

ELECTRICAL INSTALLATION PLAN

LEGEND	
Double Socket whit Grounding Line	⊕
Wall Lamp	☼
Three pin-plug	●
1 Swiche	■ S1
Double Swiche	■ S2
Lighting Panel	▬
Floor Pipeline	—
Line, Neutral and Ground	—x—

LOGOTIPO, FIRMA URBANIZADORA  
 NÚMERO DE CONTRATO O NÚMERO CARTA DE COMPROMISO

DISEÑADOR :  
 Nombre: \_\_\_\_\_  
 Matrícula Profesional: \_\_\_\_\_

REPRESENTANTE LEGAL  
 O PROPIETARIO Nombre: \_\_\_\_\_  
 C.C. O NIT: \_\_\_\_\_

REVISION	ACUEDUCTO:
INGENIERO: _____ M.P. No.: _____	INGENIERO: _____ REGISTRO No. _____
APROBO: _____ M.P. No.: _____	Vo.Bo. INGENIERO: _____ REGISTRO No. _____

LOCALIZACION  
 ESC:

PUNTO DE AMARRE  
 IGAC  
 NORTE: \_\_\_\_\_  
 ESTE: \_\_\_\_\_  
 COTA: \_\_\_\_\_  
 Coordenadas Medias  
 E \_\_\_\_\_  
 N \_\_\_\_\_  
 PLANCHA

MODIFICACIONES			
FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA

**acueducto**  
 AGUA Y ALCANTARILLADO DE BOGOTÁ

GERENCIA -----

DIRECCION -----

PLANO DE DISEÑO DE REDES DE ACUEDUCTO

NOMBRE DE LA OBRA/URBANIZACION/BARRIO LOCALIDAD

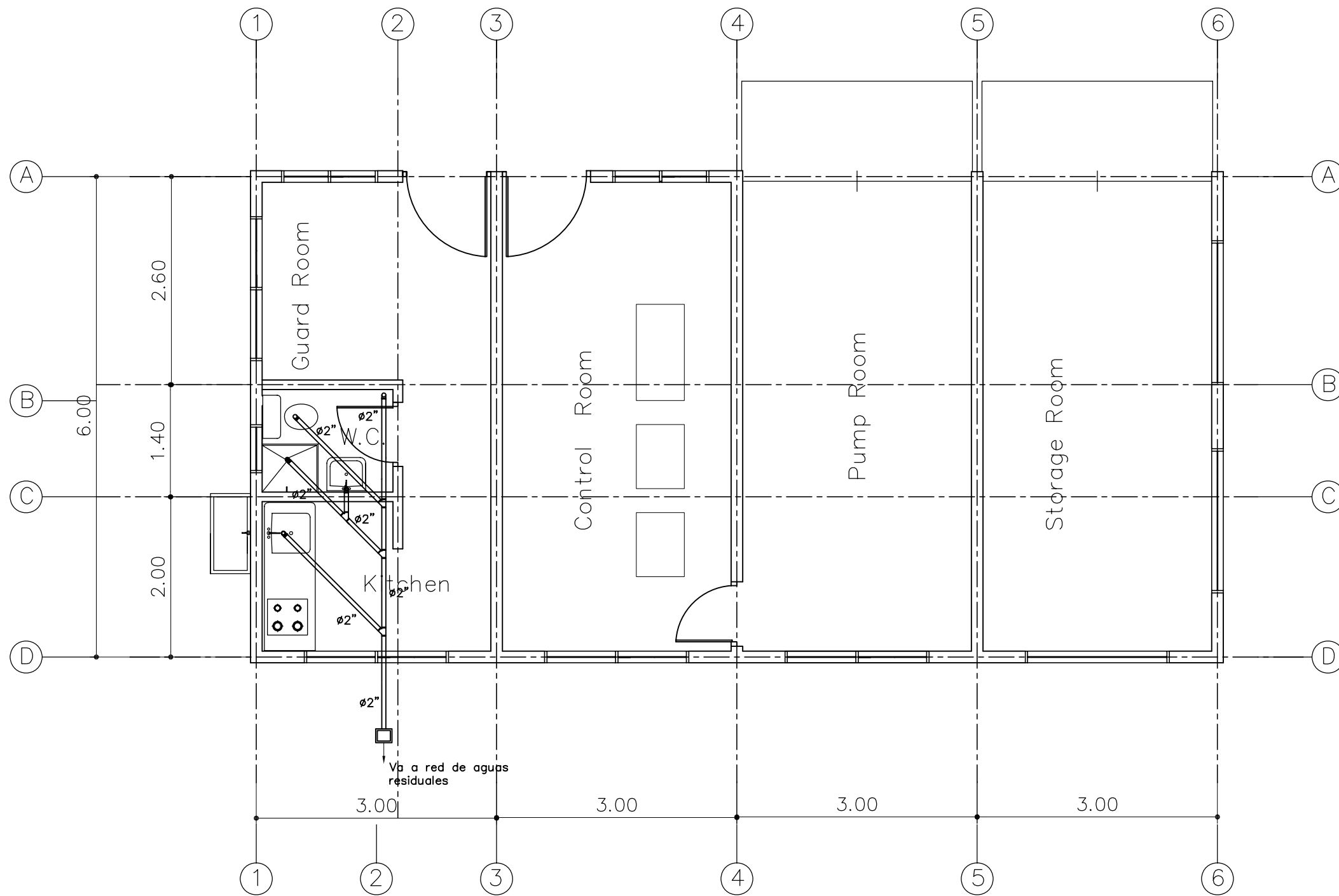
CONTIENE:  
 ELECTRICAL INSTALLATION PLAN

ESCALA: 1:100 NOMBRE DEL ARCHIVO: LA SALLE

PROYECTO N° : \_\_\_\_\_

FECHA: JANUARY 2009

PLANO No. 1/2

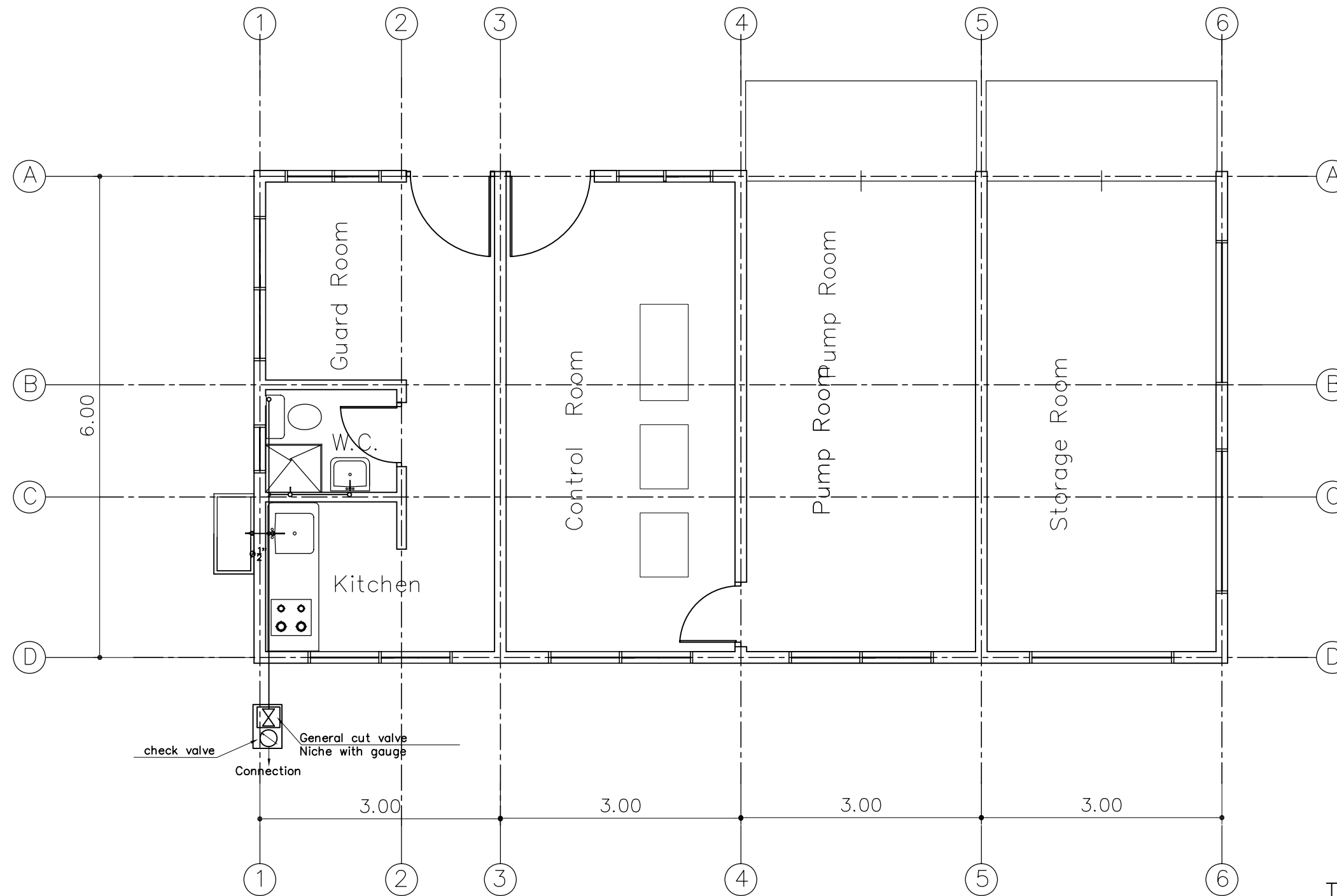


DRAINAGE PLAN  
SCALE: 1:100

LEGEND

Sewerage Pipeline	====
Sanitary Y 2" * 2"	Y
Siphon	⊥

LOGOTIPO, FIRMA URBANIZADORA NÚMERO DE CONTRATO O NÚMERO CARTA DE COMPROMISO DISEÑADOR : REPRESENTANTE LEGAL O PROPIETARIO	<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ	LOCALIZACIÓN ESC:	PUNTO DE AMARRADO NORTE: ESTE: COTA: Coordenadas Medias E PLANCHA	MODIFICACIONES			<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ GERENCIA ----- DIRECCION ----- PLANO DE DISEÑO DE REDES DE ACUEDUCTO	NOMBRE DE LA OBRA/URBANIZACIÓN/BARRIO LOCALIDAD CONTIENE: <b>DRAINAGE PLAN</b>		PROYECTO N° :
				REVISION ACUEDUCTO: INGENIERO: M.P. No.: RECIBIÓ: INGENIERO: REGISTRO No. APROBO: INGENIERO: M.P. No.: Vo.Bo. INGENIERO: REGISTRO No.	FECHA MODIFICACION NOMBRE ING. RESPONSABLE FIRMA	ESCALA: 1:100		NOMBRE DEL ARCHIVO: LA SALLE	FECHA: JANUARY 2009 PLANO No. 2/3	



SUPPLY FACILITIES PLAN  
SCALE: 1:100

LEGEND

- T T
- Check Valve
- Cut Valve
- Conveyance Pipeline

LOGOTIPO, FIRMA URBANIZADORA  
NÚMERO DE CONTRATO O NÚMERO CARTA DE COMPROMISO

DISEÑADOR :  
Nombre:   
Matrícula Profesional:   
REPRESENTANTE LEGAL  
O PROPIETARIO Nombre:   
C.C. O NIT:

REVISION ACUEDUCTO:

REVISO: INGENIERO: M.P. No.:  
RECIBIO: INGENIERO: REGISTRO No.:  
APROBO: INGENIERO: M.P. No.:  
Vo.Bo. INGENIERO: REGISTRO No.:

LOCALIZACION ESC:

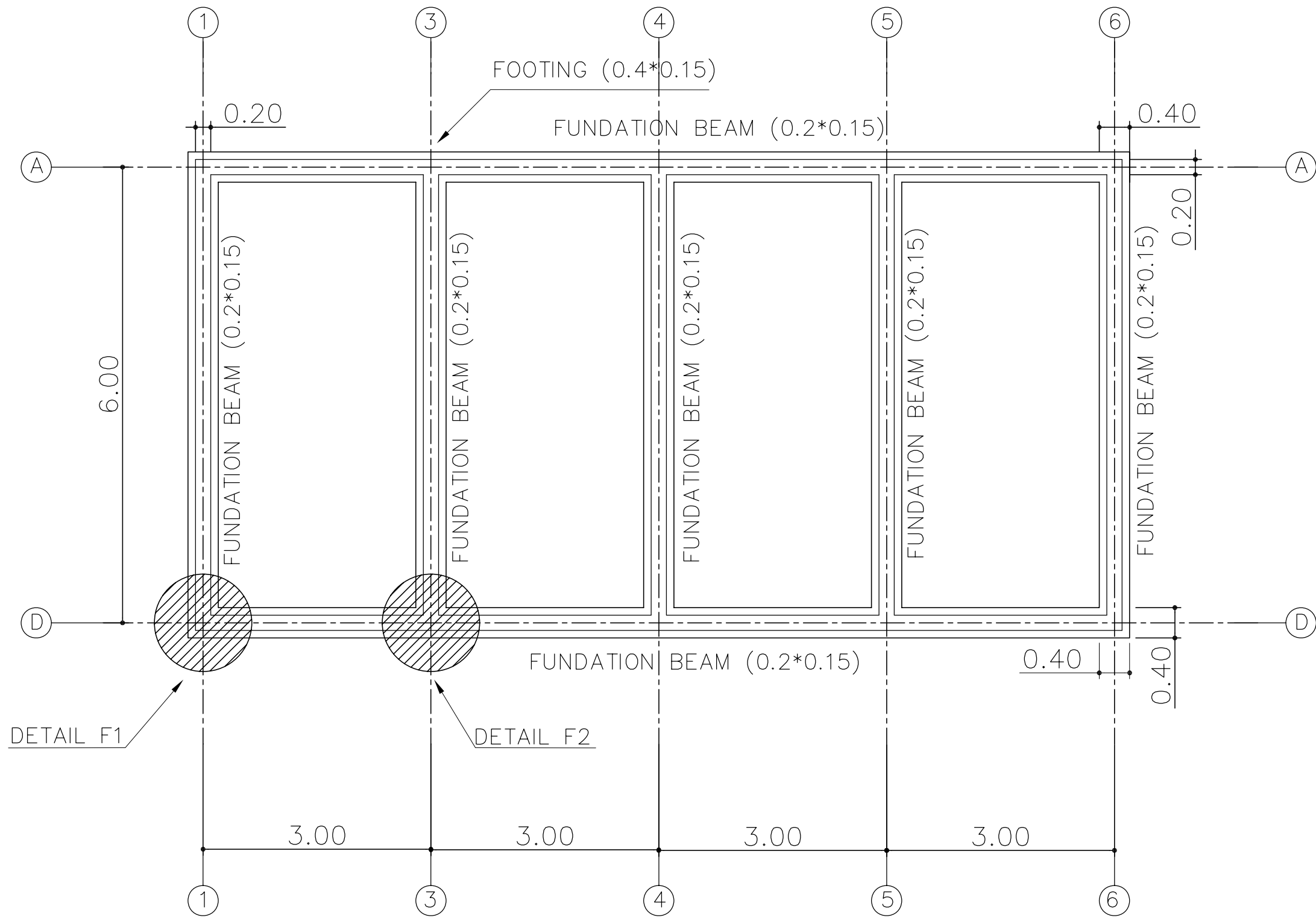
PUNTO DE AMARRA IGAC  
NORTE:  
ESTE:  
COTA:  
Coordenadas Medias E  
PLANCHA

MODIFICACIONES			
FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA

**acueducto**  
AGUA Y ALCANTARILLADO DE BOGOTÁ  
GERENCIA -----  
DIRECCION -----  
PLANO DE DISEÑO DE REDES DE ACUEDUCTO

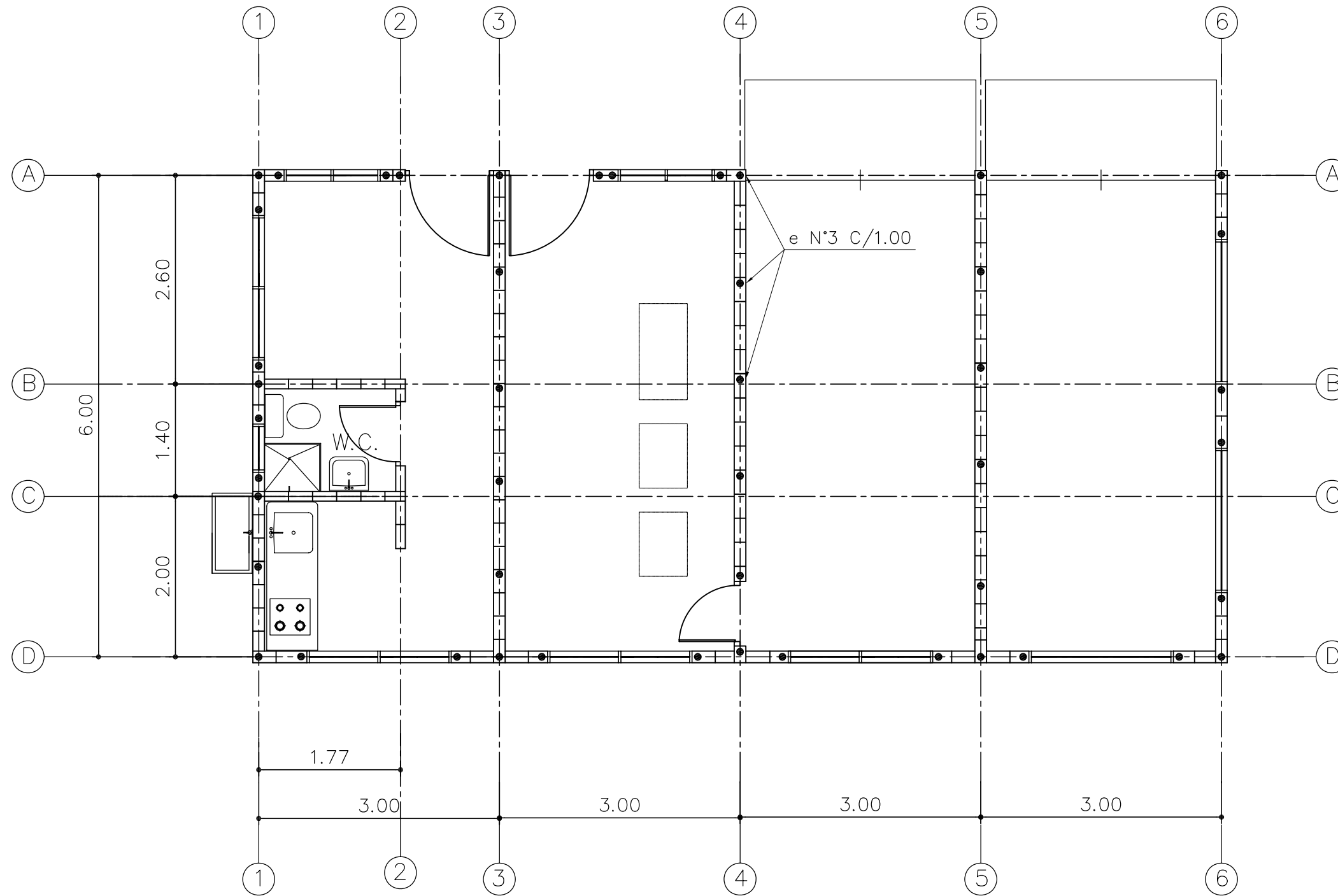
NOMBRE DE LA OBRA/URBANIZACION/BARRIO LOCALIDAD  
CONTIENE:  
SUPPLY FACILITIES PLAN  
ESCALA: 1:100 NOMBRE DEL ARCHIVO: LA SALLE

PROYECTO N° :  
FECHA: JANUARY 2009  
PLANO No. 1/3



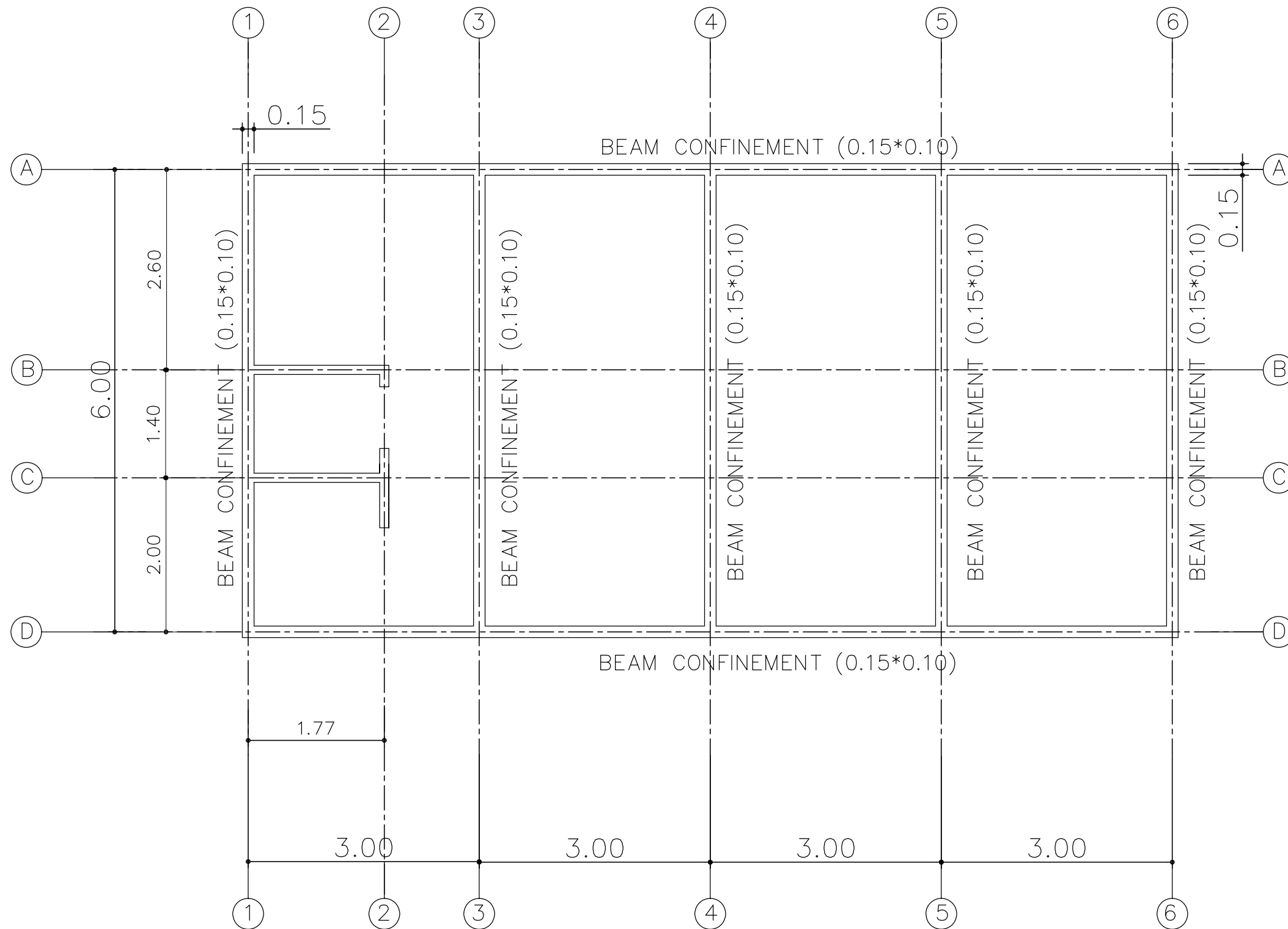
FUNDATION PLAN  
SCALE: 1:100

LOGOTIPO, FIRMA URBANIZADORA NÚMERO DE CONTRATO O NÚMERO CARTA DE COMPROMISO  DISEÑADOR : Nombre: _____ Matrícula Profesional: _____  REPRESENTANTE LEGAL O PROPIETARIO Nombre: _____ C.C. O NIT: _____	<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ		LOCALIZACIÓN ESC: _____	PUNTO DE AMARRE IGAC: NORTE: _____ ESTE: _____ COTA: _____ Coordenadas Medias E _____ N _____ PLANCHA _____	MODIFICACIONES <table border="1"> <thead> <tr> <th>FECHA</th> <th>MODIFICACION</th> <th>NOMBRE ING. RESPONSABLE</th> <th>FIRMA</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA													<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ GERENCIA - - - - - DIRECCION - - - - - PLANO DE DISEÑO DE REDES DE ACUEDUCTO	NOMBRE DE LA OBRA/URBANIZACIÓN/BARRIO LOCALIDAD CONTIENE: <b>FUNDATION PLAN</b> ESCALA: 1:100 NOMBRE DEL ARCHIVO: LA SALLE	PROYECTO N° :  FECHA: JANUARY 2009 PLANO No. 1/4
	FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA																				
REVISION INGENIERO: _____ M.P. No.: _____  APROBO: INGENIERO: _____ M.P. No.: _____	ACUEDUCTO: INGENIERO: _____ REGISTRO No. _____  Vo.Bo. INGENIERO: _____ REGISTRO No. _____	LOCALIZACIÓN ESC: _____	PUNTO DE AMARRE IGAC: NORTE: _____ ESTE: _____ COTA: _____ Coordenadas Medias E _____ N _____ PLANCHA _____	MODIFICACIONES <table border="1"> <thead> <tr> <th>FECHA</th> <th>MODIFICACION</th> <th>NOMBRE ING. RESPONSABLE</th> <th>FIRMA</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA													<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ GERENCIA - - - - - DIRECCION - - - - - PLANO DE DISEÑO DE REDES DE ACUEDUCTO	NOMBRE DE LA OBRA/URBANIZACIÓN/BARRIO LOCALIDAD CONTIENE: <b>FUNDATION PLAN</b> ESCALA: 1:100 NOMBRE DEL ARCHIVO: LA SALLE	PROYECTO N° :  FECHA: JANUARY 2009 PLANO No. 1/4	
FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA																					



