\$
School Name [MoE #]		\$	\$	\$
Progress Payment:				
Horizontal Cabling (10%) AG1, BG1,CG1 1 st fix		\$	\$	\$
Backbone Cabling (10%) AG1, BG1, CG1 1 st fix		\$	\$	\$
Patch Cords (inc mounting switches)		\$	\$	\$
Cabinets (50%) Cabinets installed AG1, BG1				
Trunking				
Pathways				
Electrical				
Misc				
Total % of Project value of this claim (10%)				
Total % of project valued claimed to date (30%)				
Variations to Contract				
Horizontal Cabling.....		\$	\$	\$
Total % of Variation value of this claim (15%)				
Total % of Variation value claimed to date (45%)				
COMMENTS:		SUB-TOTAL		\$
School Network Upgrade Project Final Phase		GST @ 12.5%		\$
Contract No: NNN-NNNN		TOTAL		\$
Tax Invoice for Payment of Agreement Costs		(GST INCLUSIVE)		\$

Please pay within 20 working days of Ministry approval (as per Contract nnn-nnnn).

Note: This will usually occur in the first or third week of every month.

Payable by Direct Credit to XXXXX Ltd

Bank account No.

Bank: Branch:

Accounts Receivable Contact Name and Details:

APPENDIX C - Forms

C1 Template Forms

C.1.1 Cabling Installation Practical Completion Sign-off

	Please Complete
SNUP Stage	Final Phase
School Name	
School Number	
Cabling Installer	

CHECK	YES	NO
All cabinets installed and cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet labelled with 100mm x 40mm engraved (not printed) self adhesive label	<input type="checkbox"/>	<input type="checkbox"/>
All outlets labelled on the plates and behind the plates as per the RFP	<input type="checkbox"/>	<input type="checkbox"/>
Number of data outlets installed as per the RFP scope of works _____	<input type="checkbox"/>	<input type="checkbox"/>
New electrical switch board installed and properly labelled (if required)	<input type="checkbox"/>	<input type="checkbox"/>
Number of power outlets installed (and labelled) as per the RFP scope of works _____	<input type="checkbox"/>	<input type="checkbox"/>
Training provided on how to patch (connecting outlets to the switch)	<input type="checkbox"/>	<input type="checkbox"/>
All documentation provided to [insert project manager name] including site inspection forms and tag completion verification, installer workmanship declaration, cabling manufacturer inspection forms, draft as-built drawings for Data, Electrical and Site Services (Pathways), photo's, Electrical COC, Test results in original format.	<input type="checkbox"/>	<input type="checkbox"/>
The school has received all of the documentation bound in an A4 folder	<input type="checkbox"/>	<input type="checkbox"/>
All data outlets tested and soft copy provided to [insert project manager name] in original scanner format and tested to ASNZS3080 Standard.	<input type="checkbox"/>	<input type="checkbox"/>
All power outlets tested and live	<input type="checkbox"/>	<input type="checkbox"/>
Contact details of the installer provided to the school to cover the installation from defects for 24 months	<input type="checkbox"/>	<input type="checkbox"/>
Server on a separate electrical, RCD protected circuit and tested.	<input type="checkbox"/>	<input type="checkbox"/>
Manufacturer of Cabling has inspected the site and has provided a signed copy of the MoE site inspection form. (Installer cannot self inspect)	<input type="checkbox"/>	<input type="checkbox"/>
Copy of Electrical Certificate of Compliance provided for electrical work carried out	<input type="checkbox"/>	<input type="checkbox"/>

C.1.2 Cabling Installation Sign-off and Acceptance

Cabling Installation Sign-off and Acceptance

Installation was completed on _____ and has been finished to my satisfaction.

