PROCEDURES MANUAL

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PROGRAM OF WORKS FOR PIPELINE DESIGN

Objective -

This procedure prepares the Program of Works (POW) for Pipeline Extension to serve the concessionaires of Cagayan de Oro City.

Scope -

This procedure determines the desired pipeline size, make and design for all proposed pipeline extension of Cagayan de Oro City Water District.

This procedure is limited to the planning of Program of Works.

Definition of Terms -

Hydraulic Analysis – Water modeling of water distribution system pipe networks

Epanet – Water distribution system modeling software

POW – Program of Works consist of Inspection Report, Hydraulic Analysis Report, GanttChart, Bill of Materials and Cost Estimates, Interconnection Details, Location and Vicinity Maps, and Request letter (if applicable).

P & D – Pipeline Section – refers to Planning & Design – Pipeline Section

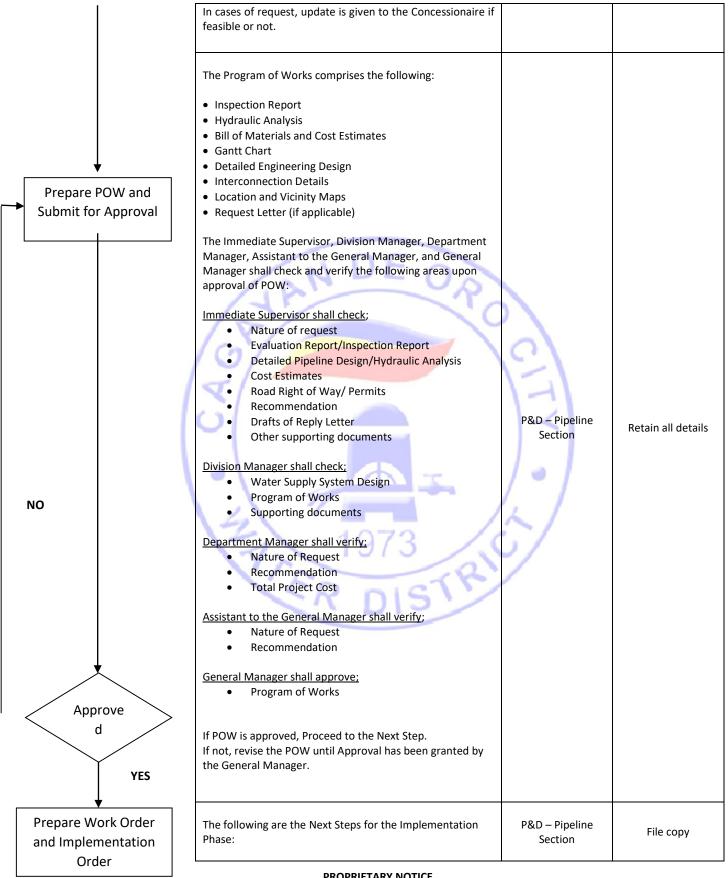
Process Flow	Detailed Description	Responsibility	Retained Documented Information
Start			
Inspection and Evaluation	Pipeline designs are based on Annual Plan and of Concessionaire's Request of pipeline connection. This be completed within Thirty-Five (35) Calendar Days. The following activities are to be conducted in determining to Pipeline Design: Conduct Site Inspection to get the Exact Locati Nearest Tapping Point Conduct Pressure Monitoring for Peak and Avenues Conduct Data Logger Monitoring if necessary to reconduct Data for some areas of Low Water Pressure	mining P&D – Pipeline ion of Section verage	Inspection Report, Pressure Data, Request Letter (if applicable)
Conduct Hydraulic		P&D – Pipeline Section net is	Hydraulic Simulation, Request Letter
Prepared By:	Approved By	: :	

Prepared By:	Approved By:
Lyndon P. Butron	
Process Owner	Quality Management Representative

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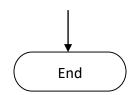
PROGRAM OF WORKS FOR PIPELINE DESIGN



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PROGRAM OF WORKS FOR PIPELINE DESIGN



• Prepare Work Order

• Prepare Implementation Order

Inform Requisitioned of the Approved POW.