MASONRY REINFORCEMENT STRUCTURAL PLAN  
SCALE: 1:100

LOGOTIPO, FIRMA URBANIZADORA NÚMERO DE CONTRATO O NÚMERO CARTA DE COMPROMISO  DISEÑADOR : Nombre: _____ Matrícula Profesional: _____  REPRESENTANTE LEGAL O PROPIETARIO Nombre: _____ C.C. O NIT: _____	<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ		LOCALIZACIÓN ESC: _____  PUNTO DE AMARRE IGAC NORTE: _____ ESTE: _____ COTA: _____ Coordenadas Medias E _____ PLANCHA _____	MODIFICACIONES <table border="1"> <thead> <tr> <th>FECHA</th> <th>MODIFICACION</th> <th>NOMBRE ING. RESPONSABLE</th> <th>FIRMA</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA									<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ GERENCIA - - - - - DIRECCION - - - - - PLANO DE DISEÑO DE REDES DE ACUEDUCTO	NOMBRE DE LA OBRA/URBANIZACIÓN/BARRIO LOCALIDAD CONTIENE: <b>MASONRY REINFORCEMENT STRUCTURAL PLAN</b> ESCALA: 1:100 NOMBRE DEL ARCHIVO: LA SALLE		PROYECTO N° : _____  FECHA: JANUARY 2009  PLANO No. 2/4
	FECHA	MODIFICACION		NOMBRE ING. RESPONSABLE	FIRMA																
REVISION ACUEDUCTO: REVISOR: INGENIERO M.P. No.: _____ RECIBIO: INGENIERO REGISTRO No. _____ APROBO: INGENIERO M.P. No.: _____ Vo.Bo. INGENIERO REGISTRO No. _____	LOCALIZACIÓN ESC: _____		MODIFICACIONES <table border="1"> <thead> <tr> <th>FECHA</th> <th>MODIFICACION</th> <th>NOMBRE ING. RESPONSABLE</th> <th>FIRMA</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA									<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ GERENCIA - - - - - DIRECCION - - - - - PLANO DE DISEÑO DE REDES DE ACUEDUCTO	NOMBRE DE LA OBRA/URBANIZACIÓN/BARRIO LOCALIDAD CONTIENE: <b>MASONRY REINFORCEMENT STRUCTURAL PLAN</b> ESCALA: 1:100 NOMBRE DEL ARCHIVO: LA SALLE		PROYECTO N° : _____  FECHA: JANUARY 2009  PLANO No. 2/4	
FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA																		



BEAM CONFINEMENT TO 2.40m  
SCALE: 1:100

LOGOTIPO, FIRMA URBANIZADORA  
NÚMERO DE CONTRATO O NÚMERO CARTA DE COMPROMISO

DISEÑADOR :  
Nombre: \_\_\_\_\_  
Matrícula Profesional: \_\_\_\_\_

REPRESENTANTE LEGAL  
O PROPIETARIO Nombre: \_\_\_\_\_  
C.C. O NIT: \_\_\_\_\_

**acueducto**  
AGUA Y ALCANTARILLADO DE BOGOTÁ

ACUEDUCTO:

REVISION

REVISOR: INGENIERO: M.P. No.: \_\_\_\_\_

RECIBIDO: INGENIERO: REGISTRO No. \_\_\_\_\_

APROBO: INGENIERO: M.P. No.: \_\_\_\_\_

Vo.Bo. INGENIERO: REGISTRO No. \_\_\_\_\_

LOCALIZACION  
ESC:

PUNTO DE AMARRE  
IGAC

NORTE: \_\_\_\_\_  
ESTE: \_\_\_\_\_  
COTA: \_\_\_\_\_  
Coordenadas Medias  
E N  
PLANCHA

MODIFICACIONES			
FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA

**acueducto**  
AGUA Y ALCANTARILLADO DE BOGOTÁ

GERENCIA -----

DIRECCION -----

PLANO DE DISEÑO DE REDES DE ACUEDUCTO

NOMBRE DE LA OBRA/URBANIZACION/BARRIO  
LOCALIDAD

CONTIENE:  
HIGHER BEAMS

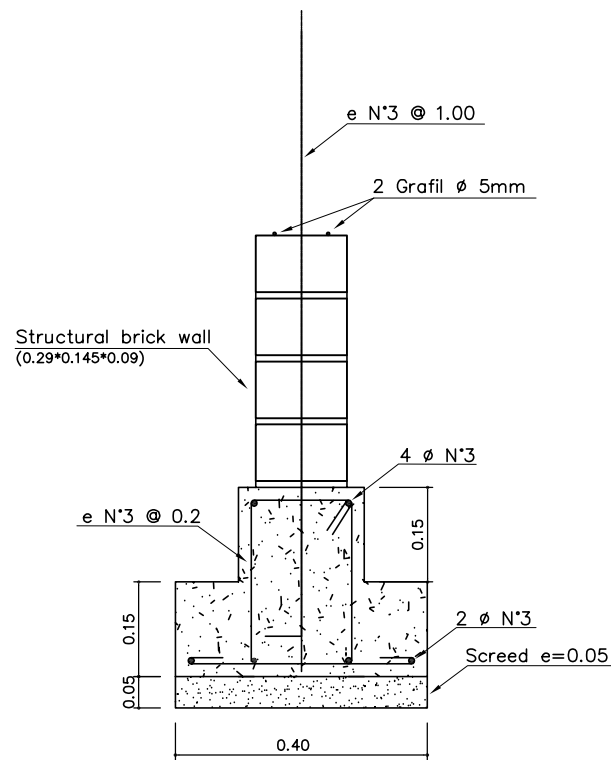
ESCALA: ESCALA: 1:100

NOMBRE DEL ARCHIVO: LA SALLE

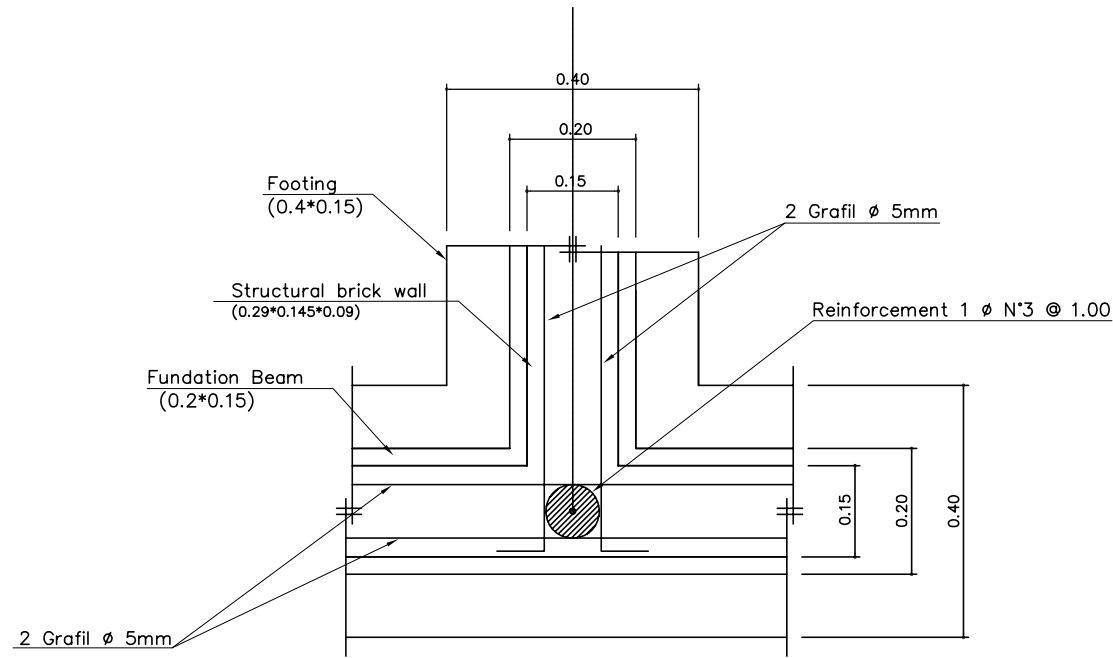
PROYECTO N° :

FECHA: JANUARY 2009

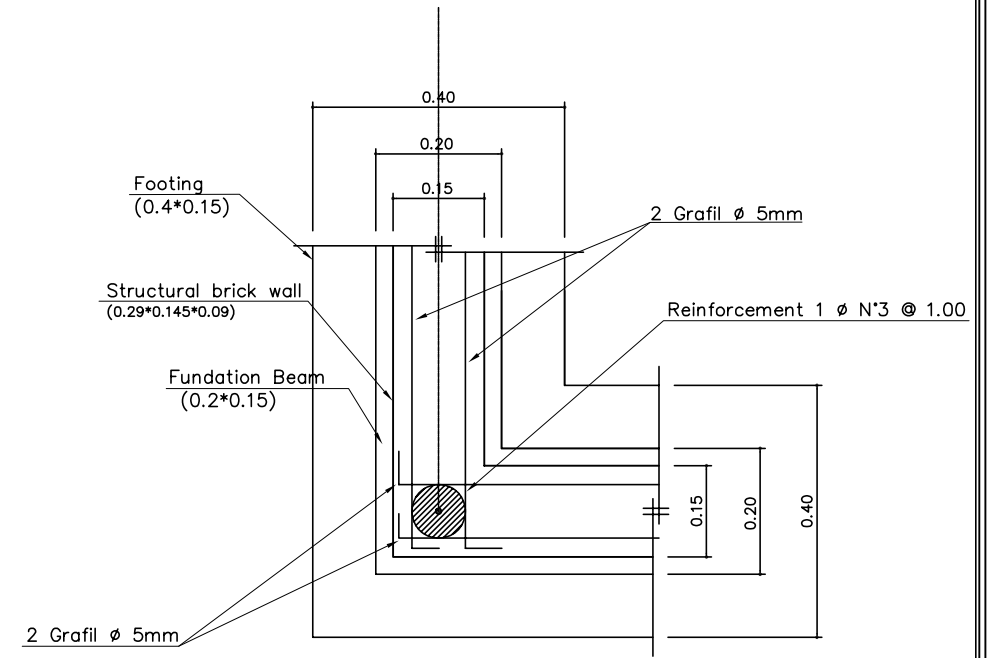
PLANO No. 3/4



FUNDATION DETAIL



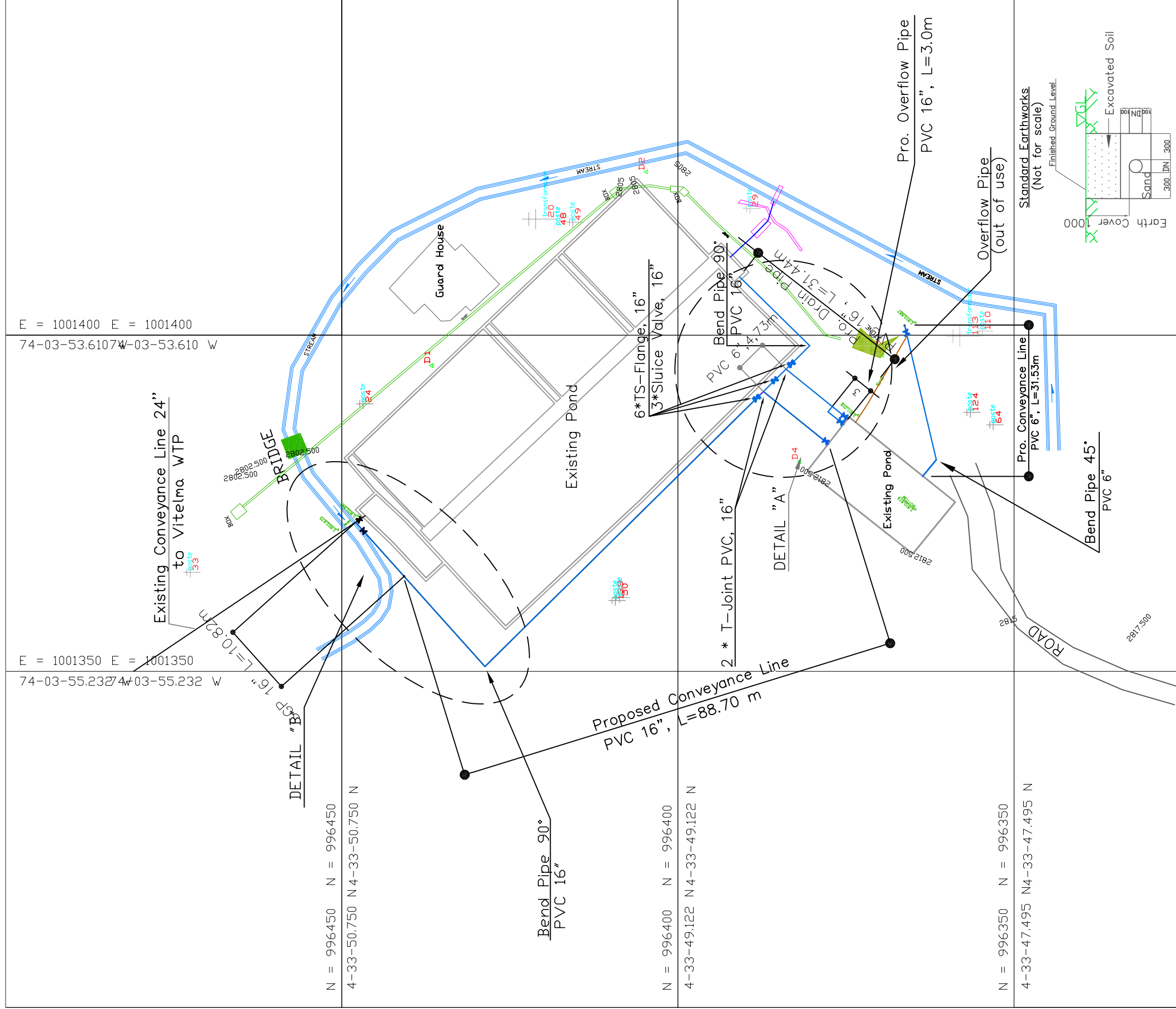
FUNDATION DETAIL (F2)



FUNDATION DETAIL (F1)

SCALE: 1:20

LOGOTIPO, FIRMA URBANIZADORA NÚMERO DE CONTRATO O NÚMERO CARTA DE COMPROMISO  DISEÑADOR : Nombre: _____ Matrícula Profesional: _____  REPRESENTANTE LEGAL O PROPIETARIO: Nombre: _____ C.C. O NIT: _____	<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ		LOCALIZACIÓN ESC: _____	PUNTO DE AMARRE IGAC: NORTE: _____ ESTE: _____ COTA: _____ Coordenadas Medias E _____ PLANCHA	MODIFICACIONES <table border="1"> <thead> <tr> <th>FECHA</th> <th>MODIFICACION</th> <th>NOMBRE ING. RESPONSABLE</th> <th>FIRMA</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA									<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ GERENCIA - - - - - DIRECCION - - - - - PLANO DE DISEÑO DE REDES DE ACUEDUCTO	NOMBRE DE LA OBRA/URBANIZACIÓN/BARRIO LOCALIDAD CONTIENE: DETAILS ESCALA: 1:20 NOMBRE DEL ARCHIVO: LA SALLE	PROYECTO N° :  FECHA: JANUARY 2009 PLANO No. 4/4
	FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA																
REVISION REVISO: INGENIERO: _____ M.P. No.: _____ APROBO: INGENIERO: _____ M.P. No.: _____	ACUEDUCTO: RECIBIO: INGENIERO: _____ REGISTRO No. _____ Vo.Bo. INGENIERO: _____ REGISTRO No. _____																			



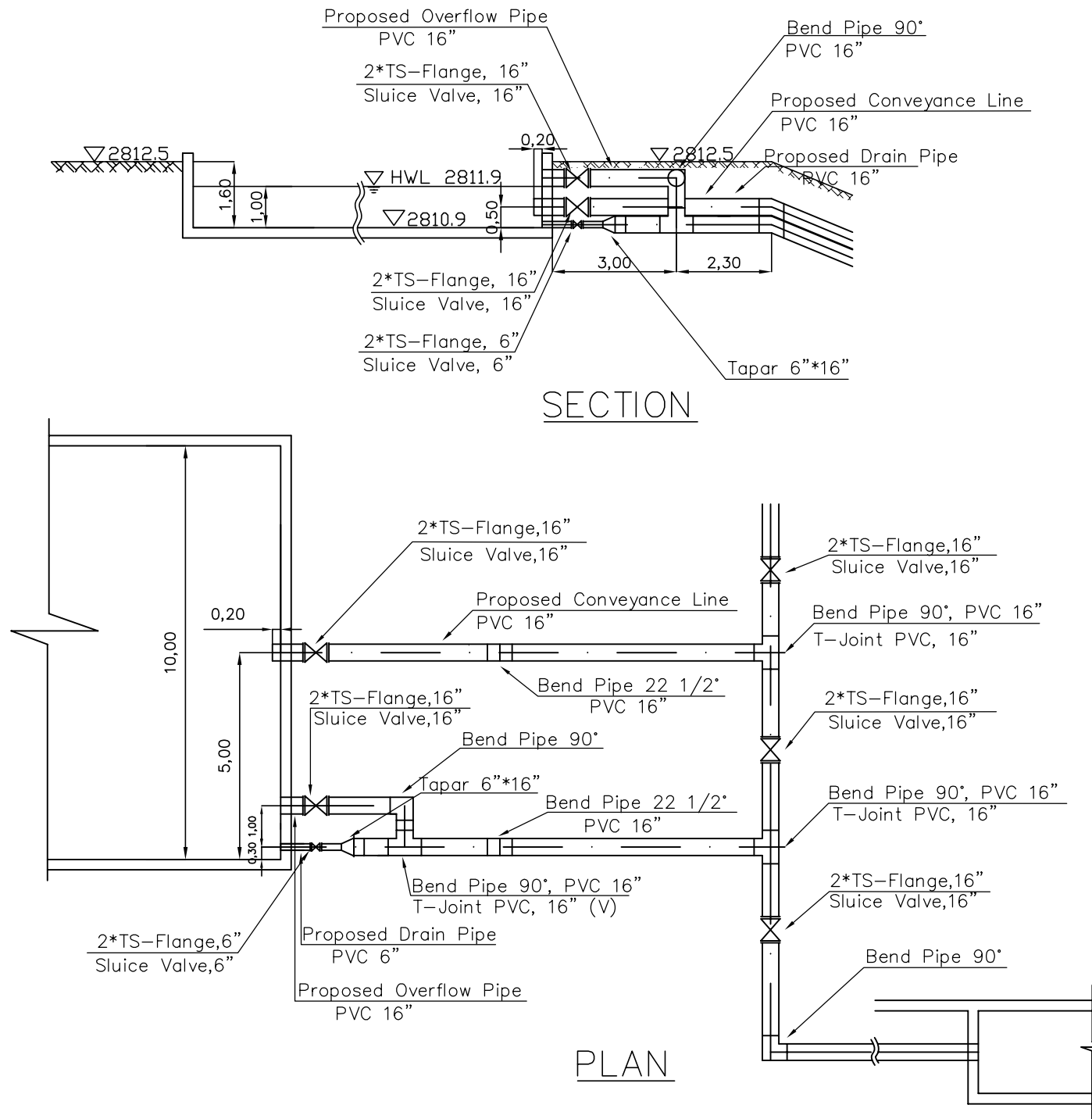
**LEGEND**

OTHER PROJECT NETWORK	---
EXISTING NETWORK	—
PROPOSED NETWORK	— (Blue)
NOT IN USE NETWORK	— (Orange)
BRIDGE	— (Green)
RIVER	— (Blue)

LOGOTIPO, FIRMA, URBANIZADORA NUMERO DE CONTRATO O NUMERO CARTA DE COMPROMISO DISEÑADOR : REPRESENTANTE LEGAL O PROPIETARIO	REVISION N° P. No.: N° P. No.:	ACUEDUCTO: RECIBIO: REGISTRO No.:	PROYECTO N° : LOCALIDAD NOMBRE DE LA OBRA/URBANIZACION/BARRIO
	APROBO: N° P. No.: N° P. No.:	Vo.Bo. REGISTRO No.:	Contiene : Plan Drawing for El Delirio
DIRECCION :-----		GERENCIA :-----	NOMBRE DEL ARCHIVO: Drawing for El Delirio
PLANO DE DISEÑO DE REDES DE ACUEDUCTO		ESCALA: 1:1000	