Installers Name: _____ Signature: _____

Date Submitted: _____

Project Manager: _____ Signature: _____

Date: _____

Comments: _____

Principals Name: _____ Signature: _____

Comments: _____

C.1.3 Final Claim sign-off

	Please Complete
SNUP Stage	Final Phase
School Name	
School Number	
Cabling Installer	

CHECK	YES	NO
2-year cabling installation warranty from the Installer to the school	<input type="checkbox"/>	<input type="checkbox"/>
20-year cabling manufacturers performance warranty	<input type="checkbox"/>	<input type="checkbox"/>
Final data installation as-builts in Visio or AutoCAD format	<input type="checkbox"/>	<input type="checkbox"/>
Final power installation as-builts in Visio or AutoCAD format	<input type="checkbox"/>	<input type="checkbox"/>
Final site services as-builts in Visio or AutoCAD format	<input type="checkbox"/>	<input type="checkbox"/>
Delivery of operation and maintenance manual to school	<input type="checkbox"/>	<input type="checkbox"/>

Final Sign-off and Acceptance

Installation was completed on _____ and has been finished to my satisfaction.

Installers Name: _____ Signature: _____

Date Submitted: _____

Project Manager: _____ Signature: _____

Date: _____

C2 Installer Workmanship Declaration

If you are uncertain of the completion status of any of the items you are required to sign off, please request further information from the project manager.

School Name	
School Number	
Practical Completion Date	
Installation Company	
Company Representative	
Email Address	
Phone Number	
Fax Number	

I warrant that all aspects of the installation completed at the above school will be free from installation defects for a period of 24 months from the date of cabling sign-off.

I confirm that I have the authority to commit our company to rectifying any issues identified at our own expense within 10 working days.

Signature: _____

Date: _____

APPENDIX D - Service levels

D1 Service Level Agreement (SLA)

The Works will be delivered in accordance with this Service Level Agreement (SLA) for Cabling Installation.

Service elements	Service Levels	Action	Timeframe	Achievement
Management	Relationship managers	Manage the compliance of the SLA	On-going	100%
Service management	Availability	Normal business hours E-mail support	Coverage parameters 8.30am – 5pm working days	100%
Service Delivery	Availability	Urgent afterhours assistance for failures affecting cutovers in the weekend or holidays	Same day	95%
Liaison with Ministry's Project Manager	Installation	Coordination and meetings	As required	98%
Service delivery	Quality	Installation to be done to Ministry standards and where appropriate to manufacturer standards	ongoing	100%
Service delivery	Installation	Each stage on installation to be completed by the dates agreed with the project manager	As agreed	98%
Service delivery	Project management	Project management and site supervision of employees and sub-contractors	ongoing	100%
Warranty	Issuance	Guaranteed warranty turnaround after installation is complete	2 weeks	95%
Warranty	Issue rectification	A fault established as being related to a warranty issue for any component within the cabling installation solution is rectified and tested to warrantable standard	10 working days	98%

APPENDIX E - Auditing

E1 School Audit Process

E.1.1 *Fixed price for schools*

The Ministry works through a number of stages to reach a final price for each school's ICT infrastructure upgrade. An audit of their existing school network by the PM is carried out to gain an understanding of the schools existing network and requirements and to give a preliminary indication of the best case/worst case price scenario. All schools must be audited before work begins.

At that point:

- a) The school confirms they have funding for their share of the cost.
- b) The school approves the proposed design (NDP).
- c) The job to upgrade the school network is priced.
- d) A final price is accepted and a contract signed between the Ministry and the installer.
- e) A school contribution form is then signed confirming what their final contribution will be.

E.1.2 *Audits*

On the scheduled audit date, the PM will go onsite to the school and audit the school's network infrastructure. The audit will capture the existing state of the network including details such as the number of data outlets (TOs) & power outlets (GPOs), state of existing devices e.g. switches, servers, UPS, cabinets and power boards. During the audit the PM will discuss the school's network requirements with the school's site contact.

E.1.3 *Asbestos*

If the school is aware of the presence of asbestos, the PM will manage this as per the asbestos process. They will usually request a variation for an asbestos audit. The Project Officer processes this as a regular variation (just in the asbestos section of the spreadsheet). NOTE – MoE has specific requirements in recording and dealing with asbestos. This information can be found at <http://www.minedu.govt.nz>

E.1.4 *Network Development Plan (NDPs)*

The NDP is a written report for each school based on the PM's audit findings and a network drawing of the recommended upgrade. The NDP report will document the details of the existing network, indicate how much is compliant and following the Ministry's standards, and how much needs replacing. It will document whether new switches, servers or UPS' are also required.

