



Information System Improvement Plan for Water Supply & Sewerage

July 2014

Urban Management Centre
Performance Assessment System (PAS)

Prepared by Urban Management Centre (UMC)
July 2014

All photographs are by UMC unless otherwise mentioned.



Urban Management Centre (UMC)

The Urban Management Centre (UMC) is a not-for-profit organization based in Ahmedabad, Gujarat, working towards professionalizing urban management in India and South Asia. UMC provides technical assistance and support to Indian state local government associations and implements programs that work towards improvement in cities by partnering with city governments. UMC builds and enhances the capacity of city governments by providing much-needed expertise and ready access to innovations on good governance implemented in India and abroad. UMC is a legacy organization of International City/County Management Association (ICMA) and hence is also known as ICMA-South Asia. More details are available on www.umcasia.org.



Performance Assessment System (PAS)

PAS, a five-year action research project, has been initiated by CEPT University with funding from the Bill and Melinda Gates Foundation. PAS aims to develop better information on water and sanitation performance at the local level to be used to improve the financial viability, quality and reliability of services. It will use performance indicators and benchmarks on water and sanitation services in all the 400-plus urban areas of Gujarat and Maharashtra. UMC and the All India Institute of Local Self Governance are CEPT's project partners in Gujarat and Maharashtra, respectively. More details are available on www.pas.org.in.



Acknowledgements

Urban Management Centre (UMC) would like to thank Vadodara Mahanagar Seva Sadan for their continuous support throughout the study. We wish to give a special mention to the following officers/ departments

- Municipal Commissioner
- Assistant Municipal Commissioner
- City Engineer
- Add. City Engineer
- SLB Nodal Officer
- Director IT, EDP Unit
- Ex. Engineer, Dy. Ex. Engineers, AE, AAE, Operators, Water Supply Dept.
- Ex. Engineer, Dy. Ex. Engineers, AE, AAE, Operators, Sewerage & Drainage Dept.
- Head of Dept., Solid Waste Management
- Chemist, Public Health Laboratory, VMSS
- Revenue Department
- Accounts Department
- Tax Department
- JnNURM Cell
- Private operators of various facilities such as water treatment plants, sewage treatment plants, waste processing plants, scientific landfill site, door-to-door collection service, etc.

UMC would also like to thank the team at CEPT University, especially Prof. Meera Mehta and Prof. Dinesh Mehta for their continuous support and guidance for completion of this study. UMC also appreciates the work the efforts put in by its team members including Anurag Anthony, Arvind Singh, Dhruvi Panchal, Hemal Patel, Kinjal Pillai, Meghna Malhotra, Urvi Patel, Vimal Sharma and Vinay Patel.

Contents

1. Objectives of ISIP
2. VMSS and service level benchmarking
3. Water supply
4. Sewerage
5. Solid waste management
6. Summary of recommendations



Contents

1. Objectives of ISIP
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The aim of this ISIP

1. Improve data recording, processing/usage and reporting
2. Improve data reliability as per SLB definitions
3. Implement innovative tech-solutions for information system
4. Subsequently, pave way for fully integrated municipal MIS



List of activities undertaken for this study

UMC team assessed data recording practices and formats. Key activities undertaken include:

- a) sensitising VMSS staff on SLB and data reliability
- b) Review existing formats
- c) discussed and reviewed existing monitoring system and internal data flow
- d) prepare a strategy to improve both service delivery and reliability of data through minimal changes in the existing system
- e) discussed the design of a system for automatic update of dynamic data
- f) discussed with the EDP unit, various IT/ mobile-enabled solutions for data reporting, sharing and monitoring
- g) Exposure visit for VMSS staff on SCADA system and 24x7 water supply systems



Methodology adopted

Stage 1: Existing situation assessment of data recording, processing/usage and reporting