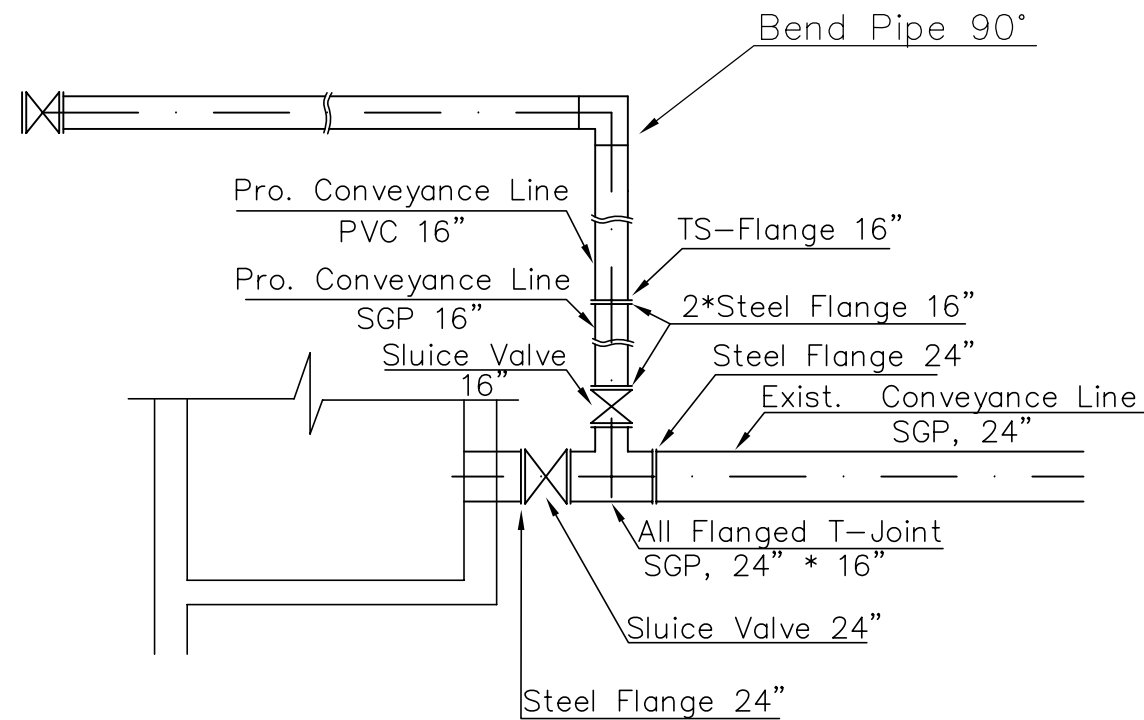
# DETAIL "A"



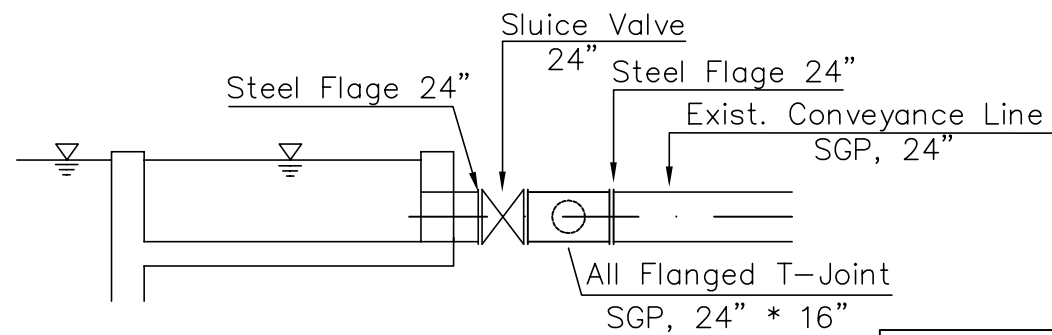
LEGEND	
EXISTING NETWORK	_____
PROPOSED NETWORK	_____

LOGOTIPO, FIRMA URBANIZADORA NUMERO DE CONTRATO O NUMERO CARTA DE COMPROMISO			LOCALIZACION	PUNTO DE AMARRE IGAC	MODIFICACIONES			 AGUA Y ALCANTARILLADO DE BOGOTÁ GERENCIA	NOMBRE DE LA OBRA/URBANIZACION/BARRIO		PROYECTO N°:
					FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE		FIRMA	LOCALIDAD	
DISEÑADOR :	REVISION	ACUEDUCTO:	NORTE: ESTE: COTA: Coordenadas Medias E	PLANCHA				Contiene :		FECHA:	
REPRESENTANTE LEGAL O PROPIETARIO	APROBO:	RECIBIO:						Detail "A" Drawing for Vitelma Intake		PLANO No. 2/3	
Nombre: M.P. No.:	INGENIERO: M.P. No.:	INGENIERO: REGISTRO No.:				DIRECCION		ESCALA: N.S.	NOMBRE DEL ARCHIVO: Detail Drawing for Vitelma Intake		
Nombre: C.C. O NIT:	INGENIERO: M.P. No.:	INGENIERO: REGISTRO No.:				PLANO DE DISEÑO DE REDES DE ACUEDUCTO					

### DITAIL "B"



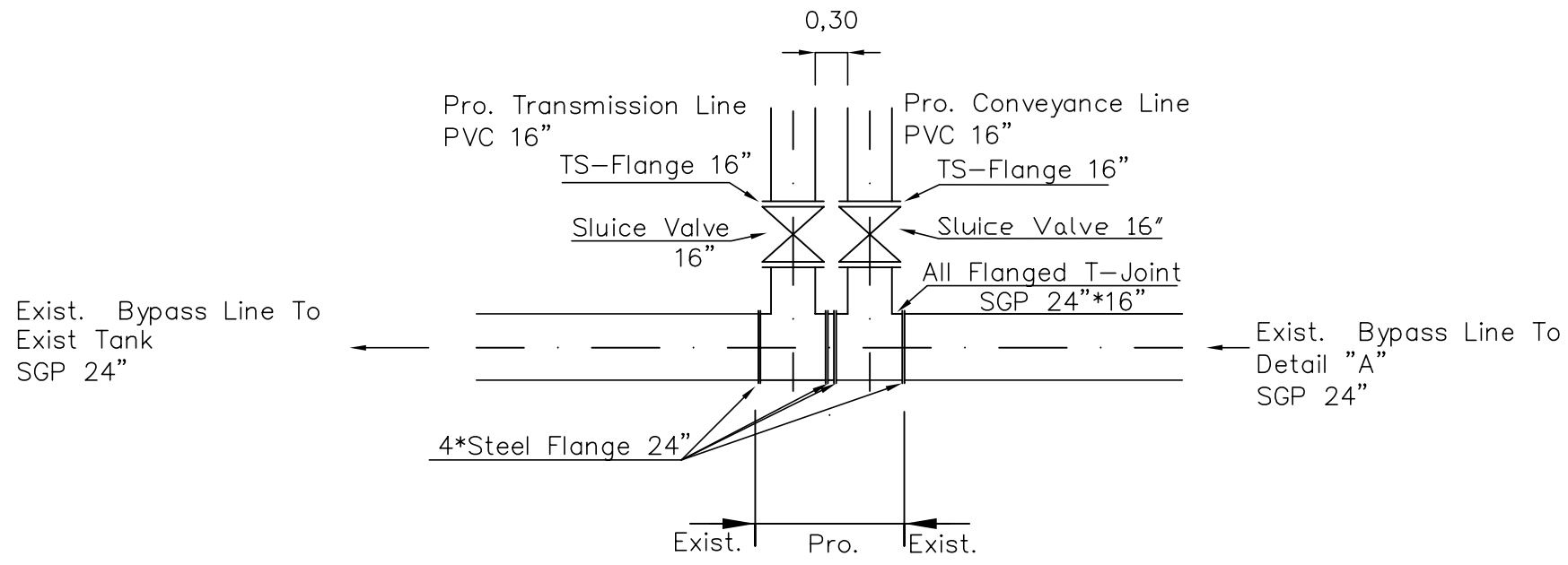
Plan



Section

LEGEND	
EXISTING NETWORK	_____
PROPOSED NETWORK	_____

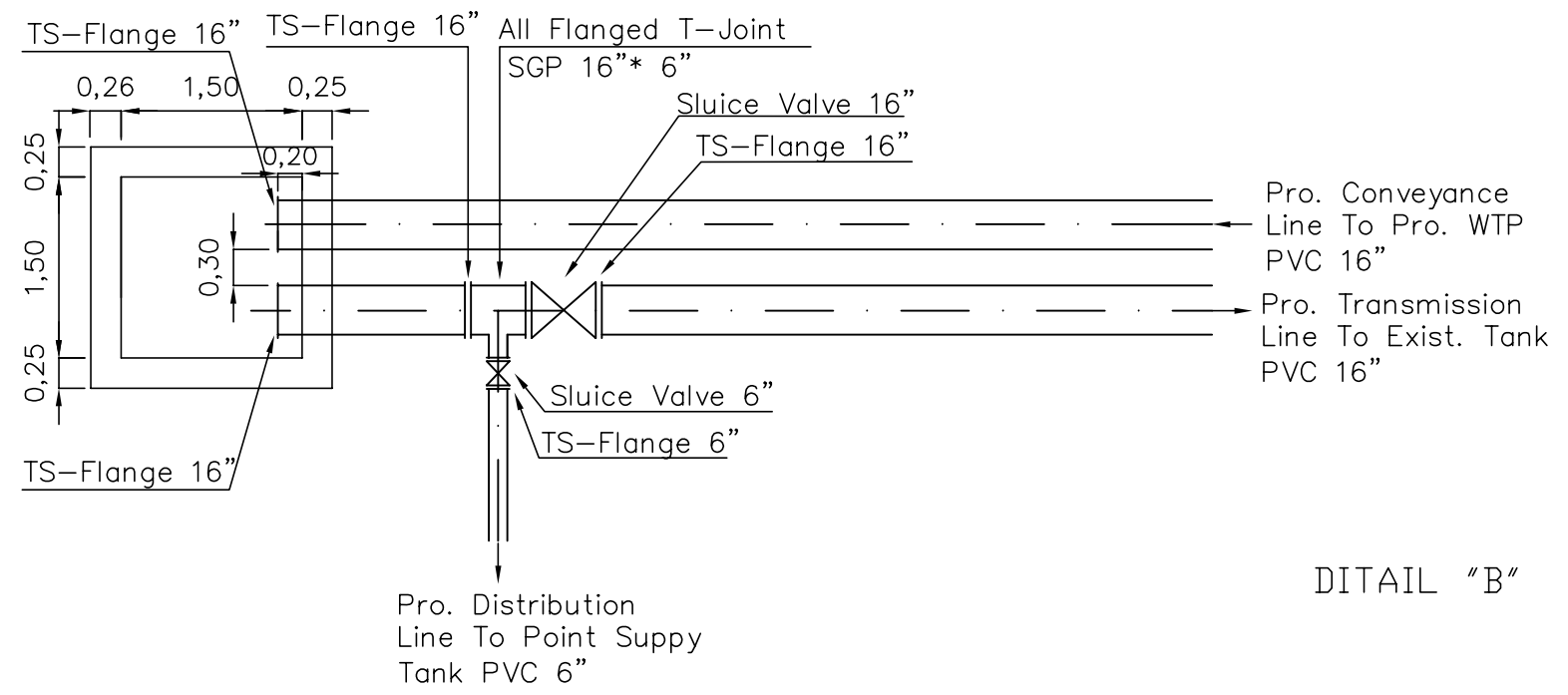
LOGOTIPO, FIRMA URBANIZADORA NUMERO DE CONTRATO O NUMERO CARTA DE COMPROMISO  DISEÑADOR :  REPRESENTANTE LEGAL O PROPIETARIO	<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ		LOCALIZACION ESC:  PUNTO DE AMARRE IGAC NORTE: ESTE: COTA: Coordenadas Medias E, N PLANCHA	MODIFICACIONES <table border="1"> <thead> <tr> <th>FECHA</th> <th>MODIFICACION</th> <th>NOMBRE ING. RESPONSABLE</th> <th>FIRMA</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			FECHA	MODIFICACION	NOMBRE ING. RESPONSABLE	FIRMA					NOMBRE DE LA OBRA/URBANIZACION/BARRIO LOCALIDAD  Contiene : Detail "B" Drawing for El Delirio		PROYECTO N° :  FECHA:  PLANO No.
	FECHA	MODIFICACION		NOMBRE ING. RESPONSABLE	FIRMA												
Nombre: M.P. No.: Nombre: C.C. O NIT:	REVISION REVISO: INGENIERO: M.P. No.: APROBO: INGENIERO: M.P. No.:	ACUEDUCTO: RECIBIO: INGENIERO: REGISTRO No.: Vo.Bo. INGENIERO: REGISTRO No.:	DIRECCION ----- PLANO DE DISEÑO DE REDES DE ACUEDUCTO	ESCALA: N.S.	NOMBRE DEL ARCHIVO: Detail Drawing for El Delirio	3/3											



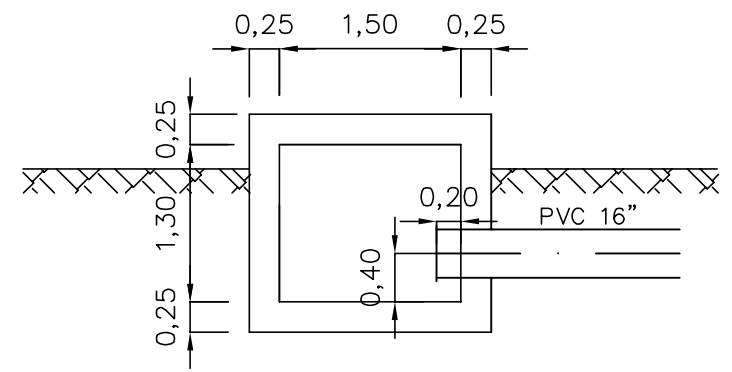
DITAIL "A"

Plan

Section

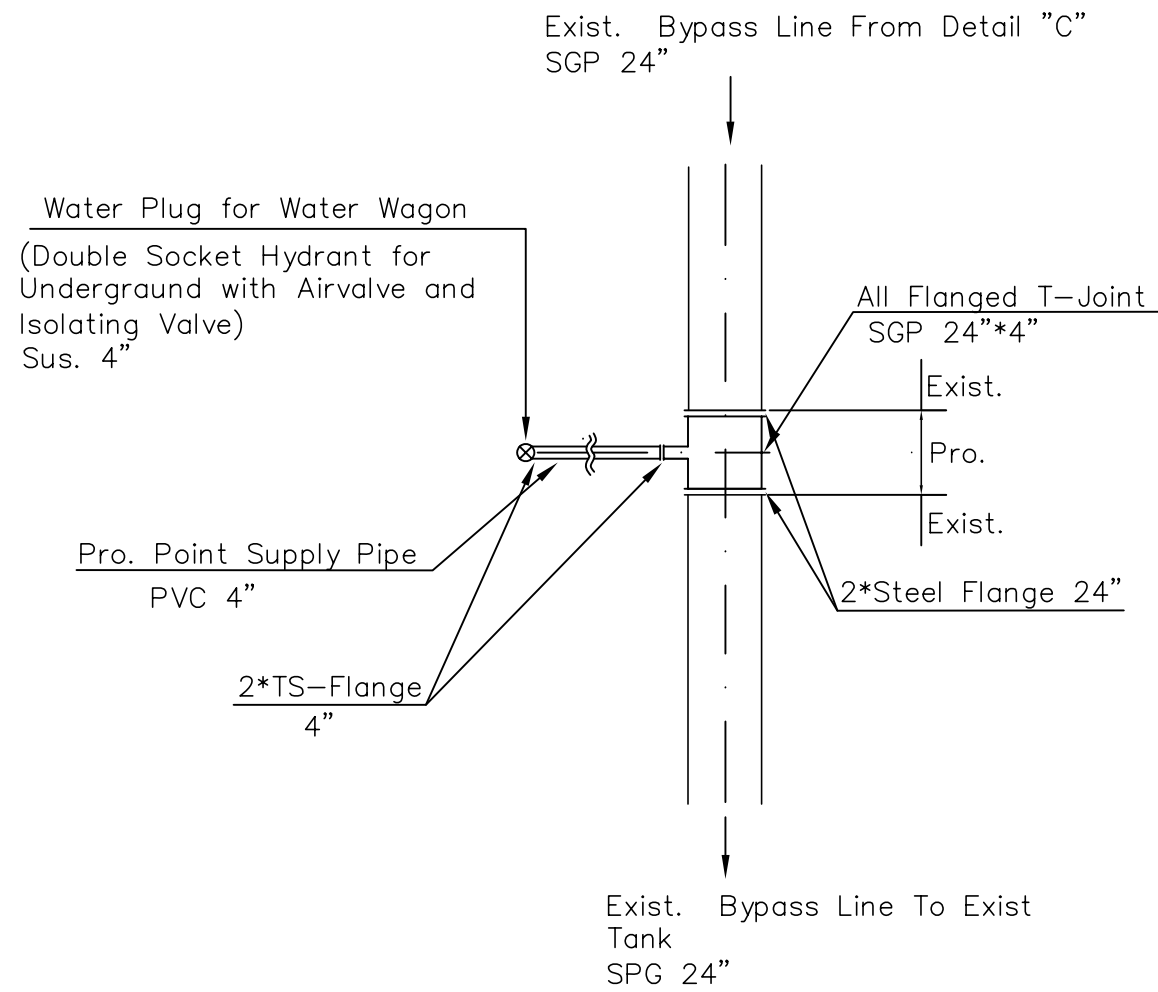


DITAIL "B"




LEGEND	
EXISTING NETWORK	_____
PROPOSED NETWORK	_____

LOGOTIPO, FIRMA URBANIZADORA NUMERO DE CONTRATO O NUMERO CARTA DE COMPROMISO	<b>acueducto</b> <small>AGUA Y ALCANTARILLADO DE BOGOTÁ</small>		LOCALIZACION ESC:	PUNTO DE AMARRE IGAC NORTE: ESTE: COTA: Coordenadas Medias E ,N PLANCHA	MODIFICACIONES			<b>acueducto</b> <small>AGUA Y ALCANTARILLADO DE BOGOTÁ</small> GERENCIA ----- DIRECCION ----- PLANO DE DISEÑO DE REDES DE ACUEDUCTO	NOMBRE DE LA OBRA/URBANIZACION/BARRIO LOCALIDAD		PROYECTO N° :
	DISEÑADOR :	REVISION			ACUEDUCTO:	FECHA	MODIFICACION		NOMBRE ING. RESPONSABLE	FIRMA	Contiene :
REPRESENTANTE LEGAL O PROPIETARIO	Nombre: M.P. No.:	REVISOR: INGENIERO: M.P. No.:	RECIBIO: INGENIERO: REGISTRO No.:					GERENCIA -----	Detalle Drawing for Vitelma	PLANO No.	
	Nombre: C.C. O NIT:	APROBO: INGENIERO: M.P. No.:	Vo.Bo. INGENIERO: REGISTRO No.:					DIRECCION -----	ESCALA: N.S.	NOMBRE DEL ARCHIVO: Detalle Drawing for Vitelma	2/3



DITAIL "C"

LEGEND	
EXISTING NETWORK	_____
PROPOSED NETWORK	_____

LOGOTIPO, FIRMA URBANIZADORA NUMERO DE CONTRATO O NUMERO CARTA DE COMPROMISO	<b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ		LOCALIZACION ESC:	PUNTO DE AMARRE IGAC NORTE: ESTE: COTA: Coordenadas Medias E PLANCHA	MODIFICACIONES			 <b>acueducto</b> AGUA Y ALCANTARILLADO DE BOGOTÁ GERENCIA ----- DIRECCION ----- PLANO DE DISEÑO DE REDES DE ACUEDUCTO	NOMBRE DE LA OBRA/URBANIZACION/BARRIO LOCALIDAD		PROYECTO N° :
	DISEÑADOR :	REVISION			ACUEDUCTO:	FECHA	MODIFICACION		NOMBRE ING. RESPONSABLE	FIRMA	Contiene :
REPRESENTANTE LEGAL O PROPIETARIO	REVISOR:	RECIBIDO:						Detail Drawing for Vitelma	PLANO No.		
Nombre: M.P. No.:	INGENIERO: M.P. No.:	INGENIERO: REGISTRO No.:						ESCALA: N.S.	NOMBRE DEL ARCHIVO: Detail Drawing for Vitelma	3/3	
Nombre: C.C. O NIT:	APROBO:	Vo.Bo.									
	INGENIERO: M.P. No.:	INGENIERO: REGISTRO No.:									

## **APPENDIX-3**

### **LIST OF COUNTERPART PERSONEL**

## List of Counter Personnel

	Institution	Name	Profession	Tel. Fax
1	JICA Study Team	Hiroshi Nakamura	Team Leader and Hydrology Expert	3447000
2		Masahiru Takeuchi	Water Supply plan Expert	3447000
3		Takashi Inoue	Hydrogeology	3447000
4		Peifeng Lei	Hydraulics/ Hydrology (irrigation)	3447000
5		Naoki Yasuda	Hydraulics/ Hydrology (irrigation)	3447000
6		Shigeru Ueda	Water Quality/ Environment (Sewerage treatment)	3447000
7		Masaru Fujita	Geophysical Exploration	3447000
8		Keiichi Ikeda	Exploration Drilling	3447000
9		Hideyuli Igarashi	Water Supply Plan (Operation and maintenance)	3447000
10		Toru Fujii	Facility design/Cost Estimate	3447000
11		Elsa Garcia S	Social Survey	3447000
12		Noboru Osakabe	Economic and Financial Analyses	3447000
13		Naoyuki Hara	Administrative Organization. Institution	3447000
14		Atsushi Kato	Coordinator	3447000
15		Liliana Castro	General Coordinator	3447000
16	Acueducto	Oscar Garcia	Master System Manager	3447000
17		Alberto Groot Sáenz	Supply Director	3447000
18		Jorge Barriga	Specialized Professional	3447000
19		José Manuel De La Torre	Specialized Professional	3447000
20		Gino Alexander González	Planning and control Division Director	3447000
21		Néstor Raúl García García	Technical Director	3447000
22		Luis Carlos Morales	Specialized Professional	
23		James Antonio Copete Ríos	Specialized Professional	3447000
24		Gustavo Herrán Sandoval	Specialized Professional	3447000
25		Pedro Alejandro Sandoval C.	Specialized Professional.	3447000
26		Edwin Ancisar Montaña	Specialized Professional	3447000
27		Nubia Irley León López	Specialized Professional	3447000
28		Diana Santana Santana	Legal Assessor	3447000
29		Angel Triana	Social management	3447000
30		Héctor Alfredo Ospina Vargas	Specialized Professional	3447000
31		Luz Stella Merchán	Economist	3447000
32		Pedro Buitrago Aguilar	Specialized Professional	3447000
33		Johan Rivera Bahamón	Specialized Professional	3447000
34	DPAE	Germán Barreto Arciniegas	Specialized Professional	4297414
35		Giovanni Almanza	Specialized Professional	4297414
36		Álvaro de Jesús Bocanumenth	Specialized Professional	3358000
37	Gobernación de Cundinamarca	Felix Guerrero	Specialized Professional	4260593
38		Jackeline Meneses	Specialized Professional	4260593
39	CAR	Oscar Garzón Forero	Specialized Professional	3209000
40		Romulo Camacho	Specialized Professional	3209000
41		Miriam Amparo Andrade	Bogota-La Calera Director	3209000
42		Abel Fernandez Acevedo	Specialized Professional	
43	SDA	Oscar Orlando Osorio	Area Professional	4441030
44		Diana Milena Rincon Davila	Group Coordinator	4441030
45	MAVDT	Juan Peña	Specialized Professional	
46		Miguel Angel Castro	Specialized Professional	
47		Luis Orlando Avila Parra	Specialized Professional	
48	IDEAM	Herbert Rivera	Specialized Professional	
49		Omar Vargas	Specialized Professional	
50	INGEOMINAS	Liliana Alcarado	Specialized Professional	2200106
51		María Consuelo Vargas	Specialized Professional	2200149
52		Luis Eduardo Vásquez	Specialized Professional	2200218
53	ACCION SOCIAL	Jorge Enrique Prieto Cardozo	Specialized Professional	5960800 ext. 7213
54		Ros Angela Correa	Specialized Professional	
55		Carolina Porras	Specialized Professional	5960800 ext. 7216

## **APPENDIX-4**

### **MINUTE OF MEETINGS**

MINUTES OF MEETING  
ON  
THE INCEPTION REPORT  
FOR  
THE STUDY ON SUSTAINABLE WATER SUPPLY  
FOR BOGOTA CITY AND ITS SURROUNDING AREA BASED ON  
THE INTEGRATED WATER RESOURCES MANAGEMENT  
IN THE REPUBLIC OF COLOMBIA

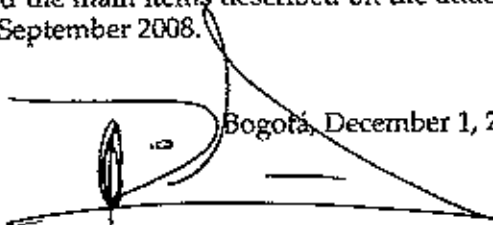
In response to the official request of the Government of the Republic of Colombia (hereinafter referred to as "the GRC"), the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Study Team. The Japanese side and the Colombian side came to an agreement on the Scope of Work (hereinafter referred to as "S/W") and signed it on April 8, 2005.