Reference Documents -

1. Manual of Local Water Utilities Administration (LWUA) Standards & Specifications

- 1. Request Letter
- 2. Work Order
- 3. Implementation Order
- 4. Pipeline Layout
- 5. Communication Matrix



Document No. : PM-ENG-02 Eff. Date : XX-XX-XXXX

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LINE SURVEY

Objective -

This procedure describes the surveying process of pipeline within the service area of the Cagayan de Oro City Water District.

Scope -

This procedure determines the Plan and Profile Lay-Out of area for possible pipeline extension within the service area of **CAGAYAN DE ORO CITY WATER DISTRICT** (COWD) for future reference.

Definition of Terms -

Total Station – An electronic/optical instrument used in modern surveying and building construction to measure sloping distance of object to the instrument.

P & D – Planning & Design

Process Flow	Detailed Description	Responsibility	Retained Documented Information
	18/		
Request for Survey	Request for Survey facilitated by a Routing Slip from the Planning & Design Division Manager is given to the Assigned Staff to conduct Survey to be submitted within Fifteen (15) Calendar Days.	P&D – Division Manager	Routing Slip
Site Survey	Total Station Instrument is used to collect data to further calculate the Horizontal Distance, Coordinates of a Point and Reduced Level of Point.	P&D – Civil Works Section	Total Station Data
Plan Profile & Layout	A Plan & Profile Lay-Out is prepared using the AUTOCAD based from collected data gathered from the Total Station Instrument and is submitted to the Immediate Supervisor for review.	P&D – Civil Works Section	Plan & Profile Lay- out
Accomplishment Report	An Accomplishment Report is submitted to the Engineering Department Manager with an attached copy of Plan & Profile Lay-Out for Approval.	P&D – Civil Works Section	Accomplishment Report

Reference Documents -

1. Routing Slip

- 1. Plan & Profile Lay-Out
- 2. Accomplishment Report

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Document No. : PM-ENG-03 Eff. Date : XX-XX-XXXX

Section

Revision No. : **00** Pages : **1 of 2**

INSTALLATION OF NEW SERVICE CONNECTION

Objective -

This procedure prepares the installation of new service connection of customers of Cagayan de Oro City Water District.

Scope -

This procedure describes the installation of New Service Connections using the Standard Design of Cagayan de Oro City Water District.

Definition of Terms -

END

RIS – Requisition Issue Slip, form used to request for materials.

Process Flow	Detailed Description	Responsibility	Retained Documented Information
Job Order Prepare RIS	Based on the Job Order prepared by the Commercial Department, the Construction Division –Installation Section prepares the Requisition and Issuance Slip (RIS) which includes the following: Material description, size and quantity. Signatories of the RIS are the following: Requisitioner: Leadman Checked by – Supervisor Approved by – Division Manager	Construction – Installation Section	RIS
DAILY	Actual installation of New Service Connection and issuance of Water Meter Receipt.	Construction – Installation Section	Water Meter Receipt
	Submit Daily Accomplishment Report to the Engineering Department Manager.	Construction – Installation Section	Accomplishment Report

Prepared By:	Approved By:
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Process Owner	Quality Management Representative

Document No. : PM-ENG-03 Eff. Date : XX-XX-XXXX

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INSTALLATION OF NEW SERVICE CONNECTION

Reference Documents -

- 1. Water Service Application
- 2. Job Order
- 3. COWD Service Standard Design

- 1. Water Meter Receipt
- 2. Accomplishment Report



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PRODUCTION WELL/ AQUIFER TESTING

Objective -

This procedure determines the ability of the aquifer to yield water. The data from aquifer test will be subject to a suitable mathematical analysis to predict the effects of continuous pumping with no recharge and determine the safe withdrawal rate from the aquifer as basis for making decision.