The drawing is based on the school layout plans and will show the existing network, and what new proposed infrastructure is required.

The NDP will estimate a preliminary best- and worst-case estimate for an upgrade of the school.

NDP school approval

When the PM has completed the audit and documented their findings they will release the NDP to the school for their approval. Once approved the plans are made available to the Ministry.

NDP MoE approval

Once a school has approved an NDP, the PM will make the signed NDP school approval available to the Ministry.

The Ministry of Education Technical Advisor will then review the NDPs and either approve or decline the drawings. Occasionally they may discuss with the school to confirm the design, in which case "clarifications" will be sent to the PM. Following this the Technical Advisor will approve the NDP with the PM and deliver the approved hard copy of the drawings to the Ministry Project Officer.

APPENDIX F - Disputes

F1 Dispute Resolution

F.1.1 *Negotiation*

The parties will enter into negotiations to resolve the Dispute within 10 Business Days of the Dispute Notice being issued. Negotiations will be held between representatives of the parties (who must have authority to settle the Dispute). The Dispute will be escalated to senior management as necessary.

F.1.2 *Mediation*

If:

- a) the parties agree; and
- b) the Dispute is not resolved by negotiation within 10 Business Days of receipt of the Dispute Notice,

then the Dispute may be referred to mediation by one party giving written notice to the other (*Mediation Notice*). The mediation will be heard as soon as possible in Wellington, New Zealand and conducted in accordance with the provisions of the then-current LEADR New Zealand Incorporated Standard Mediation Agreement (*Mediation*). The Mediation will be conducted by a mediator, and at a fee, agreed by the parties. If the parties fail to agree such matters within 10 business days following the date of the delivery of the Mediation Notice, the Chair for the time being of LEADR New Zealand Incorporated will select the mediator and determine the mediator's fee. The parties will share equally the cost of the mediator's fee.

F.1.3 *Arbitration*

If the Dispute:

- a) has not been resolved within a period of 10 business days (or such longer period as the parties may agree) in accordance with Clause 1 of this Schedule; or
- b) in accordance Clause 2 of this Schedule,
- c) then either party may issue a notice (*Arbitration Notice*) referring the Dispute to arbitration.

Each Arbitration Notice will be regarded as a reference of the Dispute to arbitration in accordance with the Arbitration Act 1996 (*the Act*). Each such arbitration will be conducted on the following terms:

- d) the place of arbitration will be Wellington, New Zealand.
- e) the tribunal will consist of a sole arbitrator, to be appointed by agreement of the parties, but if the parties fail to reach such agreement within 10 business days of the date of the Arbitration Notice, then the arbitrator will be appointed by the President for the time being, or his or her nominee, of the Arbitrators' and Mediators' Institute of New Zealand Inc.
- f) the arbitration will be conducted as quickly as possible and, as far as is practicable, the arbitrator will issue his or her award within four months of his or her appointment. When determining the procedure and scheduling of the arbitration, the arbitrator will take this time period into consideration.
- g) each party will pay its own costs in relation to the arbitration.

F.1.4 *Interlocutory relief*

Nothing in this Schedule will prevent either party, at any time, from seeking any urgent interlocutory relief from a court of competent jurisdiction in relation to any matter that arises under this Agreement.

F.1.5 *Continuity*

In the event of a dispute between the parties concerning this Agreement, the Supplier will continue to provide the Works unless the Ministry requires otherwise in writing.

F.1.6 *Without prejudice*

Unless and until a Dispute is resolved by an express written agreement of the parties, any and all statements and undertakings made by the parties in connection with the associated Dispute resolution process will be deemed to have been made on a "without prejudice" basis.

APPENDIX G - Tender for ICT service

G1 Installer Tender Process

The Ministry requires that only approved ICT contractors be used in schools and provides for management of the Ministry's Approved ICT Contractors List. This list and the associated policy and procedures can be found at <http://www.minedu.govt.nz/>

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