JICA sent to Colombia the JICA Study Team (hereinafter referred to as "the Team") for THE STUDY ON SUSTAINABLE WATER SUPPLY FOR BOGOTA CITY AND ITS SURROUNDING AREA BASED ON THE INTEGRATED WATER RESOURCES MANAGEMENT (hereinafter referred to as "the Study") from November 28, 2006. The Team held a series of meetings with the officials of Empresa de Acueducto y Alcantarillado de Bogotá (hereinafter referred to as "ACUEDUCTO") and other authorities concerned on the Study. The list of those who attended these meetings is shown in the Annex-1.

In the course of discussions, both sides confirmed the main items described on the attached sheets. The Team will proceed to further works until September 2008.

中村 浩

Mr. Hiroshi NAKAMURA  
Team Leader,  
Japan International Cooperation Agency (JICA),  
Japan

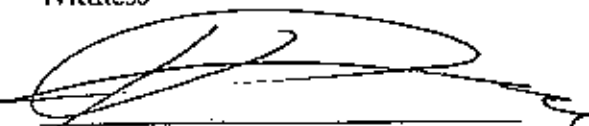
  
Bogotá, December 1, 2006

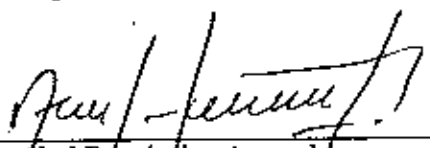
Mr. Oscar García Poveda  
Director of Water Supply,  
Empresa de Acueducto y Alcantarillado  
de Bogotá (ACUEDUCTO),  
The Republic of Colombia




Mr. Alberto Groot Sáenz  
Coordinator of the Study  
Empresa de Acueducto y Alcantarillado  
de Bogotá (ACUEDUCTO),  
The Republic of Colombia

Witness

  
Mr. Kazunori HAYASHI  
Resident Representative,  
JICA Colombia Office,  
JICA

  
Mr. Abel Fernández Acevedo  
Leader of International Cooperation Office,  
Corporación Autónoma Regional de  
Cundinamarca (CAR)  
The Republic of Colombia

  
Mr. Luis Alberto Jaramillo  
Bogotá River Office,  
Departamento Administrativo de Medio  
Ambiente (DAMA),  
The Republic of Colombia



## Attachment

### 1. Explanation of Inception Report (IC/R)

The Team submitted ten (10) English copies and fifteen (15) Spanish copies of the Inception Report (IC/R) to the ACUEDUCTO on November 28, 2006 in accordance with the Implementing Arrangement agreed upon between the GRC and JICA on April 8, 2005.

ACUEDUCTO and the Team held a series of meetings on the IC/R. The Team presented the basic concept, outline and scope of the Study proposed in the IC/R, including the technology transfer program proposed in the Study. Technical discussions were conducted between the Team and the Counterpart (C/P) Team on each of the study items, surveys and data required for the Study.

The Colombian side has agreed in principle with contents of the IC/R and promised the closer cooperation with the Team in the Study.

Major issues and the contents regarding the IC/R are as follows;

- 1) The Team explained that ACUEDUCTO requested a development study on the water supply to residential areas of low-income groups at high altitude, which is one of the objectives of the Study. The Team explained that groundwater development would be an important option in the output of the Study in consideration with the Integral Water Resources Management.
- 2) Both sides agreed that it is important to compare the cost of groundwater development with the one of surface water development with the aspect of construction, operation and maintenance cost.
- 3) The Colombian side suggested the Team would refer to the simulation models for groundwater executed by various organizations and the information of potential of groundwater investigated by Corporación Autónoma Regional de Cundinamarca (CAR).
- 4) The Colombian side emphasized that it is necessary to analyse carefully the decrease in groundwater level and land subsidence due to groundwater development.

### 2. Stages of the Study

The Team explained that the Study is divided into some stages, and JICA and the C/P will evaluate the efficiency of groundwater development especially with cost comparison of groundwater development with surface water development, result of exploratory drilling and well monitoring.

### 3. Preparation For Groundwater Development

The Team insisted that ACUEDUCTO include in its organizational structure and area dedicated to the Study and development of groundwater as an institutional policy, an engineer training and appointment, and a financial plan. ACUEDUCTO basically understood it and explained that it is needed to evaluate the efficiency in consideration with technical, environmental, legal, financial and economic, and operation and maintenance aspects.

### 4. Permission for exploitation drilling

The Team explained the exploitation drilling is planned under the Study and ACUEDUCTO will apply for the permission for it. CAR explained as one of the organizations to evaluate the applications that it will normally take 6 months at the maximum to issue the permission in consideration with environmental, political and legal aspects. But CAR mentioned to be ready to cooperate in the process of authorization.

**5. Water demand and water concession**

ACUEDUCTO explained that the water demand in 2006 is 14.21m<sup>3</sup>/s. ACUEDUCTO introduced and provided to the Team two reports named "Actualización del plan maestro de abastecimiento" and "Estudio de población y demanda" for the better understandings and the Team would refer to them.

CAR explained that CAR, CORPOGUAVIO and CORPORINOQUIA have an authority to respond to water concession applications for surface water and groundwater, so they do not have a plan of water concession projections as they are granted upon request.

**6. Water supply for low – income groups at high altitude**

ACUEDUCTO explained that there are 6 socio-economic scales and people categorized in each scale pay different tariffs. To supply water to low income groups at high altitude would impact economically, socially, financially and environmentally on ACUEDUCTO and the City. But ACUEDUCTO mentioned that it is necessary to expand the water supply area to these groups according with population growth and expansion of settlement areas, as mentioned in the studies included in paragraph 5 and in the plan of regulation and management of basin (PONCA).

**7. Role of organizations**

Many organizations are requested to cooperate together under the Study and the Team and ACUEDUCTO agreed that ACUEDUCTO, CAR, DAMA, INGEOMINAS, IDEAM, CORPOGUAVIO, CORPOORINOQUIA etc. would be the related organizations. ACUEDUCTO explained the role of each organization under the Study.

**8. Others**

Minutes of Meetings are prepared in English and Spanish. In case of discrepancy in the interpretation, English version will prevail.

ANNEX-1 List of attendants of the Counterpart Meeting

ANNEX-2 List of the members of the Counterpart Team

nl

Handwritten signatures and initials in black ink, including a large signature and several smaller initials.A handwritten mark consisting of a curved line and a small symbol, possibly a signature or a checkmark.

## List of attendants of the Counterpart Meeting

## &lt;Colombian Side&gt;

**Empresa de Acueducto y Alcantarillado de Bogotá (ACUEDUCTO)**

Oscar Garcia Poveda	Director, Abastecimiento
Alberto Groot Sáenz	Director, Dirección de Programa de Santa Fe
Jose Mannuel De La Torre Sosa	Profesional Especializado, Dirección de Programa de Santa Fe
Jorge Humberto Barriga	Profesional Especializado, Dirección de Programa de Santa Fe
Nestor R Garcia	Gerencia Corporativa Sistema Maestro
Edwin Molano	Profesional especializado, Gerencia Sistema Maestro
Carolina Rivera	Profesional, Dirección de Abastecimiento
Masazumi Alejandro Chavez	Profesional Especializado, Servicio al Cliente
Carlos A. Ortega Galvis	Asesor, Gerencia General
Adriana Isabel Torres	Asistente, Gerencia General
Sonia R Duarte Cely	Directora, Ambiental
Eder Pedraza	Asesor, Gerencia Ambiental
Gino Gonzalez	Líder, Apoyo Técnica
Guillermo Diaz	Dirección de Seguro y Riesgo
Maria del Carmen Gomez	Dirección de Gestión
Lus Stella Zamudio	Dirección de Gestión
Nubia Irely León López	Dirección Ingeniería Especializada
Pedro Buitrago	Dirección de Información
James Copete	Hidrología
Johan Amel Rivera	Lider Sistema Información Geografica

**Ministerio de Ambiente, Vivienda, Desarrollo Territorial (MAVDT)**

Milciades Hernandez	Consultor
---------------------	-----------

**Corporación Autónoma Regional de Cundinamarca (CAR)**

Abel Fernandez	Jefe Oficina Cooperacion Internacional
Alvaro Maldonado	Subdirector
Claudia Torres	Coordinadora FIAT
Marlene Salazar	Profesional especializada
Romulo Camacho	Profesional especializado
Leonardo Niño	Coordinador Grupo Cuencas
Carlos J Molano	Asesor Dirección

**Departamento Administrativo de Medio Ambiente (DAMA)**

Luis Alberto Jaramillo	Oficina de Rio Bogotá
Jesus M Sepúlveda	Profesional especializado Aguas Subterráneas

**Dirección para Prevención y Atención de Emergencia (DPAE)**

Carolina Rogelis	Profesional Especializado
German Barreto A	Jefe Grupo Aluvial

**Acción Social**

Jorge Enrique Prieto Cardozo	Subdirector, Ayuda Oficial al Desarrollo
Carolina Porras Rodríguez	Asesora, Ayuda Oficial al Desarrollo

<Japanese Side>

**Study Team**

Hiroshi NAKAMURA  
Elsa Garcia  
Atsushi KATO

Team Leader / Water Supply Planning  
Social Survey  
Coordinator

**JICA**

Hidetake AOKI

Staff / JICA Headquarter

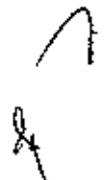
**JICA Colombia Office**

Kazunori HAYASHI  
Shintaro AKIYAMA  
Chiku CH. Ricardo Yukio

Resident Representative  
Staff  
Coordinator, Technical Cooperation

HR





## List of the members of the Counterpart Team

	Assignment	Member of Study Team	Member of CP	Profession
1	Team Leader / Water Supply Plan (1) / Groundwater Development	Hiroshi NAKAMURA	<ul style="list-style-type: none"> <li>• Gino Gonzalez</li> <li>• Nestor Garcia</li> <li>• Alberto Groot</li> <li>• Jose Manuel de la Torre</li> <li>• Jorge Barriga</li> <li>• Carolina Rivera</li> </ul>	Water supply and groundwater Water supply plan Hydraulics Quality management Civil construction Water supply plan
2	Water Supply Plan (2)	Masahiro TAKEUCHI	<ul style="list-style-type: none"> <li>• Gino Gonzalez</li> <li>• Nestor Garcia</li> <li>• Alberto Groot</li> <li>• Jose Manuel de la Torre</li> <li>• Jorge Barriga</li> <li>• Carolina Rivera</li> </ul>	Water supply and groundwater Water supply plan Hydraulics Quality management Civil construction Water supply plan
3	Hydrogeology	Takashi INOUE	<ul style="list-style-type: none"> <li>• Romulo Camacho(CAR)</li> </ul>	Hydrogeology
4	Hydraulics / Hydrology (irrigation)	Lei PEIFENG	<ul style="list-style-type: none"> <li>• Gustavo Herran</li> <li>• Alberto Groot</li> <li>• Eber Rivera(IDEAM)</li> </ul>	Hydrology Hydraulics Hydrogeology/groundwater
5	Water Quality / Environment (Sewerage treatment) / Socio-environmental consideration)	Shigeru UEDA	<ul style="list-style-type: none"> <li>• Nubia Leon</li> <li>• Eder Pedraza</li> <li>• Sara Usme</li> <li>• Sonia Duarte</li> </ul>	Water quality Environment Socio-environmental consideration Chemical environment
6	Geophysical Exploration	Masaru FUJITA	<ul style="list-style-type: none"> <li>• Carlos Ortega</li> </ul>	Geology/Geophysics
7	Exploration Drilling	Keiichi IKEDA	<ul style="list-style-type: none"> <li>• Hugo Ariza</li> </ul>	Hydrogeology
8	Water Supply plan (Operation and Maintenance)	Hideyuki IGARASHI	<ul style="list-style-type: none"> <li>• Alberto Groot</li> <li>• Mauricio Jimenez</li> <li>• Jose Manuel de la Torre</li> </ul>	Hydraulics Water supply plan Quality management
9	Facility Design / Cost Estimate	Kiyoshi SIMIZU	<ul style="list-style-type: none"> <li>• Oscar Pardo</li> <li>• Jorge Barriga</li> <li>• Jorge Camargo</li> </ul>	Project evaluation Civil construction Project evaluation
10	Social Survey	Elsa GARCIA	<ul style="list-style-type: none"> <li>• Javier Pava</li> <li>• Algel Triana</li> </ul>	Risk analysis Sociology
11	Economic and Financial Analysis	Noboru OSAKABE	<ul style="list-style-type: none"> <li>• Jose Garcia</li> <li>• Alejandro Chavez Watanabe</li> </ul>	Cost analysis Tariff analysis
12	Administrative Organization / Institution	Naoyuki HARA	<ul style="list-style-type: none"> <li>• Edwin Montano</li> <li>• Liliana Marino</li> <li>• Sonia Duarte</li> </ul>	Environmental management Legal part of environment Legal part of environment

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

Steering Committee Meeting Objectives		Date	
<ul style="list-style-type: none"> <li>To realize the necessary coordination to strength the execution of JICA study sustainable water supply for the Bogotá city and its surroundings area based on the integrated water resources management.</li> <li>To promote Colombian entities interested to participate in this project and therefore to guarantee the institutional technical cooperation, to make easy the management operation and the technology transfer required to the proper Study development.</li> </ul>		December 14 of 2006	
Participants:			
Steering Committee members of the Study		Invited to participate	
Alberto Groot Sácnz	Santa Fe Program Director	Luis Alberto Jaramillo	DAMA
Hiroshi Nakamura	JICA Study team leader	Jesús Miguel Sepulveda	DAMA
Jackeline Menceses	Gobernación de Cundinamarca	María Carolina Rogelis	DPAE
		Rafael Aragon	Gobernación de Cundinamarca
		María Consuelo Vargas	INGEOMINAS
		Luis Eduardo Vásquez	INGEOMINAS
		César Villanil	DAPD
		Romulo Camacho Ch.	CAR
		Claudia Patricia Torres	CAR
		Elsa Garcia S.	Jica Team, Social research expert
		Alejandro Chavez Waranabe	Client service management Assistant
		José Manuel De La Torre Sosa	Santa Fe Program Direction. Specialized Professional

Meeting agenda:
I. Explanations about the inspection report. II. Study introduction III. Work schedule IV. Counter part team V. Technology transfer VI. Inter -Institutional Study Coordination development.

<b>TOPIC</b>	I. Explanations about the inspection report.
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>The Steering Committee provides a copy of the inspection report to the committee members to review it and analyze it.</li> <li>Mr. Nakamura, JICA Team Leader, submitted to the Colombian entities consideration the inspection report. He expressed his intention to explain any concern regarding this report.</li> <li>The Acueducto de Bogotá according with the study inspection report, presented by JICA, requests the active participation from Bogotá city and Cundinamarca entities.</li> </ul>
<b>TOPIC</b>	2. Study introduction
<b>DECISIONS/ ACTIONS</b>	

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

	<ul style="list-style-type: none"> <li>• Mr. Nakamura explained the study general aspects and the need to improve the available information about groundwater from several points of view, including the environmental and economics diagnostics, looking for a safer and sustainable water supply system for Bogotá City in emergency cases.</li> <li>• Mr. Nakamura, team Leader of JICA Study, established the procedures for the Steering Committee as follows:</li> <li>• The presentation will be load in the assignee JICA folder and it can be consult inside the sub-folder named "Actas Comité Coordinador del Estudio".</li> <li>• CAR representatives manifested their interest to support JICA project. For this reason they asked to the Acueducto of Bogotá to send an official announcement to the Corporation. By doing this, they can inform JICA desire to realize geophysical explorations at the eastern hills using the TEM method (time domain electromagnetic method). The purpose is to improve the feasibility of the existent technical information. In this way, CAR designales can participate and supervise the development of that exploration.</li> <li>• Mr. Nakamura briefly explained the methodology to be used at the geophysical exploration to be realized by Mr. Masaru Fujita. He will be in Colombia from December 12 of 2006 until February 24 of 2007.</li> <li>• In addition, CAR expressed their concern because according to the actual regulation, any activity around eastern hills is restricted to forest conservation; therefore JICA Study Team should take this in account for all the activities planned around that area at this moment and in the future.</li> <li>• DAMA expressed their interest and support for this Study and this new process of research for the Acueducto de Bogotá. It will help to better understand the groundwater situation on Bogotá city.</li> <li>• DAMA representatives mentioned that for the last 3 years the water level of all the wells in Bogotá there is not water level fluctuation, the water level remains the same. Also clarify that for southern Hills in Bogotá City, it is not require any permission for geophysical measurements from DAMA. Therefore the activity of geophysical measurements can be done according with the schedule.</li> <li>• INGEOMINAS representatives manifested that at this time they don't have enough professionals to be assignee as a project counter part in the geophysical and hydrogeology areas. Since they are developing a geophysical research at several points at the national territory with the Canadian geophysical technology support.</li> <li>• INGEOMINAS expressed that inside the institution there are several changes from the operational point of view that reduce dramatically the activity of groundwater office. Also they want to know the answer of the previous Study Team or JICA to the questions expressed by the counter part professionals of other entities, about the final report of that Study.</li> <li>• The Gobernación de Cundinamarca representatives expressed special interest to know the project possibilities to explore new alternatives for the water supply for the metropolitan area neighborhoods municipalities, because the current problems in the water supply system, the water quality and continuity, and the availability of the same.</li> </ul>				
<p><b>TOPIC</b></p> <p><b>DECISIONS/ ACTIONS</b></p>	<p><b>3. Work schedule</b></p> <ul style="list-style-type: none"> <li>• The schedule study is shown in the inspection report. It is an annex of this record of discussion.</li> </ul>				
<p><b>TOPIC</b></p> <p><b>DECISIONS/ ACTIONS</b></p>	<p><b>4. Counterpart team</b></p> <ul style="list-style-type: none"> <li>• It was informed that the Empresa de Acueducto designated as a counter part members the followings employees:</li> </ul> <table border="1" data-bbox="414 1848 1538 1886"> <thead> <tr> <th data-bbox="414 1848 989 1886">SUBJECTS</th> <th data-bbox="989 1848 1538 1886">COUNTERPART</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	SUBJECTS	COUNTERPART		
SUBJECTS	COUNTERPART				

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

	Groundwater Exploration and exploitation study. Population studies, and water supply demand realized by EAAB	Gino Alexander González – EAAB Red Matriz Director
	EAAB Master Plan	Néstor Raúl García García – Technical Support Unit Direction
	EAAB Supply master plan.	Carolina Rivera González – Dirección de Abastecimiento
	Hydraulics	Alberto Groot Sáenz – Santafe Program Direction.
	Hydrology	José Manuel De La Torre – Santafo Program Direction James Antonio Copete Ríos - Specialized Engineer. Direction Gustavo Herrán Sandoval – Specialized Engineer Direction
	Geophysics. Technical and geographical information direction	Pedro Alejandro Sandoval Cavanzo - Technical and Geographical Information Direction
	Environmental management	Sonia Raquel Duarte Cely - Environmental Technical Direction Edwin Ancisar Montaña – Environmental Technical Direction Eder Pedraza Forero – Environmental Technical Direction Sandra Milena Medina – Environmental Technical Direction
	Water Quality	Nubia Irley León López -Specialized Engineering Direction
	Environmental juridical assessor	Diana Santana Santana – Legal Assessor Direction.
	Social Management.	Angel Triana - Community management
	Economic and financial analysis	Héctor Alfredo Ospina Vargas – Financial management Luz Stella Merchán - Financial management
	Geographical information system. (GIS).	Pedro Buitrago Aguilar - Technical and Geographical Information Direction. Johan Rivera Bahamón - Technical and Geographical Information Direction
	<ul style="list-style-type: none"> <li>It was asked to the representatives of the governmental entities to assign the professionals to conform the counter part team in the following areas: Hydraulic, hydrology, hydrogeology, geology, geophysics, environmental management and social management. They will participate in the technical meetings and workshops of technology transfer contemplated in this project.</li> </ul>	
<b>TOPIC</b>	<b>5. Technology transfer</b>	
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>The JICA Study Team leader explained that the process of technology transfer will be handled through technical workshops, two per month, where the counter part and JICA experts will interact and discuss with their knowledge of the working methodology for every subject of the study.</li> <li>Field work, mainly Acueducto counterpart personnel will receive the knowledge of the different field activities from the JICA Study Team members, although every entity of the counterpart like CAR, DAMA, DPAE, INGEOMINAS, IDEAM, are more than welcome to participate at any time they want or request</li> </ul>	
<b>TOPICS</b>	<b>6. Inter -Institutional Coordination to the study development pursuit.</b>	
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>Steering Committee consists of the representatives from Acueducto de Bogotá, Gobernación de Cundinamarca, DPAE, DAMA, and INGEOMINAS, who had been officially assigned by the respective</li> </ul>	





**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

Jackeline Meneses

María Carolina Rogelis

Rafael Aragon

María Consuelo Vargas

Luis Eduardo Vásquez

Cesar Villamil

Romulo Camacho Ch.