Scope -

This procedure covers well conduct and aquifer test; computation and analysis of data; evaluation and recommendation.

Definition of Terms -

SWL - Static Water Level (m)
PWL - Pumping Water Level (m)

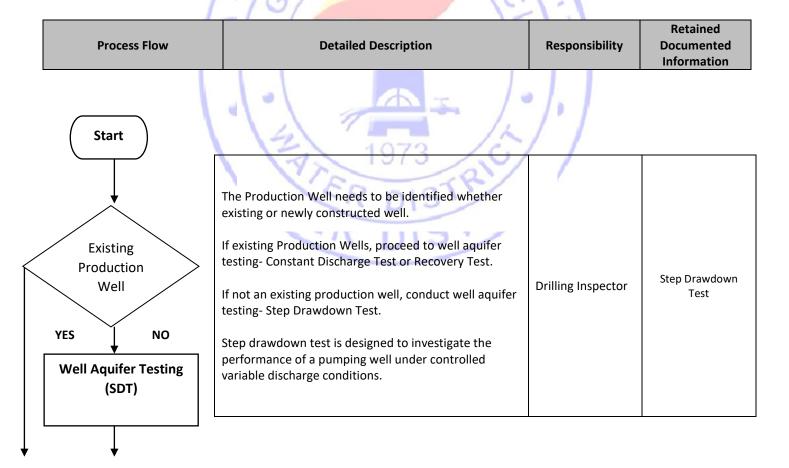
Specific Capacity - Sustainable discharge divided by the drawdown yielding the discharge (Q/s)

Transmissivity - Measure of how much water can be transmitted horizontally, such as to pumping

well

SDT Step Drawdown Test
CDT - Constant Discharge Test
RCY - Recovery Test

Drawdown - Lowering of surface water level in wells

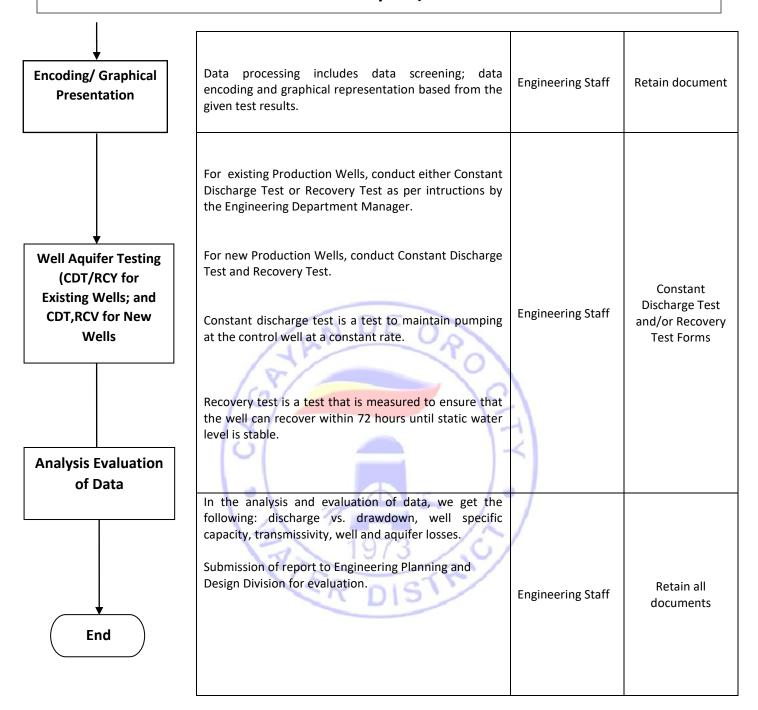


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Document No. : PM-ENG-04 Eff. Date : xx-xx-xxxx

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PRODUCTION WELL/ AQUIFER TESTING



Reference Documents-

1. LWUA Standards on Well Development

Records Generated-

- 1. Step Drawdown Test
- 2. Constant Discharge Test
- 3. Recovery Test

PROPRIETARY NOTICE

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CONSTRUCTION

Objective -

This procedure defines the system for delivery of construction services of Cagayan de Oro City Water District and to ensure a systematic procedure in the implementation of the operation processes.