Claudia Patricia Torres

Elsa García S.

Alejandro Chavez Watanabe

José Manuel De La Torre Sosa

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

### STEERING COMMITTEE MEETING OF THE JICA STUDY

Objective of the Meeting		Date	
<ul style="list-style-type: none"> <li>To realize the necessary coordination to strength the execution of the Study carry out by the Japanese International Cooperation Agency (JICA) about the Sustainable Water Supply for the Bogotá City and Surrounding Areas Based on the Integrated Water resource Management.</li> <li>To promote the participation of Colombian side entities interested on the development of this Study to ensure the institutional technical cooperation, to make easy the administrative management and the technical transfer of information required for the proper execution of the Study.</li> </ul>		February 15 of 2007	
<b>Attendance</b>			
<b>Steering Committee Members of the Study</b>		<b>Invited to participate</b>	
Alberto Groot Saenz	Santa Fe Program Director	Romulo Camacho	CAR
Hiroshi Nakamura	JICA Study Team Leader	Aura Wilches	CAR
		Maria Carolina Rogelis	DPAE
		Germán Barreto	DPAE
		Giovanni Almanza	DPAE
		Juan F. Phillips	JICA
		Elsa Garcia Salazar	JICA
		Shintaro Akiyama	JICA
		Ricardo Chiku	JICA
		Shigueru Ueda	JICA
		Noboru Osakabe	JICA
		Masaru Fuyita	JICA
		Alejandro Chávez W.	EAAB
		Jose Manuel de la Torre	EAAB
		Angel Triana	EAAB
		Edwin Montaña	EAAB
		Nestor Raul Garcia	EAAB
		Flor Alba Martinez	EAAB
		Carolina Ortiz	EAAB
		Luisa Sandoval	EAAB
		Gerardo Sandoval	EAAB
		Carlos Moreno	EAAB
		Miriam Mejia	EAAB
		Ana Catalina Roa	EAAB
		Angela Moreno	EAAB
		Sara Ponguta	EAAB

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

### STEERING COMMITTEE OF THE STUDY

1. Reading and approval of the Minute No. 1 of Steering Committee, of 14<sup>th</sup> of December 2006.
2. Presentation of the results of the first stage of the Study.
  - I. Development of Groundwater in the Study Area.
  - II. Geophysical Exploration.
  - III. Water Quality.
  - IV. Finance Assessment.
  - V. Social Survey
3. Question and answers.

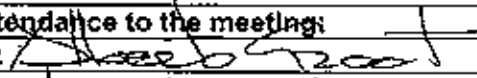
<b>TOPIC</b>	<b>1. Reading and approval of the Minute No. 1, Meeting of 14<sup>th</sup> of December 2006.</b>
<b>Decisions /Actions</b>	The technical coordination of the Steering Committee of the JICA Study read the minute No. 1 of 14 <sup>th</sup> of December 2006, which was approved and published through internet for everybody information on <a href="http://rfuse.acueducto.com.co">rfuse.acueducto.com.co</a> , in folder "Dirección Programa Santa Fe" and "Actas comite Coordinador del Estudio".
<b>TOPIC</b>	<b>2. Presentation of the results of the first stage of the Study.</b>
<b>Decisions /Actions</b>	<p style="text-align: center;"><b>I. Development of Groundwater in the Study Area</b></p> <p>Mr. Hiroshi NAKAMURA, JICA Study Team Leader, informed the progress of the project and introduces the partial results of the groundwater study for the eastern and southern hills of the City. After that it was made a brief description of the activities carried out at the first stage of the Study and it was mentioned also the main activities it would be done for the next stage of the project. The presentation is attached to this minute and it is part of it.</p>
<b>Decisions /Actions</b>	<p style="text-align: center;"><b>II. Geophysical Exploration</b></p> <p>Mr. Masaru FUJITA described the methodology of TEM (Time Domain Electromagnetic Method) used for the geophysical survey. The main topics of this presentation were: Background and physical principles of the method, advantages to use the TEM method compared with other field surveys, procedure to calibrate the TEM measurements, and presentation of preliminary results of the Study. The presentation is attached as integral part of this Minute.</p>
	<p style="text-align: center;"><b>III. Water Quality</b></p> <p>Mr. Shigueru UEDA made a brief diagnostic of the drainage system of the City and the quality of surface water sources, the system of Doña Juana Sanitation Pit, levels of contamination at different parts of Bogotá River and management of the Waste Water Treatment Plant El of Salitre, which presentation is attached as integral part of this minute.</p>
	<p style="text-align: center;"><b>IV. Financial Assessment</b></p> <p>Mr. Noboru OSAKABE presented the progress from the financial point of view, for the sustainable development of groundwater of the eastern and southern hills</p>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

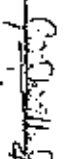
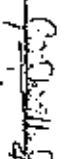
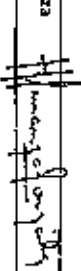







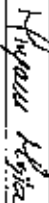
	<p>of Bogotá City. It was indicated the elements to be analyzed to determine the economical feasibility of the project for the use of groundwater such as: where come from the information of the Study, general scheme of the phases of the Study and the actual location of the Study, and also introduce the preliminary results of the Study from the Financial point of view.</p>
	<p><b>V. Social Survey</b></p> <p>Ms. Elsa GARCIA analyzed the socio-economic context of the project. Some of the topics were: introduction, definition of the Study Area, relationship of the socio-economic analysis with the objectives of the project; methodology to obtain the social – economic information, presentation and discussion of the preliminary results of the social survey.</p>
<b>TOPIC</b>	<p><b>3. Question and answers.</b></p> <ul style="list-style-type: none"> <li>• Romulo Camacho (CAR), asked: It was considered to do explorations on the second stage of this project around Soacha – Granada area?</li> <p>Mr. Hiroshi Nakamura answered: No, in this Study it was not planned to do explorations around that area.</p> <li>• Romulo Camacho (CAR), asked: It will be carried out groundwater flow direction studies in the next stage of the Project?</li> <p>Mr. Hiroshi Nakamura answered: This topic was analyzed and determined on the previous Study of JICA and the flow direction was identified.</p> <li>• Romulo Camacho (CAR), made the following recommendations: <ul style="list-style-type: none"> <li>- The construction of conceptual models should take into account of each sub-basin of Bogotá Plain.</li> <li>- It is necessary a detail study of aquifers recharge.</li> <li>- It is necessary to make a pre- feasibility Study about the development of groundwater.</li> </ul> </li> <li>• Mr. Alberto Groot, (Acueducto) mentioned that other relative organizations should take a more active participation for the next stages of this Study, and not only limite their job to submitted information to the Study Team of JICA but also it is recommended participate on every discussion.</li> <li>• Mr. Alberto Groot (Acueducto), suggested to include on this study geophysical research near La Herrera Wetland (between Madrid and Mosquera towns), and also near San Rafael Damp, considering the last one as interesting area for recharge of aquifers.</li> <li>• Mr. Giovanni Almanza (DPAE), recommend to include the analysis of Seismic Risk that can generate the exploitation of groundwater (due to decreasing the water level, and land subsidence). Also it was recommended to include the actual Study of DPAE for the analysis of risk of each component and sub component of the Water Supply and Sewerage System of the City.</li> </ul>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

- Mr. Romulo Camacho (CAR), suggested to the Study Team in order to include in this JICA Study to consider construction of a battery of recharge wells in San Rafael Damp. Also to include as a topic of this project, the possibility to bring water from Tunjuelo River to Soacha due to the low precipitation around this town. Finally, it was proposed to carry out the TEM method near by Muña Damp.
- Mr. Alberto Groot, (Acueducto), insisted on the necessity that ACUEDUCTO as well as other relative organizations involved in this project have more technological transfer from the members of the JICA Study Team.
- Mr. Romulo Camacho, (CAR) proposed, the JICA Study Team should include as part of this project, a component related to monitor the water contamination along Bogotá Plain, and conduce an analysis how this contamination will affect the groundwater quality.
- Mr. Alberto Groot, (Acueducto), mentioned that even though it can not be neglected the difficult situation of people living on the Study area, it is necessary to take into account that in many cases, there are illegal settlements and for this reason Acueducto of Bogotá can not make any straight action to overcome that situation of lack of water and sewerage system. The identified solution to this problem so far in the Study Area can not come only from running a project of groundwater development in Bogotá Plain. It is necessary to consider also the re- location of families that are illegally living on the Study area.
- Mr. Ignacio Castro, (Acueducto), wanted to point that this project can generate negative effects in the Study area from the planning point of view. To look for a solution of water supply and sewerage system problems, can generate an expected growing on population on illegal areas. That is why it is important to work as a team together with those that live actually around those areas with the target of: generate environmental conscience and get them to consider the area as their own concern, which will promote protection and sustainable water resources use. To create perception inside the communities is necessary about the growing population negative effect in that border areas, looking forward to find a natural helping attitude to mitigate this problem and find mechanism of out – regulation to control the growing situation.
- Mr. Germán Barreto, (DPAE), recommended that taking into account the previous concepts of the meeting. It is necessary to plan very carefully the development of this project on the following stages, always keeping on mind the dynamic that can be generated in the Study Area (the wells are oasis in the desert).

<b>Responsible of the Minute:</b>	Alberto Groot Saenz
<b>Signature of the attendance to the meeting:</b>	
Alberto Groot Saenz	
Hiroshi Nakamura	中村浩

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

	Aura Wilches	
	German Barrio	
	Giovanni Almazan	
	Juan F. Phillips	
	Elsa Garcia S.	
	Shintaro Miyoshi	
	Ricardo Chiku	
	Shigeru Ueda	
	Moboru Osakabe	
	Masaru Fujita	
	Alejandro Chavez Wiframbe	
	José Manuel De La Torre Sosa	
	Angeli Trisna	
	Estelin Montañó	
	Nestor Garcia	
	Flor Alba Martinez	
	Carolina Ortiz	
	Luisa Sandoval	
	Gerardo Avenas	
	Carlos Moreno	
	Miriam Mejia	
	Ana Catalina Ros	
	Angela Moreno	
	Sara Pangua	

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**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

Objective of the Meeting		Fecha	
<ul style="list-style-type: none"> <li>To realize the necessary coordination to strength the execution of the Study carry out by the Japanese International Cooperation Agency (JICA) about the Sustainable Water Supply for the Bogotá City and Surrounding Areas Based on the Integrated Water resource Management.</li> <li>To promote the participation of Colombian side entities interested on the development of this Study to ensure the institutional technical cooperation, to make easy the administrative management and the technical transfer of information required for the proper execution of the Study.</li> </ul>		March 1 de 2007	
Attendance			
Steering committee Members of the Study		Invitados a participar	
Alberto Groot Sáenz	Santa Fe Programe Director	Giovanni Almanza	Shift of Network – DPAE
Hiroshi Nakamura	JICA Study Team Leader	Carlos H Castellanos	Shift of Projects – Gobernación of Cundinamarca
Carolina Porras	Advisor – Acción Social de la Presidencia de la Republica	Aura Ahide Wilches	CAR
Shintaro Aklyama	Shif of Technical cooperation for Colombia - JICA	Rómulo Camacho	Groundwater - CAR
		Javier Torres	GIS Division- CAR
Jairo Pérez	Advisor – MAVDT , Ministry of Environment	Nestón Plato	Concession Division- CAR
		Elsa García	JICA
Francisco Velandía	Subdirector - INGEOMINAS	Eduardo Zamudio	Modeling Coordinator – IDEAM
		Catalina Castañeda	Consultant - MAVDT
		Luis Eduardo Vásquez	Geophysics - INGEOMINAS
		Jose Manuel de la Torre	EAAB
		Gustavo Herrán	Hydrology Office - EAAB
		Julio Beltrán H.	Environmental Adm. -EAAB
		Nubia León	Chemical Ing. - EAAB
		Sandra Mónica Melo	EAAB

Meeting Agenda



## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

VII.	Reading and approval of the Minute No. 2 of Steering Committee of 15th of February 2007
VIII.	Presentation of the results of the first stage of the Study.
	<ul style="list-style-type: none"> <li>I. Introduction</li> <li>II. Hydrogeology</li> <li>III. Development of Groundwater</li> <li>IV. Schedule</li> <li>V. Groundwater Cost</li> <li>VI. Conclusions</li> </ul>
IX.	Questions and answers

<b>TOPIC</b>	<b>2. Reading and approval of the Minute No. 2 of Steering Committee of 15th of February 2007</b>
<b>DECISIONS/ ACTIONS</b>	The technical coordination of the Steering Comité of the JICA Study, read the Minute No. 2 of February 15th of 2007, which was approved and published trough internet for everybody information on <a href="http://nfuse.acueducto.com.co">nfuse.acueducto.com.co</a> , in folder "Dirección Programa Santa Fe" and "Actas comite Coordinador del Estudio".

<b>TOPIC</b>	<b>2. Presentation of the results of the first stage of the Study</b>
<b>DECISIONS/ ACTIONS</b>	<p><b>I. Introduction</b></p> <p>Mr. Hiroshi NAKAMURA, JICA Study Team Leader, informed the progress of the project and introduces the partial results of the groundwater study for the eastern and southern hills of the City. After that it was a made a brief description of the activities carry out at he fist stage of the Study and it was mentioned also the main activiltires it will be done for the next stage of the project. The presentation is attached to this minute and it is part of it.</p> <p><b>II. Hydrogeology</b></p> <p>Mr. Hiroshi NAKAMURA, reiterated the importance that groundwater exploration has on eastern hills of the City in order to determine with more precision the potential of this sector. It was mentioned that the obtained results of simulation model from previous JICA Study was satisfactory as it was confirm at Vitelma Site.</p> <p>In order to make more clear this situation it was asked to review the final report of the previous JICA Study which is available through internet and any doubt will be attended as soon as possible. The presentation is attached to this minute and it is part of it.</p> <p><b>III. Groundwater Development</b></p> <p>The JICA Study Team leader mentioned that it will contemplate the groundwater use above 2.750 masl at southern hills of Bogota City. The Guadalupe sandstone formation is the most suitable for drilling and easy to access on remote areas of the District where it is required without cross long distances.</p> <p><b>IV. Ground Water Cost</b></p> <p>Mr. Hiroshi Nakamura mentioned that the expected cost to do this Project will not be bigger than the actual cost for water supply; any how, this data will be precise for the next stage of this project.</p>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

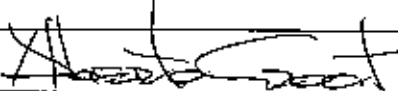
	<p><b>V. Conclusions</b></p> <p>The JICA Study Team leader explained that the main target of this Project is to compensate the vulnerability of the actual water supply system, and the supply at those areas where there is not water like high altitude marginal areas of the city.</p> <p><b>VI. Schedule</b></p> <p>Decision to continue this study of groundwater will be take from JICA and EAAB. The deep analysis of this first working period will be very important for that decision. Also the detail cost analysis of the study and the environment impact relted to the exploitation plan has to be considered.</p> <p>It was clarified that the first part of the Study has not finished jet, it will last up to December 2007, it is still missing to do the exploratory drilling work and discussions about the Study.</p> <p>Therefore, the JICA Study Team goes back to Japan in the next days of March and come back on May to continue the first part of the Study.</p>
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TOPIC	3. Questions and Answers
DECISIONS/ ACTIONS	<ul style="list-style-type: none"> <li>∞ Mr. Gustavo Herrera (EAAB), mentioned that it can be expensive the groundwater recharge.</li> <li>✦ Mr. Hiroshi Nakamura adds that in the previous JICA Study it was carry out isotope analysis and the result was very interesting due to it determine the age and origin of quaternary and cretaceous water.</li> <li>- Mr. Luis Eduardo Velásquez, (INGEOMINAS), comment that the Andes University made an interesting studies from the faults behavior point of view at the eastern hills of Bogota that can be taking into account.</li> <li>✦ Mr. Hiroshi Nakamura thanks for the information and consider that at the moment of earthquakes all faults will move and as consequence many pipes of Acueducto will be broken, that is why we will propose a new method in case of emergency for the city.</li> <li>∞ Mr. Alberto Groot, (EAAB), mentioned that vertical wells are build on stainless steel and in case of emergency it can be deformed.</li> <li>∞ Mr. Ro'mulo Camacho, (CAR), mentioned that also should be consider the emergency in case of any well collapse.</li> <li>- Mr. Alberto Groot, (EAAB), clarified that depend of the results of phase one of this Study it can be put on consideration new exploration drilling points around Mosquera, Madrid and La Calera towns. Additionally mentioned that before to decide any additional drilling points it should be analyzed the information generated on the first phase of the Study, which runs up to December 2007. Also he mentioned that the General Manager of Acueducto is very much interested to keep going with the Study.</li> </ul>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

	<ul style="list-style-type: none"> <li>- Mr. Jairo Pe'rez (MAVDT), said that related to the exploitation wells its impact on quantity and availability of streams and rives should be monitored, because this new use can generate inconformity between the actual users which has already water concessions and can be affected considerably affected.</li> <li>- Mr. Hiroshi Nakamura response that this is an important problem that is been analyzed from the socio-economic point of view in the hilly areas of the city. Also added that this small water sources are very important for people survival.</li> <li>- Mr. Jairo Pe'rez (MAVDT), mentioned that there are country laws that prohibit exploitation in certain places of the city.</li> <li>- Mr. Romulo Camacho, (CAR), says that CAR will not give any permission for exploration until they have the concept support of Cundinamarca Court.</li> <li>- CAR members from the GIS and concession division say that it can be possible to joint the Study Team of JICA to select the drilling point at the right polygons where the corporation will not make any objection.</li> <li>- Mr. Ro'mulo Camacho (CAR) adds that any field trip and commission from Car members has to be done trough Mr. Oscar Garzo'n.</li> <li>- Mr. Jose Manuel de la Torre (EAAB), explained how to use the Study information and the access to the CITRIX accounts.</li> <li>- Mr. Luis Eduardo Velásquez (INGEOMINAS), propose to invite people from Universities and associations to participate in the Study discussions.</li> </ul>
<b>Responsable of the Minute:</b>	Alberto Groot Sáenz

**Signature of the attendance to the meeting:**

Alberto Groot Sáenz		Giovanni Almanza
Hiroshi Nakamura	中村 浩	Carlos H Castellanos
		Aura Ahide Wilches
		Rómulo Camacho
		Javier Torres
		Nestón Plato
		Carolina Porras
		Francisco Velandia

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

	Elsa García
	Eduardo Zamudio
	Shintaro Akiyama
	Jairo Pérez
	Catalina Castañeda
	Luis Eduardo Vásquez
	Jose Manuel de la Torre
	Gustavo Herrán
	Julio Beltrán H.
	Nubia León
	Sandra Mónica Melo

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

Objective of the Meeting		Date	
<ul style="list-style-type: none"> <li>▪ To present the schedule and contents for the second period of the Agency of Cooperation International of Japan (JICA) Study on the Sustainable Water Supply for Bogotá city based on integrated water resources management.</li> <li>▪ To discuss with Colombian counterpart organizations about issues like groundwater development potential, concession of permits for exploratory well drilling, pilot study on groundwater development and the importance of JICA Study.</li> </ul>		July 4 of 2007	
Participants:			
Members of the Committee of Coordination of the Study		Guests to participate	
Alberto Groot Sáenz	Water Supply Programme Director – EAAB	Rómulo Camacho	Profesional especializado – CAR
		Myriam Amparo Andrade	Jefe OTC Bogotá – CAR
Hiroshi Nakamura	JICA Study Team Leader	Gerardo Rugetas	Profesional Especializado OBDC – CAR
		Diana Milena Rincón	Profesional Contratista – SDA
		Ismael E. Mopino	Profesional Contratista – SDA
		Gilberto Almeida R.	Profesional Contratista – SDA
		Giovanni Almanza G.	Coordinación Gestión Sectorial – DPAE
		Germán Barreto	Coordinación Aluvial – DPAE
		Luis Eduardo Vásquez	Profesional Especializado – INGEOMINAS
		Diego Felipe Sánchez	Profesional Especializado – SDP
		Jose Manuel de la Torre	Profesional Especializado – EAAB
		Jorge Barriga	Profesional Especializado – EAAB
		Nelson Cobos Monsalve	Tecnólogo Construcción – EAAB
		Sonia R. Duarte Cely	Dirección Saneamiento Ambiental – EAAB
		Edwin Montaña	Profesional Especializado – EAAB
		Mildreth González	Profesional Especializado – EAAB
		Noboru Osakabe	JICA Study Team
		N Hara	JICA Study Team
		Elsa García	JICA Study Team
		Juan Fernando Phillips	JICA Study Team

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

<b>Agenda of the Session of Work</b>	
	<ol style="list-style-type: none"> <li>1. Reading and approval of Act No. 03 of March 1 – 2007</li> <li>2. Presentation of schedule and contents of second stage of the study             <ol style="list-style-type: none"> <li>I. Introduction</li> <li>II. Study schedule of 2<sup>nd</sup> year period</li> <li>III. Contents of Study of 2<sup>nd</sup> year period</li> </ol> </li> <li>3. Questions and answers</li> <li>4. Discussion topics             <ol style="list-style-type: none"> <li>I. Groundwater development potential and Pilot Project on groundwater development</li> <li>II. Concession of permits for exploratory well drilling</li> <li>III. Superficial water rights in Tibitóc</li> <li>IV. Importance of JICA Study</li> </ol> </li> <li>5. Questions and answers</li> <li>6. Final comments</li> </ol>
<b>SUBJECT</b>	3. Reading and approval of Act No. 03 of March 1 – 2007
<b>DECISIONS/ ACTIONS</b>	Technical Coordination of Coordinating Committee of JICA study gave reading to the previous act of March 1 of 2007, being approved and published for consultation through Internet at <a href="http://nfuse.acueducto.com">nfuse.acueducto.com</a> , in the subfolders "Dirección Programa Santa Fé" and "Actas Comité Coordinador del estudio".
<b>SUBJECT</b>	2. Presentation of schedule and contents of second stage of the study
<b>DECISIONS/ ACTIONS</b>	<p><b>I. Introduction</b></p> <p>Mr. Alberto Groot, Water Supply Director – EAAB, welcomes everybody and, afterwards, makes a brief introduction about the purpose of the Steering Committee meeting and, after that, he reads the agenda of session of work.</p> <p>He reminds to the assistants that the Water Supply Direction replaces the <i>Programa Santa Fé</i> inside the new organizational structure of EAAB.</p> <p><b>II. Study schedule of 2<sup>nd</sup> year period</b></p> <p>Mr. Hiroshi Nakamura, JICA Study Team Leader, welcomes the assistants and begins his presentation.</p> <p>He explains the Study schedule of second year period. He said that he would return to Japan at the middle of July to discuss with JICA Tokyo about continuity of the Study.</p> <p><b>III. Contents of Study of 2<sup>nd</sup> year period</b></p> <p>Mr. Hiroshi Nakamura speaks that the present Study also takes into account the following aspects:</p> <ul style="list-style-type: none"> <li>♦ Measures to secure water supply in emergency by natural disaster will be formulated.</li> </ul>

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

<b>SUBJECT</b>	<b>2. Presentation of schedule and contents of second stage of the study</b>
	<ul style="list-style-type: none"> <li>• Collapse of tunnel and interruption for water conveyance between Chingaza dam and Bogotá city are forecasted as a result of outbreak of large-scale earthquakes by DPAE.</li> <li>• Groundwater development in the Eastern and Southern Hills for water supply for case of emergency will be examined.</li> </ul> <p>Afterwards he explained in detail the activities that he mentioned before.</p>
<b>SUBJECT</b>	<b>3. Questions and answers</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• Mr. Alberto Groot says that JICA Study Team members should conduct training to personnel of the Colombian counterpart and that the technology transfer seminars should be held with an objective of compressive technology transfer on specific topics, such geophysical exploration and groundwater simulation. Additionally he remains to Mr. Hiroshi Nakamura that personnel from INGEOMINAS, SDA, CAR, DPAE and from the Ministry of Environment, Housing and Territorial Development (MAVDT) have made many comments on the contents of the Report of Work Results, which are required to be answered. JICA Study Team should include these comments and then socialize the Report of Work Results with the Colombian counterpart organizations. Also, he says that the construction of infrastructure planned by EAAB is not subordinated to the results of the Study of JICA, although the results will be very important for the formulation of the Water Supply Master Plan for Bogotá city. Finally, he explains that JICA Study Team will only formulate the Groundwater Supply Master Plan for Bogotá city.</li> <li>• Mr. Ismael Mopino, SDA Professional Consultant, asks why it was not considered to drill an exploratory well in Suba Hills, and additionally he wants to know in which way JICA Study Team did select the location of the observation well in the Quaternary Formation.</li> <li>• Mr. Hiroshi Nakamura responds that the EAAB drilled two exploration wells in the Suba Hills during the previous Study of JICA (2003). He says that the geological structure of Suba Hills is similar to that of the Easter Hills and that these wells have a production of 2.000 m<sup>3</sup>/day. To the second question Mr. Nakamura responds that the location of the observation well in the Quaternary Formation was established taking into account its proximity to the exploratory wells that will be drilled in the Cretaceous Formation. He says that this observation well will be used to collect information on the effects of pumping in the Cretaceous Formation on groundwater level of the Quaternary aquifer.</li> <li>• Ms. Diana Milena Rincón, SDA Professional Consultant, says that the SDA can provide to JICA Study Team a database that contains the location of all wells that lie under SDA jurisdiction to improve the monitoring of pumping of Cretaceous.</li> <li>• Mr. Rómulo Camacho, CAR Specialized Professional, ask how JICA Study Team plans to observe the influence of the pumping test carried out in Cretaceous Formation on groundwater level in the Quaternary Formation if the drilling depth in this Formation is 150 m while the drilling depth in Cretaceous Formation is 300 m?</li> <li>• Mr. Hiroshi Nakamura answers that JICA Study Team wants to evaluate if the exploitation of groundwater in the Cretaceous Formation can cause soil subsidence in the Quaternary Formation. He says that the soil subsidence generally happens at depths between 0 and 150 m of depth, so a well of 150 m of depth will be appropriate to study if groundwater</li> </ul>

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

SUBJECT	3. Questions and answers
	<p>exploration in the Cretaceous Formation can generate soil subsidence in the Quaternary one. Mr. Hiroshi Nakamura says that information coming from six wells of INGEOMINAS and from other wells drilled in the Quaternary Formation will be used to evaluate this issue.</p> <ul style="list-style-type: none"> <li>• Mr. Rómulo Camacho wants to know if JICA Study Team and EAAB will drill six (6) wells or sixty (60) wells in this Study.</li> <li>• Mr. Hiroshi Nakamura responds that JICA Study Team and EAAB are planning to drill six wells with the purpose of studying and monitoring the groundwater potential of Cretaceous aquifer and that the results that they will obtain will use to evaluate the feasibility of groundwater development in Bogotá city. The battery of wells will be constructed only if groundwater development is feasible.</li> <li>• Mr. Rómulo Camacho says that it is very important to conduct this type of studies to evaluate the groundwater potential for water supply in Bogotá city.</li> <li>• Mr. Luis Eduardo Vásquez, INGEOMINAS Specialised Professional, says that all that has to do with technology transfer is welcome; even so it is necessary to keep in mind that the existence of many works on the topic of groundwater development by local entities and professionals.</li> <li>• Mr. Hiroshi Nakamura says he has reviewed in detail INGEOMINAS study and in this sense the technology transfer is important not only for Colombian counterpart organizations but also for JICA Study Team.</li> </ul>

SUBJECT	4. Discussion topics
DECISIONS/ ACTIONS	<p><b>1. Groundwater development potential and Pilot Project on groundwater development</b></p> <p>Mr. Alberto Groot explains though EAAB has sufficient capacity for water supply at ordinary times (EAAB has a surplus of 12-15 m<sup>3</sup>/s) and is enhancing preparedness against disasters, is also looking for other alternative source for emergency water supply to secure availability of water in the event when surface water sources are not available due to some natural disaster. This is an obligation of the entity from view point of the disaster prevention.</p> <p>He mentions that despite the small potential of the groundwater (is not enough to satisfy the water supply necessities of Bogotá city), one has to have in mind that it has been estimated that the consumption in the case of emergency is 15 l/day/person. This volume corresponds to 15% of the normal water consumption per inhabitant in Bogotá city (90-110 l/day/person). For such a reason the use of groundwater should be considered as an alternative water source for emergency water supply and thus should be integrated in the contingency plans of EAAB.</p> <p>He explains that the groundwater potential can be established only with exploratory well drilling and that without the results of this Study, EAAB will not be able to know if it is feasible or not to use groundwater as an alternative water source for emergency water supply. He says that JICA Study Team and EAAB are planning to drill six wells with the purpose of studying the groundwater potential of Cretaceous aquifer and that the results that they will obtain will use to evaluate the feasibility of groundwater development in Bogotá city. In other words without this information it is impossible to know if groundwater development for</p>



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SUBJECT	4. Discussion topics
	<p>Bogotá city is feasible or not.</p> <p>Mr. Alberto Groot explains that the information coming from the pumping tests alone is not enough to determine if the use of groundwater is an good alternative water source for emergency water supply development or not. He also mentions that it is recognized that to enhance the preparedness for emergency water supply with groundwater, it is necessary to use the groundwater at ordinary times as well to assure that the wells function at times of emergency.</p> <p>For this reason, EAAB contemplates the construction of a Pilot Project in order to evaluate groundwater development feasibility and also to obtain detailed information on costs and operation of a battery of wells. This Pilot Project might be located in <i>Vitelma</i>, <i>Yomasa</i> or in <i>San Diego</i> because in each of these locations EAAB has a Water Treatment Plants that might be re-opened for groundwater treatment. This Pilot Project will offer valuable information needed to decide the viability of implementing the use of groundwater in contingency plans.</p> <p><b>II. Concession of permits for exploratory well drilling</b></p> <p>Mr. Alberto Groot explains that as regard on the groundwater exploration or any other activity in the Eastern Hills of Bogotá city, CAR can not emit a concept because in the year 2006 the <i>Tribunal de Cundinamarca</i> emitted a precautionary measure that forbid SDA, SDP and CAR to grant permits to develop activities inside the area of the Eastern Hills Forestry Reserve different from the ones that seek the protection of natural resources.</p> <p>In this sense, he says that groundwater development projects could be carried out in places located below the 2.700 m contour line, since these places are not covered by the <i>Tribunal de Cundinamarca</i> precautionary measure. EAAB will request to get permission from CAR and SDA for exploratory drilling in six points in places where the legislation does not prevent to conduct exploration well drilling.</p> <p>Mr. Alberto Groot says that EAAB will start shortly the application procedure to obtain exploration permit at the <i>Mochuelo</i> Mining Park.</p> <p>However the necessity of determine the potential of groundwater on Eastern Hills as an important countermeasure activity against any lack of water on the city should prevail and have a special treatment from the <i>Tribunal de Cundinamarca</i> as an emergency project implementation and for that reason EAAB will officially request to <i>Tribunal de Cundinamarca</i> an exception to assess the groundwater potential on Eastern Hills.</p> <p><b>III. Superficial water rights in Tibitóc</b></p> <p>Mr. Alberto Groot mentions that many years ago the concession of waters was carried out assigning a given percentage of the capacity of total storage of a reservoir. For example, if the Northern Aggregate had a total volume of 800.000-900.000 m<sup>3</sup>, a 30 m<sup>3</sup>/s concession was granted.</p> <p>At present time the volume of flow of the <i>Tibitóc</i> concession is calculated in a different way. Nevertheless, it is necessary that all the institutions involved in this matter participate in order to decide which should be the appropriate volume of flow given in concession. He thinks that in an emergency scenario CAR should grant a concession of the maximum</p>

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<b>SUBJECT</b>	<b>4. Discussion topics</b>
	<p>volume of flow to EAAB.</p> <p>Mr. Alberto Groot mentions that the investments of EAAB for rehabilitation of <i>Tibitóc</i> Treatment Plant overcome 60 million dollars. Also he says that EAAB considers <i>Tibitóc</i> as a bank of water and it is necessary to establish agreements with CAR in relation to water rights of <i>Tibitóc</i>.</p> <p><b>III. Importance of JICA Study</b></p> <p>Mr. Jose Manuel de la Torre, EAAB Specialised Professional, reminds the assistants that JICA Study Team members are going back to Japan in a couple of days to discuss continuity of this Study.</p> <p>For this reason is very important to know the opinion and thoughts of each of the Colombian counterpart organizations about the Study that JICA Study Team is carrying out on groundwater development.</p> <p>In this sense all parties of Colombian counterpart organizations request to JICA to continue the Study in order to conduct technical assistance to the Colombian Counterpart for assessment of groundwater potential for emergency water supply, for formulation of a Master Plan on Groundwater Supply in emergency cases and for a feasibility study as a priority project.</p>

<b>SUBJECT</b>	<b>5. Questions and answers</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• Mr. Germán Barreto, DPAE Alluvial Coordination Professional, wants to know what EAAB and JICA Study Team mean when they mention "case of emergency".</li> <li>• Mr. Alberto Groot clarified that an emergency means that the structure of the system of supply or of conveyance of water is damaged by an earthquake, or by some natural disaster. In the specific case of an earthquake, previous studies showed that according to the location of the epicentre of the earthquake certain sections of the system can suffer damages. Although the system of supply is interconnected (that is to say it is a redundant system) EAAB needs to identify alternative water sources as groundwater. If groundwater development is feasible, the treatment plants that are closed might be reopen for the treatment of underground waters and in case of emergency EAAB could incorporate these treated waters into the supply system.</li> <li>• Mr. Rómulo Camacho reminds to Mr. Alberto Groot that the report corresponding to the permit for scientific exploration that was granted to JICA Study Team in the previous JICA Study is has not been completed. Thus he recommends EAAB to fulfil the requirements as soon as possible because CAR can not grant a new permit for scientific exploration until EAAB the report is completed. Also he remains Mr. Alberto Groot that when an exploration permit is granted to any organization, in this case EAAB, CAR expects to receive information corresponding to the final location and final technical design of the well, as well as the results of the pumping tests and of the calculations of the hydraulic constants. He says that CAR has not received, for instance, the results of the pumping tests or the information regarding the iron removing treatments used to clean groundwater pumped from <i>Vitelma</i> well.</li> </ul>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**


<b>SUBJECT</b>	<b>5. Questions and answers</b>
	<ul style="list-style-type: none"> <li>• Mr. Giovanni Almanza, DPAE Sectorial Management Division Professional, mentions that they copied the Report of Work Results and left a copy in each of the divisions of DPAE; after reading it they produced a document that contains all the comments about the contents of the Report. He says that so far they have not received any answer on behalf of JICA Study Team about their comments.</li> <li>• Mr. Hiroshi Nakamura says that as soon as possible JICA Study Team members will write an official answer on the comments not only those made to the Inception Report but also those of the previous JICA Study Final Report.</li> </ul>

<b>SUBJECT</b>	<b>6. Final comments</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• Mr. Giovanni Almanza says that the assessment of the groundwater potential and the environmental effects of a large scale exploitation is very important not only for the emergency attendance point of view but also for the limitations and the feasibility itself. He mentions that the results of the study of JICA are important not only to SDP but also to floriculture enterprises since they depend in great measure on the availability of underground waters. Likewise, he says that the information that JICA Study Team will generate on the topic of groundwater treatment is important to evaluate how these waters might be exploited for other purposes different from water supply for human consumption.</li> <li>• Ms. Diana Milena Rincón mentions that SDA supports the study that JICA Study Team is carrying out on groundwater development. SDA finds very appropriate that JICA Study Team works in assessment of groundwater potential and in the development of a sustainable exploitation model. She considers that JICA groundwater development study on the Cretaceous Formation will complement the information that SDA has on the subject, since 93% of the wells that lie under jurisdiction of SDA take groundwater from Quaternary aquifers. Equally it is important that JICA Study Team supports the work on groundwater simulation that SDA has been carrying out.</li> <li>• Mr. Rómulo Camacho says that CAR supports the work that JICA is carrying out. Although he considers that it should also benefit the municipalities of the surroundings of Bogotá, since many of them have problems of water supply and belongs to EAAB water supply obligations.</li> <li>• Mr. Luis Eduardo Vásquez mentions that the assessment study of the groundwater potential is convenient from the scientific point of view to all Colombian counterpart organizations. INGEOMINAS will support JICA as much as possible.</li> <li>• Mr. Alberto Groot mentions that it is clear that the assistants see with good eyes the work that JICA Study Team has carried out, they support it and want to participate actively in it.</li> <li>• EAAB express formally to JICA Study Team the necessity of get the equipment of TEM-FAST method and the proper training to use it in order to implement immediately this technique for the identification of new drilling points around Bogotá city.</li> <li>• Finally all institutions agree that is not enough to determine the groundwater potential on Eastern and South-eastern Hills, it is also very much necessary to do the Master Plan and the Feasibility study of the selected priority project.</li> </ul>

Person in charge of the act	Alberto Groot Sáenz
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**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

Sign of the assistants:

Alberto Groot Sáenz 	Rómulo Camacho
Hiroshi Nakamura 中村 浩	Myriam Amparo Andrade
	Gerardo Rugeles
	Diana Milena Rincón
	Ismael E. Mopino
	Gilberto Almeida R.
	Giovanni Almanza G.
	Germán Barreto
	Luis Eduardo Vásquez
	Diego Felipe Sánchez
	Jose Manuel de la Torre
	Jorge Barriga
	Nelson Cobos Monsalve
	Sonia R. Duarte Cely
	Edwin Montañó
	Mildreth González
	Noboru Osakabe
	N Hara
	Elsa García
	Juan Fernando Phillips

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

Objective of the Meeting		Date	
<ul style="list-style-type: none"> <li>▪ To present the progress of the study of the Agency of Cooperation International of Japan (JICA) Study on the Sustainable Water Supply for Bogotá city based on integrated water resources management.</li> <li>▪ To answer the questions did by Colombian counterpart organizations about previous report.</li> <li>▪ To present the environment a social considerations of the study.</li> </ul>		November 23 of 2007	
Participants:			
Members of the Committee of Coordination of the Study		Guests to participate	
Alberto Groot Sáenz	Water Supply Programme Director – EAAB	Rómulo Camacho	CAR
		Myriam Amparo Andrade	CAR
Hiroshi Nakamura	JICA Study Team Leader	Gerardo Rugeles	CAR
		Aura Aidé Wilches	CAR
		Javier Torres	CAR
		Nestor Plato	CAR
		Luz Marina Villamaría	CAR
		Jose Ignacio Pinzon	PERSONERIA DE BOGOTA
		Marcelino Sanchez	PERSONERIA DE BOGOTA
		Jorge Londoño	PERSONERIA DE BOGOTA
		Adriana Lucia Rico	PERSONERIA DE BOGOTA
		Carlos Molano	HIDROGEOCOL
		Jhonny Lopez	HIDROGEOCOL
		Alcides Huguet	HIDROGEOCOL
		Giovanni Almanza G.	DPAE
		Germán Barreto	DPAE
		María Carolina Rogells	DPAE
		Jacqueline Meneses	GOBERNACIÓN DE CUNDINAMARCA
		Rafael Aragón	GOBERNACIÓN DE CUNDINAMARCA
		Carlos Castellanos	GOBERNACIÓN DE CUNDINAMARCA
		Luis Eduardo Vasquez	INGEOMINAS
		Francisco Velandia	INGEOMINAS
		María Consuelo Vargas	INGEOMINAS
		María Stella Lizarazo	ACH
		Mario Valencia	ACH
		María Carolina Perez	ACH
		Carolina Parras	PRESIDENCIA DE LA REPUBLICA
		Catalina Castañeda	MINISTERIO DE AMBIENTE
		Oscar Villalba	MINISTERIO DE AMBIENTE
		Jairo Perez	MINISTERIO DE AMBIENTE

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	Eduardo Zamudio	IDEAM
	Diana Milena Rincón	SDA
	Ismael E. Moyano	SDA
	Gilberto Almeida R.	SDA
	Dario Perez	SDA
	Diego Felipe Sánchez	SDP
	Carlos Julio Ruiz	HGA
	Jaime Cujaban	HGA
	Ornar Wilches	HGA
	Mario Diaz Granados	UNIV. DE LOS ANDES
	Edgardo Herrera	HIDROS MOSQUERA
	Eric Jose Pineda	HIDROS MOSQUERA
	Alberto Estevez	INDEPENDIENTE
	Ricardo Rocero	HIDROLOGIA
	Jose Manuel de la Torre	EAAB
	Jorge Barriga	EAAB
	Nelson Cobos Monsalve	EAAB
	Sonia R. Duarte Cely	EAAB
	Edwin Montaña	EAAB
	Mildreth González	EAAB
	Alejandro Chavez	EAAB
	Oscar Garcia	EAAB
	Humberto Triana	EAAB
	Alcira Tapia	EAAB
	Gino Gonzalez	EAAB
	Nestor Garcia	EAAB
	James Copete	EAAB
	Pedro Sandoval	EAAB
	Sandra Medina	EAAB
	Diana Santana	EAAB
	Angel Triana	EAAB
	Hector Ospina	EAAB
	Luz Stella Merchan	EAAB
	Pedro Bultrago	EAAB
	Gustavo Herran	EAAB
	Johann Rivera	EAAB
	Nubia León	EAAB
	Osakabe	JICA Study Team
	Hara	JICA Study Team

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		Ueda	JICA Study Team
		Yasuda	JICA Study Team
		Fujii	JICA Study Team
		Ikeda	JICA Study Team
		Elsa Garcia	JICA Study Team

### Agenda of the Session of Work

7. Reading and approval of Act No. 04 of July 4 – 2007
8. Presentation of Environment and Social Considerations by Sr. Ueda
9. Presentation of Sr. Nakamura
  - I. Schedule of the Study for second year
  - II. Progress of the Study
10. Answers to comments and observations did by Colombian counterpart organizations
11. Discussion (Questions and answers)
12. Final comments

<b>SUBJECT</b>	4. Reading and approval of Act No. 04 of July 4 – 2007
<b>DECISIONS/ ACTIONS</b>	It was not read the previous act No. 4 of July 4 of 2007

<b>SUBJECT</b>	2. Presentation of Environment and Social Considerations
<b>DECISIONS/ ACTIONS</b>	<p>I. Introduction</p> <p>Mr. Alberto Groot, Water Supply Director – EAAB, welcomes everybody and, afterwards, makes a brief introduction about the purpose of the Steering Committee meeting and workshop, after that, he reads the agenda of session of work.</p> <p>Mr. Groot passed on the word to Mr. Akiyama, JICA technical cooperation chief. Mr. Akiyama thanks because the invitation, and he expresses all the support JICA wants to give to the project, and finally he says it is very important to share experiences through this kind of meetings since being Japan, an advanced technologically country it has still a lot of things to learn in some aspects very well managed by Colombia.</p> <p>Mr. Groot invites Mr. Nakamura to introduce the JICA study team to the committee assistants. Mr. Nakamura introduces the team members, conformed initially by Mr. Nakamura, leader of the study team in charge of the groundwater development plan and groundwater facilities, Mr. Ueda in charge of the environment and social considerations, Mr. Osakabe in charge of economical and financial analysis, Mr. Hara in charge of distribution and regulation, Mr. Yasuda in charge of groundwater simulation, Mr. Fujii in charge of electrical design, Mr. Ikeda in charge of wells drilling, and some members which already came back to Japan as Mr. Inoue in charge of Hydrogeological analysis, Mr. Lei in charge of hydrological analysis and irrigation, Mr Takeuchi in charge of water supply facilities and Mr. Igarashi in charge of operation and maintenance plan for groundwater. All members are preparing the interim report.</p>

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

SUBJECT	2. Presentation of Environment and Social Considerations
	<p>Mr. Nakamura announce next workshop which will be carried out on December 4<sup>th</sup> where it will be presented planning about Master Plan.</p> <p>Mr. Groot reiterates the invitation to observe the progress about the formulation of Master Plan and emphasizes the importance of previous monitoring works to determine the real capacity exploratory wells have, since the project has not been constructed yet and the formulation of Master Plan will depend on the potential of groundwater exploitation in cretaceous. Quaternary will be used just to do monitoring to determine water level parameters.</p> <p>Finally, referring to the study JICA is carrying out, Mr. Groot emphasizes all planned wells are below protected area line, but EAAB do not give up to the possibility of constructing wells in this areas, because he considers very important to have another water source which in the future can be used to solve problems like forest fire or water supplying.</p> <p><b>II. Presentation of Mr. Ueda</b></p> <p>Mr. Ueda presents the topic "Environment and social considerations", which has two important subtopics: Considerations guidelines and IEE (Initial Environment Examination).</p> <p>With respect to the guidelines, it is important that Colombian organizations clarify the necessary procedures and responsibilities to carry out the project. Likewise, talks about basic policies for these considerations and about the procedure which has many steps as preliminary studies, Master Plan studies, Master Plan feasibility, Plan elaboration and execution, and finally, operation, monitoring and evaluation, for feedback of future projects.</p> <p>Regarding to IEE, it is necessary to evaluate the real necessity of carrying out an EIA (Environment Impact Assessment), but no matter what the result is, to take measures for mitigation of environment and social impacts. Finally, he explains which the requirements of IEE for these considerations are. The requirements are: Project summary, actual conditions in and around the location of the project, evaluation of environment feasibility, accordance with laws and rules, environment and society impact, and recommended measures for mitigation.</p> <p><b>III. Comments to Mr. Ueda presentation</b></p> <ul style="list-style-type: none"> <li>• Mr. Alberto Estevez considers very interesting the environment approach, which exceeds normal standards of a project environment study. Especially, he considers very important the strategic environment assessment. He thinks this project has a minimum negative impact if it is compared with all benefits it has, obtaining a new water source. He is not worried about soil subsidence, because in places where is planned do the works is known there are very solid formations. He suggests showing the positive impact too and to make a comparison to demonstrate is more positive than negative.</li> <li>• Mr. Ueda is grateful because the opinion and he explains this presentation only talk about the impact to environment and society, but into the considerations made by JICA, there is this kind of comparison.</li> <li>• Mr. Edwin Montaña, taking into account the experience and results have been obtained with this study, considers important to generate groundwater policies for district, because he doesn't know any kind of document about policies related to this topic. This proposal in</li> </ul>