Scope -

This procedure covers all construction services of Cagayan de Oro City Water District.

Definition of Terms -

Construction

includes all organized activities concerned with demolition, building, landscaping, maintenance, pipe laying, installation of pipeline appurtenances and other civil engineering

Process Flow	Detailed Description	Responsibility	Retained Documented Information
Start	Conduct Pre-Construction Meeting to plan-out construction project plan based on the PERT-CPM		
Construction Planning	(Program Evaluation Review Technique – Critical Path Method). Project Team shall then generate new Project Gantt Chart considering internal arrangements, indicating the schedules of materials purchase, equipment usage and manpower needed per phase of the project. The Construction Team shall also review the Equipment and Manpower Utilization Schedules given by the Implementing Agency/ Contractor.	Project Engineer/ Foreman	PERT-CPM, Gantt Chart, Minutes of Meeting
Mobilization	For project undertaken by Admin: Organize and deploy initial project resources such as construction personnel, equipment and operating supplies to the site to start-up the project. For project undertaken by Contract: mobilization takes place upon receipt of NTP	Project Engineer/ Foreman	

Prepared By:	Approved By:
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Document No. : PM-ENG-05 Eff. Date : XX-XX-XXXX

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CONSTRUCTION

Conduct site development, layout for building construction, conduct joint survey / as-taking for bridge or water systems construction, building, initial material testing.

Discrepancies found during joint survey, contractor will request for variation order and project time extension.

The Project Engineer shall conduct the toolbox meeting with the following agenda:

- Accomplishments
- Things to do the next day
- Safety

Construction

Problems and Issues

The Construction Team shall conduct coordination meeting regularly to address the problems on site immediately. Minutes of the Meeting shall then be generated.

Follow each phases of the construction project according to the plan by comparing actual accomplishment to plan using the Gantt Chart to know the actual status.

Project Engineer/Foreman together with representative from the Contractor should conduct regular inspection for each project phase to ensure quality of materials used and its workmanship. This includes inspection prior to pouring of concrete using the Checklist of different work activities

Established frequency of Inspection which will be the basis for Project Billing.

- 30% Project Accomplishment
- 50% Project Accomplishment
- 70 % Project Accomplishment
- Hydrotesting of Pipeline for every 100 meters pipe laid.

Conduct Pre Final Inspection

 Any nonconformity found during Pre-Final Inspection shall be corrected by the Contractor immediately prior to Final Billing for Contract-Out Project. Project Engineer

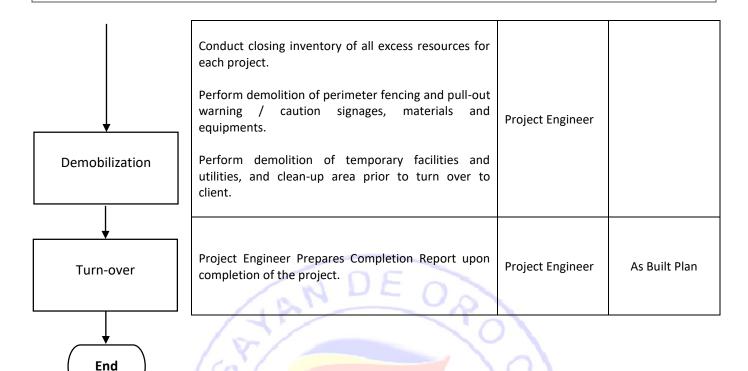
Inspection Report & Material Test Result, Checklist of different work activities (for Contract-out Project)

PROPRIETARY NOTICE

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CONSTRUCTION



Reference Documents -

1. Program of Works

- 1. Project Gantt Chart & Monthly Accomplishment Report
- 2. Construction Project Plan
- 3. Quality Control Plan (checklist of Construction activities)
- 4. Material Test Results
- 5. As Built Plan
- 6. Turn over of completed project