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<b>SUBJECT</b>	<b>2. Presentation of Environment and Social Considerations</b>
	<p>order to achieve the most efficient use of the aquifers.</p> <ul style="list-style-type: none"> <li>• Mr. Groot says JICA project is based on the existent environment level guidelines of governments.</li> <li>• Mr. Villalba considers very important the considerations presented by Mr. Ueda. He expresses his preoccupation about some topics which have some contradictions between organizations. JICA study results are different of CAR studies. Regarding to environment aspect, he speaks about IDU as an organization which in its projects has to carry out environment assessments.</li> <li>• Mr. Groot says it is expected to make and formulate an specific environment policy about groundwater exploitation and all the contributions will be welcomed. In the other hand, Mr. Groot wants to incorporate the forest fire topic, because two months ago EAAB was putting fire out in El Cable hill, which was around 20 hectares fire and immediately after that emergency, began rainy season and it was declared emergency in Bogotá, Fucha and Tunjuelo river. Forest fire topic requires water supplying to control it, because last emergency it was necessary to use helicopters. Likewise he says EAAB has 40 gamekeepers in charge of that labour and they depend on Water Supply Direction. So, EAAB considers it is necessary to have a system to mitigate forest fire propagation. So, he considers it must not have restrictions about these zones which are causing destruction of our forests. He invites assistants to include inside policies intervention in zones where legally are determined as inaccessible.</li> </ul>

<b>SUBJECT</b>	<b>3. Presentation of Sr. Nakamura</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• Mr. Nakamura thanks to assistants and begins the steering committee where will be presented the second year schedule. At this moment it is studying Master Plan in groundwater topic. From June of this year started the study and has been carried out much analysis, survey, field work, geological survey, water balance analysis, water supply facilities design, economical and financial analysis and Master Plan concept.</li> <li>• Mr. Nakamura explains the content of Master Plan, which objective is water supply in emergency cases as natural disasters. JICA study will formulate measures to ensure the emergency water supply.</li> <li>• Mr. Nakamura comments it has been planned around 60 groundwater wells, along eastern and southern hills for water supply in emergency. Likewise, it was designed facilities for water supply in emergency, it was estimated facilities and operation costs, and it was planned the operation and maintenance of them.</li> <li>• Mr. Nakamura says the potential of water resources development was revised by JICA study team. With respect to groundwater development potential, specifically in eastern and southern hills is under evaluation, and groundwater development plan will be proposed based on the development potential.</li> <li>• Regarding exploratory wells, he comments it will be drilled exploratory wells in eastern and southern hills, and it will begin from December, so they are expecting CAR and SDA permissions. Mr. Nakamura shows where wells will be located in the hills. JICA exploratory</li> </ul>

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

<b>SUBJECT</b>	<b>3. Presentation of Sr. Nakamura</b>
	<p>wells will begin from December and EAAB exploratory wells will begin from March 2008.</p> <ul style="list-style-type: none"> <li>• Mr. Nakamura says it is carrying out groundwater simulation to design a suitable plan of groundwater development to supply water in emergency cases. Simulation will be done in Visual ModFlow and PM Win.</li> <li>• With respect to groundwater development policies, it will be prepared water supply in emergency through groundwater use. Emergency scenarios are under consideration, and according to these scenarios will be examined groundwater use plan.</li> <li>• Mr. Nakamura explains Tokyo water supply system, information about capacity, population, etc. He emphasizes in daily consumption by a person in Tokyo which is about 240 liters compared with Bogota consumption which is around 80 liters per person.</li> <li>• In Tokyo water supply system, water comes from various dams located outside metropolitan area, and it flows to the city through rivers supplied by these dams.</li> <li>• In Japan there are tanks built under ground in several places in Tokyo, whose water is always flowing from and to conveyance system, with the aim of refreshing it. The water of these tanks it is used in emergency.</li> <li>• Finally, Mr. Nakamura presents seismic situation of Japan, country very prone to earthquakes and which has several epicentres along all its territory. He emphasizes deep wells are very strong against earthquakes, and there are no records about collapses in water supply deep wells by earthquakes in Japan.</li> </ul>
<b>SUBJECT</b>	<b>4. Answers to comments and observations did by Colombian counterpart organizations</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>○ Mr. Nakamura says he is going to answer the most important questions of the comments and observations of Colombian counterpart organizations</li> <li>○ Regarding to CAR observations, most of them refer to registers that organization has. The most important observation is that wells must not been located into the protected area of eastern hills. Mr. Nakamura answers to this question that all the planned wells are out of the protected area.</li> <li>○ About INGEOMINAS questions, these are focused on hydrogeological aspect. The question refers to the used geophysical method TEM. Mr. Nakamura says that in previous study, Mr. Fujita, member of JICA study team, did calculations through a geophysical survey. According to the results of the calculations did through TEM method and direct logging method, they concluded that the most adequate one is the TEM.</li> <li>○ Mr. Groot and Mr. Nakamura, say that because of the time, it is going to take so much time to answer every one of the questions, so they say they are going to write a document with all the answers and to send to the organizations.</li> </ul>

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<b>SUBJECT</b>	5. Discussion (Questions and answers)
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• Mr. Groot says that JICA study team has taking into account all the comments did to the previous report, which was made about 6 months ago. He asks to the assistants who do not have the report in order to send it by Mr. Jorge Barriga.</li> <li>• Mr. Groot says that it was made an initial report and subsequently it was made a discussion report, which to be revised again to be approved by all the interested organizations, some topics that are not so clear yet. At this moment, there is a draft which is under construction and it is possible it will be part of the final report.</li> <li>• An assistant asks if it is possible to get the past experiences.</li> <li>• Mr. Groot answers, he is going to request to the JICA study team to send to the Colombian counterpart organizations the presentations and in general, all the topics viewed to receive comments to the approach did. Likewise, he wants to say to Mr. Nakamura and to Mr. Ueda he considers all their presentations must be part of the final report.</li> <li>• Mr. Groot explains the possibility of getting the presentations and reports through internet WEB site, and he invites to open the discussion in an oral way or by letters or mails.</li> <li>• Mr. Groot emphasizes that the important thing is to continue with the way it has been doing the work, to complete it. In the past there was some problems, so it was nearly cancelled the study, but nowadays, thanks to all the JICA professional and to the organizations, there is a conviction this project will be done.</li> <li>• An assistant of DPAAE, says that in the study there are a progress about approaches of demands, and this topic is very important for DPAAE, so he wants to ask which will be the benefits in terms of flows to supply the emergency?, what are the situations or scenarios it has been considered to calculate flows? And what can we expect of estimations about water resources for emergency attention?</li> <li>• Mr. Groot answers that when we do master plan, part of the development is taking into account all the questions and proposals from assistants, in the same way we have done in the hydrologic emergency committee, of which DPAAE is part. In this committee has been estimated the possible consumption rates in emergency cases. Furthermore, this supplying must be planned to create tanks and pumping possibilities, so it will be possible to access to zones where water can't reach in actual conditions in case of fire.</li> <li>• An assistant of a Geological Association says that as well as benefits it will receive with this study, it must be taking into account how it can be useful as a survey tool, so it will be important if you plan monitoring wells to value quality and behaviour of aquifers. So, he asks if the planned wells have continuity in the territory.</li> <li>• Mr. Groot answers that wells location will depend on the water recharge of the zones. It will be constructed five (5) exploratory wells and one (1) monitoring well. The exploratory wells will be located in Ciudad Bolívar, Soacha Terreros, Cervecería Alemana, Near Quinta de Bolívar and 119 street, La Aguadora area (Acueducto area). We have also some wells constructed in previous study.</li> <li>• Mr. Groot says it is covered the exploitation potential zone. In the first stage will be determined which wells have the exploitation capacity and what is going to happen in southern hills, exactly near San Benito where it is projected a quaternary monitoring well. Because of Environment Secretary (SDA) decisions, some wells has been closed inside</li> </ul>


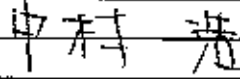
## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

<b>SUBJECT</b>	<b>5. Discussion (Questions and answers)</b>
	<p>the influence zone, the project continues according to the conditions of the wells location which has to be clarified by organizations and we hope they collaborate us to get the necessary information. Likewise, the unification of the Hydrological model methodology used by various organizations.</p> <ul style="list-style-type: none"> <li>• An assistant says in order to facilitate getting permissions to construct wells it is necessary to have a good legal argument to avoid obstacles with many organizations which bring that permission or when construction time. So he wants to ask if JICA study team and EAAB need help from this organizations to uphold the studies in order to this project be completed satisfactorily?</li> <li>• Mr. Groot answers that it is necessary to work together with all the organizations to do this project because there are strong opponents of the potential it has, so we have to evaluate the environment and social risks, and in general all the risks which can be presented by environment organizations.</li> <li>• An assistant asks what the schedule of the 60 wells construction is.</li> <li>• Mr. Groot answers it has not been decided yet, because of JICA study team are still studying the reliability for every one of the 60 wells, after evaluating which wells have construction possibilities it must be generated an investment plan. However, EAAB now is thinking about how begins this project as soon as possible, taking into account the financial study, which is considered it will be around US\$50 millions dollars, but this will be determined into the Water Supply Master Plan, likewise the priority of itself.</li> <li>• An assistant asks if is there any possibility to do the water supply in the same way is done in Tokyo, it means, instead constructing wells, constructing big tanks which preserve water.</li> <li>• Mr. Groot answers, we are in an open mind attitude, so we are receiving all the alternatives and possibilities to supply water.</li> <li>• Mr. Groot says that EAAB infrastructure is enough to supply water to the city in normal times, so it has been considered to supply water to different municipalities of the plain, even Cundinamarca municipalities, and this possibility was not considered before.</li> <li>• Mr. Groot says that one of the projects is groundwater development, however, we do not oppose to have water stored, but there is a big tank network which can be used in case of earthquake. These tanks are distributed and linked with three plants located: one in the north, another one in the south and the last one in the east. We estimate in earthquake case, is not going to stop working the three plants at the same time and because of three plants are linked, one of them can supply different areas into the city.</li> </ul>
<b>SUBJECT</b>	<b>6. Final comments</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• Mr. Groot announces about next workshop on December 4<sup>th</sup>, 8:30am – 12:00m.</li> <li>• Mr. Groot promises to send these committee presentations to all assistants.</li> <li>• Mr. Groot says thanks to all the assistants, and finishes the committee.</li> </ul>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

Person in charge of the act	Alberto Groot Sáenz
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Sign of the assistants:

Alberto Groot Sáenz 	Rómulo Camacho
Hiroshi Nakamura 	Myriam Amparo Andrade
	Gerardo Rugeles
	Aura Aidé Wilches
	Javier Torres
	Nestor Plato
	Luz Marina Villamaría
	Jose Ignacio Pinzon
	Marcelino Sanchez
	Jorge Londoño
	Adriana Lucia Rico
	Carlos Molano
	Jhonny Lopez
	Alcides Huguet
	Giovanni Almanza G.
	Germán Barreto
	Maria Carolina Rogelis
	Jacqueline Meneses
	Rafael Aragón
	Carlos Castellanos
	Luis Eduardo Vasquez
	Francisco Velandia
	Maria Consuelo Vargas
	Maria Stella Lizarazo
	Mario Valencia
	Maria Carolina Perez
	Carolina Parras
	Catalina Castañeda
	Oscar Villalba
	Jairo Perez
	Eduardo Zamudio
	Diana Milena Rincón
	Ismael E. Moyano
	Gilberto Almeida R.
	Dario Perez

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

	Diego Felipe Sánchez
	Carlos Julio Ruiz
	Jaime Cujaban
	Omar Wilches
	Mano Díaz Granados
	Edgardo Herrera
	Eric José Pineda
	Alberto Estevez
	Ricardo Rocero
	Jose Manuel de la Torre
	Jorge Barriga
	Nelson Cobos Monsalve
	Sonia R. Duarte Cely
	Edwin Montaña
	Mildreth González
	Alejandro Chavez
	Oscar Garcia
	Humberto Triana
	Alcira Tapia
	Gino Gonzalez
	Nestor Garcia
	James Copete
	Pedro Sandoval
	Sandra Medina
	Diana Santana
	Angel Triana
	Hector Ospina
	Luz Stella Merchan
	Pedro Buitrago
	Gustavo Herran
	Johann Rivera
	Nubia León
	Osakabe
	Hara
	Ueda
	Yasuda
	Fuji
	Ikeeda
	Elsa García

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

<b>Objective of the Meeting:</b>		<b>Date:</b>	
▪ Content of discussion on 4 items on continuity of this study		December 28 of 2007	
<b>Participants:</b>			
Members of the Committee of Coordination of the Study			
Acueducto		JICA	
Oscar Garcia Poveda	Gerente Corporativo Sistema Maestro – EAAB	Hiroshi Nakamura	JICA Study Team Leader
Alberto Groot Sáenz	Water Supply Programme Director – EAAB		

<b>Agenda of the Session of Work</b>
1. Content of discussion for 4 items on continuity of this Study

<b>SUBJECT</b>	<b>Discussion on 4 items on continuity of the Study</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• JICA Study Team explained content of discussion on four (4) items, related to continuity of this Study, which was held between JICA and the Study Team, during July and August 2007 in Tokyo, the content of which was translated into Spanish and submitted to Acueducto.</li> <li>• Acueducto and JICA Study Team discussed about it in detail.</li> <li>• Acueducto said that content of the discussion on 4 items was principally consistent with opinion of Acueducto, which was presented in No.4 Steering Committee Meeting held on 4<sup>th</sup> of July 2007.</li> <li>• Acueducto said that content of the discussion included important suggestions on this Study and should be examined more precisely from now on.</li> <li>• Acueducto said that most important topic of the 4 items, at this moment, was analysis of groundwater potential. Every possibility of the future project depended on the groundwater potential of the Study Area, which had not yet been made clear so far.</li> <li>• Acueducto would finally decide whether or not to implement the project proposed by the Study, based on the final result of this Study, taking into account of many aspects such as technical, financial, economy, environmental aspects, which would be analyzed further by this Study.</li> <li>• Acueducto emphasized an importance of further technical transfer of geophysical survey and groundwater simulation, including provision of TEM geophysical survey instrument and computer simulation software of Visual modflow, which was already requested to JICA before.</li> </ul>
<b>Person in charge of the act</b>	Alberto Groot Sáenz

**Sign of the assistants:**

Acueducto		JICA	
Oscar Garcia Poveda		Hiroshi Nakamura	中村 浩
Alberto Groot Sáenz			

### STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

<b>Meeting Objective:</b>	<b>Date:</b>
<ul style="list-style-type: none"> <li>▪ To make a general summary of the study progress of the Study that the Japanese International Cooperation Agency (JICA) has so far about the sustainable water supply for Bogotá city its surrounding areas based on the integrated water resource management.</li> <li>▪ To solve questions from relating organizations counter part of the study about the previous report.</li> </ul>	March 7 <sup>th</sup> of 2008

<b>Attendants:</b>	
<b>Coordination of the Study Members</b>	<b>Invited</b>
Alberto Groot Sáenz	Water Supply Director – EAAB
Hiroshi Nakamura	JICA Study Team Leader
	Jose Manuel De la Torre EAAB
	Jorge Bariga EAAB
	Elsa Garcia Salazar JICA Study Team
	Mario Valencia Aguas Subterráneas
	Diana Milena Rincón SDA
	Rómulo Camacho CAR

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**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

<b>TOPIC</b>	<b>5. Introduction y Summary of the Scope of Work</b>
<b>DECISIONS/ ACTIONS</b>	<p>In this meeting Mr. Nakamura introduce the advance of the study, including some preliminary progress of drilling works. Also it was presented a preliminary approach about the master plan for integrated groundwater resources use to supply the Bogota city in case of emergency. Finally it was introduce the schedule for the next phase of the study.</p>
<b>TOPIC</b>	<b>2. Background and main Objectives</b>
<b>DECISIONS/ ACTIONS</b>	<p>The first consideration is about affectation may have the water supply system due to a large scale earthquake or any other small emergencies generated on the normal water supply operation. It was mentioned other Studies and it was highlight the city responsibility in case of emergency. Also, city should consider the emergencies that about fire in the forest occurs every once o twice a year on the eastern hill of the city.</p> <p>The second consideration is about the urgent necessity to manage the topic of water supply for emergency cases in a team work within the District, which also include emergencies and expectations of DPAE for the city emergency attention.</p> <p>The operation of water supply of Bogota city, involves emergencies regarding the big structures like the 78" pipe lines and Chingaza Tunnel, but also the small emergencies like broken distribution pipes lines along the city.</p>
<b>TOPIC</b>	<b>3. Progress of the Study Team</b>
<b>DECISIONS/ ACTIONS</b>	<p>From the geology point of view it was mentioned the work done by Mr. Inoue, the progress on interpretation of geology southern and eastern part of the city, compare with the actual information from Ingeominas and other specific studies regarding the study area. The aquifer distribution and the hidrogeology of the study area had being improved. Advantages and disadvantages of each site of the study also had being determined. The main problem is that the production areas are located on forest protection areas this situation affects notoriously the available space and the ideal sites for big communities attention in case of emergency. Also the possible use of actual network distribution system of Acueducto is located inside the forest protection area.</p> <p>Even though so far there is not instrumentation for land subsidence, there are some general statements that can be used to understand what is going on in Bogotá city and what can be expected after groundwater exploitation according to Mr. Nakamura explanation. The land subsidence has to consider 2 main topics, the first one the type of geological conditions of the city, in this case, Quaternary, Terciary and Cretaceous formations. After that the consolidation degree of these materials should be analyzed and finally the interaction between them. For the case of Bogota, the consolidation of Cretaceous formation avoids any possibility of land subsidence related to massive exploitation of water in this aquifer. In Quaternary formation un consolidate material, many deformations and changes can occur due to high weight stress, high exploitation of production layers, and the role of local geological faults. For the second phase of this project it is expected to go in detail in this matter and get a kind of model that reflects the actual behavior of the land subsidence, also with the support of outputs of VModflow groundwater model program.</p> <p>The master plan for water supply with groundwater in case of emergency was presented. According to Mr. Nakamura explanation, the mission is facing a problem with the identification of useful zones to be used in case of emergency because most of the areas are</p>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**


	<p>already highly populated, without any space for an infrastructure of emergency attendance. That is why, the Study Team move the future well fields out of Bogota City but still on the eastern hills, in this case on Chia and Sopó municipalities. It is necessary to make aware the legal authorities, justice or courts about the importance and necessity of drilling wells along the strategically forest protection area of Bogota City and gives special treatment to the drilling permissions regarding this project.</p>
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<b>TOPIC</b>	<b>4. Annotations</b>
<b>DECISIONS/ ACTIONS</b>	<p>CAR mentioned that in Chia and Sopo there are environmental restrictions related to the POT of each municipality, and the kind of land use suitable on the hills of this two municipalities.</p> <p>Several indications was made to the environmental entities about the restriction of ground water use in case of emergency on forest protection areas and the benefits that this activity will bring for potable water supply in case of emergency or water availability at high elevations.</p> <p>It was mentioned the groundwater treatment facility, the groundwater crossing a sand filter with a pre and post chlorination and the application of Maddox, for Mn, and Fe removal.</p> <p>Emergencies can be attended with the 10% of the normal operation water supply. There will be a shortage in water and reduction on water consumption. It is establish alternatives in case of emergency, such us reopening already closed treatment plants.</p> <p>It was acknowledge to all the relative environmental entities for the drilling permissions obtain so far and the Mission expects to obtain in the near future the remaining permissions.</p> <p>There is an interest about the water quality of the wells, and the conclusion about this topic is the necessity to keep monitoring continuously the water quality.</p> <p>About the groundwater development to supply southern Hills of the city, this has to be done far from high density of population and about the restrictions of eastern hills regarding the land cost and the necessity of get legal conditions for some neighborhoods along that zone.</p>

<b>TOPIC</b>	<b>6. Final Comment</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• It is request to DPAE information and a presentation about the progress of this entity regarding water supply.</li> <li>• There was a discussion about the volume of water that is required in case of emergency and the time that water can be in a container or tank before it lose its quality conditions.</li> <li>• Also it was discussion about the groundwater level reduction in aquifers and the land subsidence of the soil. Mr. Nakamura presents mathematic formulas for this estimation.</li> <li>• The attendants mentioned about the strength that acquire the process and how interesting is this topic for the city, and the importance of post results analysis and involve a legal people in this process that helps to deal with the legal part off the study.</li> </ul>
<b>Person in charge of the minutes</b>	Alberto Groot Sáenz

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

Attendants Signature:

Alberto Groot Sáenz 	Jose Manuel De la Torre
Hiroshi Nakamura 中村浩	Elsa García
	Mario Valencia
	Jorge Barriga
	Diana Milena Rincón
	Romulo Camacho

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

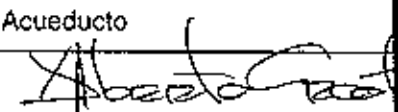
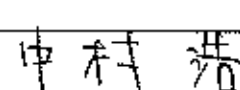
<b>Objective of the Meeting:</b>		<b>Date</b>	
• Discussion of Interim Report		May 14 of 2008	
<b>Participants:</b>			
Members of the Committee of Coordination of the Study			
Acueducto		JICA	
Alberto Groot Sáenz	Water Supply Programme Director – EAAB	Hiroshi Nakamura	JICA Study Team Leader

<b>Agenda of the Session of Work:</b>
1 Content of Interim Report

<b>SUBJECT</b>	<b>Discussion on 4 items on continuity of the Study</b>
<b>DECISIONS/ ACTIONS</b>	<ul style="list-style-type: none"> <li>• JICA Study Team submitted Interim Report to Acueducto, 15 copies of Spanish version and 12 copies of English version.</li> <li>• JICA Study Team explained content of Interim Report. Then, Acueducto and JICA Study Team discussed content of the Interim Report.</li> <li>• Acueducto has accepted the Interim Report in principle.</li> <li>• Acueducto said that content of the Interim Report was consistent with discussions, which was held between Colombian side and JICA Study Team, in the previous meetings and workshops during this Study.</li> <li>• Acueducto requested to JICA Study Team that Feasibility Study would be implemented for the next stage.</li> <li>• Acueducto said that every description of Interim Report would be examined carefully by Colombia side, and comments to the Interim Report would be submitted to the Study Team at the begging of the next stage.</li> <li>• JICA Study Team answered that every comment from Colombian side would be reflected in draft final report.</li> <li>• Acueducto said that cost for operation and maintenance of emergency water supply must be analyzed including those of Pilot Study.</li> <li>• JICA Study Team answered that cost for operation and maintenance was to be analyzed in detail in the next stage, Feasibility Study.</li> </ul>

<b>Person in charge of the act</b>	Alberto Groot Sáenz
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**Sign of the assistants:**

Acueducto	JICA
Alberto Groot Sáenz 	Hiroshi Nakamura 

## STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION

<b>Objective of the Meeting</b>		<b>Date</b>	
* Discussion on Feasibility Study		September 4 of 2008	
<b>Participants:</b>			
Members of the Committee of Coordination of the Study			
Acueducto		JICA	
Alberto Groot Sáenz	Water Supply Programme Director – EAAB	Hiroshi Nakamura	JICA Study Team Leader

<b>Agenda of the Session of Work:</b>
1. Plan of Feasibility Study


<b>SUBJECT</b>	<b>Discussion on Interim Report</b>
<b>DECISIONS/ ACTIONS</b>	<p><b>1. Master Plan Report</b></p> <ul style="list-style-type: none"> <li>• JICA Study Team submitted Interim Report of Master Plan to Colombian side in May 2008. After carefully examination, Acueducto principally accepted the Interim Report. However, Acueducto made several comments and request to Mater Plan Report.</li> <li>• JICA Study Team promised that description and content of Master Plan Report would be modified, based on comment and request from Acueducto. The result of the modification would be reflected in Draft Final Report, which will be submitted to Acueducto in January 2009.</li> <li>• Among the comments and request from Acueducto, topics below were included.             <ul style="list-style-type: none"> <li>a) Not only the total amount the entire projects cost, but also unit cost of the projects should be included in Master Plan Report.</li> <li>b) Expression of "Billion" within Master Plan Report can make confusion between <math>10^9</math> and <math>10^{12}</math>. Therefore, it is better not to use expression of "Billion" in reports. Instead of "Billion", expression of "1,000 million" should be used. As well as "Billion", "Trillion" should not be used in report from now on.</li> </ul> </li> </ul> <p><b>2. Feasibility Study</b></p> <ul style="list-style-type: none"> <li>• JICA Study Team explained, to Acueducto, the policy and strategy of Feasibility Study, including Action Plan. Principally, Acueducto accepted the policy and strategy proposed by the Study Team.</li> <li>• Acueducto and the Study Team discussed priority of the proposed projects in Master Plan Study. Finally, it was agreed between Acueducto and the Study Team: 1st priority was given to Pilot Project for Groundwater Use, 2nd priority was to Eastern Project, 3rd priority was to Southern Project and 4th priority was to Yerbabuena Project.</li> <li>• Proposed projects are to be planned with the accuracy of Feasibility Study level. However, as to accuracy of design and cost estimate of project, different accuracy should be given to each project based on its priority. Pilot project will be given higher accuracy than the other projects. On the contrary, Yerbabuena project will be given lower accuracy than the others.</li> <li>• Pilot project will be designed for 9 sites. Acueducto has 6 Cretaceous wells. Additionally, 3 Cretaceous wells are scheduled to be drilled by Acueducto in the near</li> </ul>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

	<p>future. Therefore, total 9 wells can be candidates of the Pilot Project. The Study Team will conduct topographical survey and facilities design for above 9 sites, to get cost for construction and operation/maintenance. Based on this result, Acueducto and the Study Team will decide priority of each project of 9 Pilot Projects.</p> <ul style="list-style-type: none"> <li>• In Master Plan Study, all the emergency wells are proposed out of the Forest Protection Area in Eastern Hills. However, Eastern Hills are near to the center of Bogotá city, where water consumption is high in case of emergency. Therefore, necessity of groundwater development in the Eastern Hills is very high. Considering importance of emergency wells in the Eastern Hills, there is high possibility of issuing permission for drilling wells within the forest protection area from environmental organization in the near future. Based on above reason, Acueducto requested that emergency wells should be planned even within the Forest Protection Area.</li> </ul>
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<b>Person in charge of the act.</b>	Alberto Groot Sáenz
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**Sign of the assistants:**

Acueducto		JICA	
Alberto Groot Sáenz		Hiroshi Nakamura	中村 浩

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

<b>Objective of the Meeting</b>		<b>Date</b>	
• Discussion of Interim Report		October 03 of 2008	
<b>Participants:</b>			
Members of the Committee of Coordination of the Study			
Acueducto		JICA	
Alberto Groot Sáenz	Water Supply Programme Director – EAAB	Hiroshi Nakamura	JICA Study Team Leader

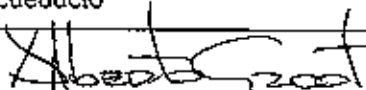
<b>Agenda of the Session of Work:</b>
1. Progress of Feasibility Study

<b>SUBJECT</b>	Discussion on Interim Report
<b>DECISIONS/ ACTIONS</b>	<p>The Study Team made explanation to Acueducto on progress of Feasibility Study. After the explanation, Acueducto and the Study Team made discussion on detail of the content of Feasibility Study as described below:</p> <p><b>1. New well site</b></p> <p>In the Feasibility Study, the Study Team found out more than twenty (20) well sites inside the forest protection area in the Eastern Hills. Acueducto has large properties inside the forest protection area. The Study Team tried to find out well sites within Acueducto properties as many as possible.</p> <p><b>2. Pilot project</b></p> <ul style="list-style-type: none"> <li>• The Study Team is now performing topographical survey at nine (9) sites which are candidates for Pilot Project. The topographical survey will be completed by the end of October 2008.</li> <li>• Acueducto expected to give higher priority to Vitelma and La Salle site for implementation of the Pilot Project. Vitelma site belongs to Acueducto, and there is Vitelma Water Treatment Plant near the site, which is available for the Pilot Project. On the other hand, La Salle site is near the city center with high population density, where water demand is high in case of emergency. La Salle site is already property of Acueducto. Acueducto and the Study Team agreed that further discussion would be made to select the high priority site for the Pilot Project from 9 sites.</li> <li>• Acueducto and the Study Team agreed that accuracy of design and cost estimate of the Pilot Project should be higher than those of the other projects, such as Eastern Project and Southern Project etc.. Acueducto and the Study Team would have further discussion, from time to time, on accuracy of design and cost estimate for the Pilot Project.</li> <li>• The Study Team proposed that optimum method for water treatment for the Pilot Project would be selected based on examination of many alternatives. Most of sites for the Pilot project are located in the city center and it is narrow, so that facilities for water treatment must be compact. The Study Team would examine this problem further.</li> </ul> <p><b>3. Period of emergency water supply</b></p> <p>Acueducto and the Study Team agreed that period of emergency water supply should</p>

**STEERING COMMITTEE MEETING – MINUTE OF DISCUSSION**

	<p>be between 60 days to 9 month, though it was proposed in Master Plan Study as between 10 day to 9 month. 10 days seems too short for facilities to be recovered.</p> <p><b>4. Specification of design</b> Study Team explained progress of facilities design for emergency water supply. Acueducto requested that every specification of the facilities must be made clear, including submersible pump, electric instruments etc. Moreover, necessary area (m<sup>2</sup>) of each facilities must be made clear site by site.</p> <p><b>5. Site for drilling</b> The Study Team selected 9 sites for Pilot Project. Most of these sites are already property of Acueducto. Other than above 9 wells, the Study Team selected more than 60 sites for emergency wells. Currently, these sites are empty with enough space, so that well drilling is possible so far. However, when Acueducto decides implementation of proposed project in the future, negotiation for land acquisition is necessary.</p> <p><b>6. Exploratory Drilling</b> The Study Team appreciated that exploratory drilling in la Aguadora site is preceding at good condition. The Study Team expressed strong expectation that another exploratory drilling in Suba tank site would be soon started, which is now under preparation for tender for selection of drilling company.</p>
<b>Person in charge of the act</b>	Alberto Groot Sáenz

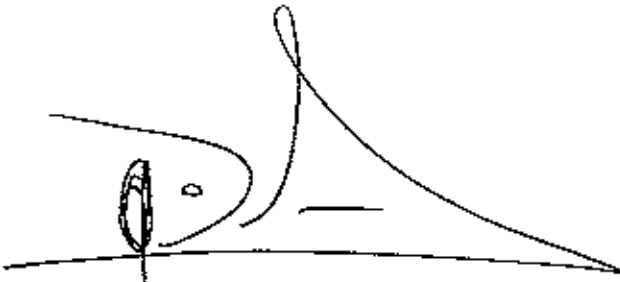
**Sign of the assistants:**

Acueducto		JICA	
Alberto Groot Sáenz		Hiroshi Nakamura	中村 浩

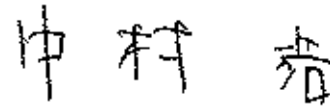


MINUTES OF MEETING  
ON  
THE DRAFT FINAL REPORT  
FOR  
THE STUDY  
ON  
SUSTAINABLE WATER SUPPLY  
FOR  
BOGOTA CITY AND ITS SURROUNDING AREA  
BASED ON  
THE INTEGRATED WATER RESOURCES MANAGEMENT  
IN  
THE REPUBLIC OF COLOMBIA

BOGOTA, January 22, 2009



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The Republic of Colombia

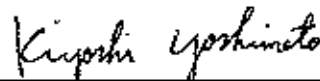


Mr. Hiroshi NAKAMURA  
Leader of Study Team

(Witnessed by)



Mr. Alberto Groot Saenz  
Coordinator of the Study  
Empresa de Acueducto y Alcantarillado de  
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The Republic of Colombia



Mr. Kiyoshi YOSHIMOTO  
Leader of JICA Mission,  
Resident Representative,  
JICA Colombia

## Attachment

### 1. Introduction

In accordance to the Scope of Work (hereinafter referred to as "S/W") and the Minutes of Meeting on S/W for the "The Study on Sustainable Water Supply for Bogota City and its Surrounding Area Based on the Integrated Water Resources Management in the Republic of Colombia (hereinafter referred to as "the Study") agreed upon between the Colombian Side and Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 8, 2005, JICA Study Team (hereinafter referred to as "the Study Team") has conducted the Study since December 2006. The Study Team submitted 15 copies (English and Spanish) of the Draft Final Report to the Colombian Side on January 15, 2009.

### 2. Explanation of Draft Final Report

For confirmation of the understanding on the Draft Final Report (hereinafter referred to as "DF/R"), JICA Headquarters dispatched a mission headed by Mr. Kiyoshi YOSHIMOTO to Colombia on January 19, 2009.

The Colombian Side, the JICA Mission and the Study Team held a seminar on DF/R in Bogota on January 21. In the seminar, the Study Team explained the DF/R, and the Colombian Side, the JICA Mission and the Study Team discussed the contents of the Study and the DF/R. The content of the seminar is in ANNEX-1 and 2. The Colombian Side, JICA Mission and the Study Team also held meetings from January 19 to 22, 2009. The Colombian Side basically understood the contents of the DF/R.

The Team explained that the Colombian side should compile and submit written comments, questions and corrections on the DF/R to JICA Colombia and the Study Team within one month by the 16<sup>th</sup> of February 2009. The Study Team will make any clarification or answer any questions, make corrections in the Final Report (F/R).

### 3. Major Issues and Contents

Major issues and the contents regarding the DF/R are as follows;

#### 3.1 Test Drilling

The Study Team appreciates the test borehole drilling which Acueducto is conducting by its own resources. The result of the test borehole drilling up to 16<sup>th</sup> of February will be included in the Study result.

#### 3.2 Priority Projects

The Study Team formulated pilot projects of La Salle and Vitelma (Delirio) in the feasibility study. Acueducto will prepare for the implementation of emergency water supply operation by implementing the pilot projects.

#### 3.3 Inclusion of the Study to the long term strategy of Acueducto

Acueducto will revise the long term water supply strategy in 2010. Acueducto will clearly state the importance of emergency water supply plan and include the contents of the Study in the long term water supply strategy.

#### 3.4 Utilization of Study Results

Acueducto will need to cooperate internally with the relevant departments, such as hydrology area and water supply direction of Acueducto among others, and externally with such organizations as SDA and CAR, to utilize and update the groundwater simulation models formulated by the Study Team to precisely understand the situation of the groundwater. Acueducto will also take into consideration the results of the additional drilling test and refine the drilling points proposed in the Study.

#### 3.5 Monitoring of Groundwater Level

Continued monitoring of groundwater will be necessary in order to implement the emergency water supply plan. Acueducto will monitor the groundwater level by monitoring the three boreholes drilled in the Study and the 10 boreholes drilled in the previous development study project in 2002.

### 3.6 Water Quality Standards

The Study Team formulated emergency water supply facility plans according to Colombia's water quality standards. Acueducto will propose to the relevant authorities of the Colombian Government to formulate water quality standards in times of emergency. In the actual implementation of the emergency water supply plans, Acueducto will review the water supply facility plans taking into account the water quality of the groundwater.

### 3.7 Concern of the Japanese Side

(1) The Japanese Side expressed concern for technical, institutional and financial feasibility of the implementation of the emergency water supply plan. The Colombian Side explained that the implementation of the plan will be under the management and responsibility of the water supply direction of Acueducto with technical support from relevant institutions as mentioned in 3.4 above and sufficient funding and personnel will be allocated.

(2) The Japanese Side also expressed concern for operation and maintenance of the emergency water supply facilities during ordinary times. The Colombian Side explained that appropriate operation and maintenance will be ensured because of the following points:

- Experience and capacity will be obtained through implementation of pilot projects as mentioned in 3.2 above. Also, the emergency water supply facility plan will be implemented gradually, therefore providing Acueducto time to obtain necessary budget and personnel for the operation and maintenance of those facilities.
- Operation and maintenance manual for the emergency water supply facilities will be formulated and included in the overall operation and maintenance manual.
- Existing operation and maintenance personnel/teams will be assigned for the operation and maintenance of the emergency water supply facilities.
- Operation and maintenance plans of the emergency water supply facilities will be included in Acueducto's annual overall operation plan, which will be reviewed according to the ISO 9001.

(3) Acueducto proposed to drill boreholes in the Forest Protection Area of the Eastern Hills. The Study Team insisted that Acueducto will obey the regulations of Colombia to utilize the plans.

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ANNEX-1 Discussion memo of the Counterpart Seminar on DF/R

ANNEX-2 Attendance list of the Counterpart Seminar on DF/R

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January 21 of January, 2009

Main Topics of Discussion

- (1) **The regulation and laws on the Eastern Hills, specifically those related to the well drilling site.**

There is the forest protection area in the Eastern Hills, where every activity for economic development is prohibited. Emergency wells proposed by the JICA Study are located out of the forest protection area.

- (2) **Impact to surface water by proposed projects:**

Groundwater is planned to be pumped up from deep Cretaceous aquifer. There is no impact to surface water that has connection with shallow groundwater within the Quaternary aquifer.

- (3) **Procurement of budget for proposing project.**

Acueducto is going to prepare budget for implementation of the proposed projects by itself. However, there is possibility to get international loans for the project.

- (4) **Consideration of faults other than Bogotá fault**

Bogotá fault was deeply studied in the JICA Study, because it is most important fault in selection of drilling sites. However, there are other faults such as Tunjuelo and La Cajita Faults, among others, which were also considered for selection of drilling sites in the JICA Study.

- (5) **Examination of example of Usme drilling**

Based on the experience on the exploratory drilling at Cerveceria Alemana site in Usme, important information in selection drilling point was obtained. This information was applied in selection of drilling points in the other area in the JICA Study.

- (6) **The accuracy of the studies on groundwater development potential**

The groundwater development potential was analyzed by the JICA Study based on various kinds of data and information (pumping test, water balance, groundwater simulation, water quality, etc). Analyzed result on development potential by the JICA Study is most reliable so far in the Bogotá Plain.

- (7) **Basis of two proposed scenarios in case of emergency.**

Two scenarios for emergency water supply were proposed by the JICA Study based on existence of two big active faults; i) an active fault located between Bogotá city and Chingaza area, ii) La Cajita Faults located in the south of Bogotá city. According to the past studies including JICA Study (2002), both faults may be active again in the near future.

- (8) **Land-subsidence by proposed project in Easter Hills**

Groundwater is planned to be pumped up from the Cretaceous sandstones. It was analyzed by the JICA Study that land subsidence by proposed project will be very small because the Cretaceous sandstone is very hard and will not cause serious land subsidence.

- (9) **Cost of mobile unit for water treatment**

Mobile unit for water treatment will be used for the Pilot Project by Acueducto. This unit will cost 50 million pesos, which can supply to 2,000 or 3,000 people with unit consumption of 15l/person/day.

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**CONTROL DE ASISTENCIA**  
**Seminario para el Abastecimiento con Aguas Subterráneas en Caso de Emergencia para la**  
**Ciudad de Bogotá y Municipios Vecinos**

Nombre del Evento: \_\_\_\_\_

Fecha de Realización del Evento: \_\_\_\_\_

Lugar y Fecha: Bogotá, Enero 21 de 2009

No.	NOMBRE	CEDULA CIUDADANIA	REGISTRO Nos.	AREA	TELEFONO	FIRMA
1	Jaidy Diaz	52009266			4163015	
2	Carolina de la Torre	35354182			3123362115	
3	GAMILLO PUENTES	80134368				
4	Giovanni Almanza	19279819			4297414	
5	Carlos A. Bello B.	79.299.547	30482	AD-SECT	3447743	
6	Pina Florio Ibañez M.	42.144.831		JICA	805640918	
7	SILVANO DOMÍNGUEZ	19102007			3111109.	
8	JUAN CARLOS	151192451			8643878	
9	Oscar L. Durán	7211906	34732	E3	3447755	
10	Molina Antik	52240188			3557400	
11	Walter Saavedra	19451714			2132361505	
12	WAL E GONZALEZ	82583126			4297414	
13	César O. Rodríguez	N. 223993			6109425	
14	Julien Chenet	356514			3111109	
15	Luis Bantú	9878245			3447777	
16	Jesus Saiz Jhes	12.93174			3111109	
17	Diana Cuyabón	52880596			441108064531	
18	Leonardo Domado	79.791985			3165566	
19	JUAN RICARDO BARRERA	79482706		AREA ESPEC.	3997880	
20	Juan Eduardo Gaitan	80.777.523			4441080	

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Lugar y Fecha: \_\_\_\_\_

Nº.	NOMBRE	CEDULA CIUDADANA	REGISTRO No.	AREA	TELEFONO	FIRMA
1	ROBERTO GARCIA	7079011	2653	D DBS	3447163	<i>[Signature]</i>
2	Tukehami KOSIMA					<i>[Signature]</i>
3	Kiyoshi YOSHIMOTO					<i>[Signature]</i>
4	Jun-ko Nomura					<i>[Signature]</i>
5	Ricardo Cárdena	79447710			315742566	<i>[Signature]</i>
6	Gerardo Díaz	5641667				<i>[Signature]</i>
7	Jairo Benítez	613641680				<i>[Signature]</i>
8	ANIBAL Acosta	19145410			3209000	<i>[Signature]</i>
9	Gerardo Acosta	51417817			3209000	<i>[Signature]</i>
10	Luis Edo Vargas	19214150			3132612155	<i>[Signature]</i>
11	Yoshi Masuda	020071482			317-5001	<i>[Signature]</i>
12	Luis Orlando Arango	70124336			3202366568	<i>[Signature]</i>
13	Diego Tabares	8008268		ADR	3447397	<i>[Signature]</i>
14	Rosendo Coronado	1933560		CAR	320225267	<i>[Signature]</i>
15	Arda Castro	49729417		CHL	3209000	<i>[Signature]</i>
16	Yorio M. Hall	74540750		ENB	5441535	<i>[Signature]</i>
17	Luis E. Restrepo	8280161		SDA	6092279	<i>[Signature]</i>
18	Ricardo Rosero Espino	19190400		Hidrolg.	2155066	<i>[Signature]</i>
19	GILBERTO FLORES	79587889		DPAE	4297414	<i>[Signature]</i>
20	Daniel Rosero	19269161	87723	DIE	3447178	<i>[Signature]</i>

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Fecha de Realización del Evento: \_\_\_\_\_

Lugar y Fecha: Bogotá, la Aquadura. Enero 21 de 2009

Nº	NOMBRE	CEDULA CIUDADANÍA	REGISTRO No.	AREA	TELEFONO	FIRMA
21	Juan Jacobo Castellano	7057173			3483600	[Signature]
22	Augusto Ramirez M	17.059.120			434-4310	[Signature]
23	Carlos E. Rivera C	93:362089	01314	Z3	3414700	[Signature]
24	Jaime A. Cortés	1010-9490			8621878	[Signature]
25	Miguel (Zil) Muñoz	17391371	00185	GLC	3444711	[Signature]
26	MARIO VALENCIA	17.137.041			271-5435	[Signature]
27	Rodrigo Obrea	23.350710			2830524	[Signature]
28	Jairo Veloz	79856877		SDA	444030	[Signature]
29	Diego Rubio	79954990		SDA	444030	[Signature]
30	Guillermo Calderón	19354402			3008201610	[Signature]
31	Carlos Uribe	7077.820			3264100	[Signature]
32	Mónica Vargas	52992926			618248	[Signature]
33	Helbert H. Yacobi	19221000				[Signature]
34	Oscar Osorio	79279273			4441030	[Signature]
35	Dilar Andrade Medina				3137700 Ext 3412	[Signature]
36	EDGARA SANABAY	23114653	S.D.A.	PIQA	4441030	[Signature]
37	Laura Piraján	10418342			4367099	Laura Piraján
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 Fecha de Realización del Evento: \_\_\_\_\_  
 Lugar y Fecha: Bogotá 21 Enero de 2009

No.	NOMBRE	CEDULA CIUDADANA	REGISTRO No.	AREA	TELEFONO	FIRMA
41	Monika Røser	020081021			3102256	<i>[Signature]</i>
42	NESTOR R. GARIBO	3176291	376	SISTEMA MOESTRO	3447151	<i>[Signature]</i>
43	GUSTAVO HERRERA	14.598.102	01599	D.I.E	3497810	<i>[Signature]</i>
44	Jorge Arboleda	120356				<i>[Signature]</i>
45	Diego H. Muñoz	5288116			2011035 Ext 631	<i>[Signature]</i>
46	Andrea Fonseca	4637261			5237-340	<i>[Signature]</i>
47	Jaime Enrique?	86053351		JARDIN BOTANICO	4372060 ext 221	<i>[Signature]</i>
48	Hiroshi Nakamura			JICA		中村 浩
49	Atsushi Kato			JICA		加藤 篤志
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