Stage 2: Identification of gaps in existing information system in VMSS

Stage 3: Assessment of use of data gathering/ measuring devices/ equipment

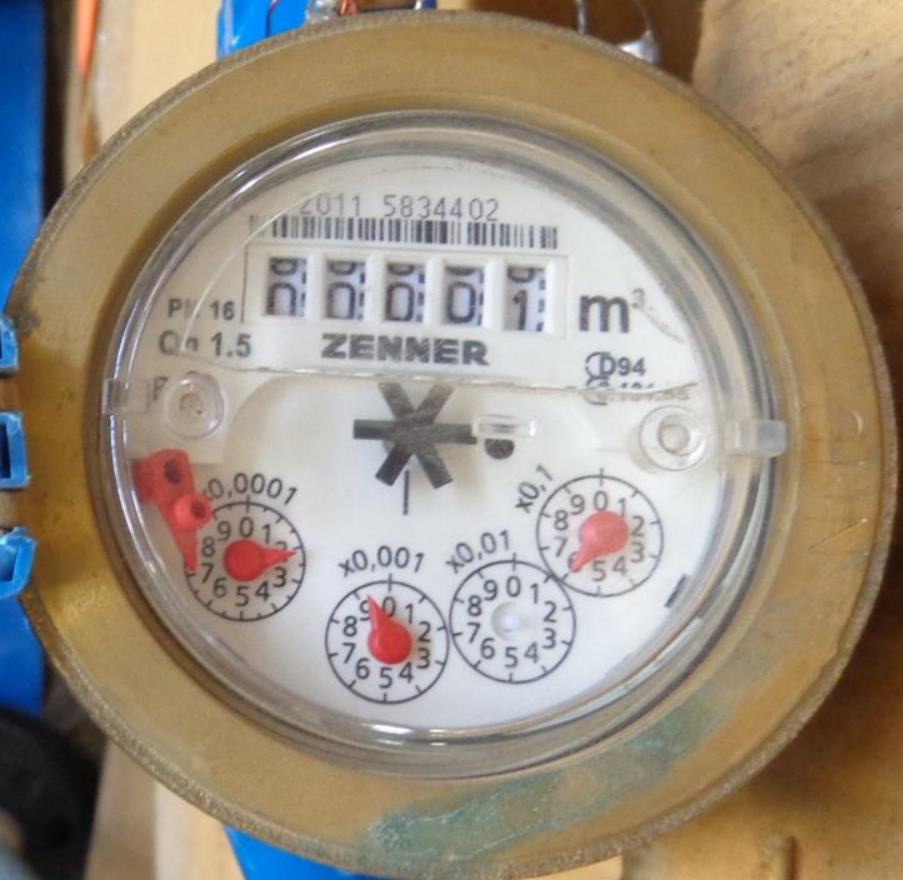
Stage 4: Assessment of field facilities where data is generated or should be generated. The assessment includes

- Availability of computers
- Availability of connectivity to VMSS head office
- Availability of staff trained in basic use of computer application

Stage 5: Recommending interventions in three categories

- Design of existing and new forms for gathering data; including surveys wherever required
- Installation of measuring equipment at various locations at appropriate
- Training and capacity building of staff for implementation of ISIP





2011 5834402

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Qn 1.5

ZENNER

D94

x0,0001

x0,001

x0,01

x0,1























Wash Basin

TDS Meter

pH Meter

Digital Weigh balance











LOSS OF HEAD

32.12

ALARM

NORMAL

ZERO

SPAN

RATE OF FLOW INDICATOR

78394

ALM

TBL / INT

ALM

M / IN / CAL

QIP-1177
QC Passed
Sign

Type: LOH ROF
S. No. 891004
Type: 3

NVO CONTROLS PVT. LTD. 194, Electronic Complex, Indore

3





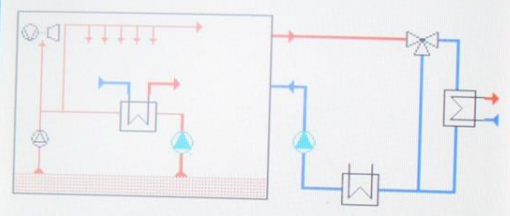






Jenbacher DIA.NE XT

LUBE OIL/JACKET WATER SCHEMATIC ALARM P-20
181 kW ISOLATED OPERATION 11/04/12
SPEED MODE 15:23:10



85.8 °C
3.78 bar

84.5 °C
1.60 bar

F1
F2
F3
F4

F5
F6
F7
F8

START
ELE
HYD
STOP
CYL
CTRI
OH
AUX
DAT
OFF
SYS
CTR2

AMM
PRIO
ACK
▲
◀ OK ▶
▼

7 8 9
4 5 6
1 2 3
. 0 -
ESC ↑ ENT











MICRO
Tech



MAINS
INPUT
OUTPUT

AUTOMATIC VOLTAGE STABILIZER

MILLITRONICS
MINISANDER PLUS



040
96.7
mA 0.7

**WATER LEVEL
INDICATOR**





Limitations of the study

1. This study focuses on improving reliability of SLB indicators in Vadodara only. It may or may not be applicable to other cities in its current form.
2. Revisions of SLB framework for some indicators* have been suggested.
3. It is assumed that linemen, pump operators, engineers and other staff are filling forms (both manual as well as digital) diligently.
4. Irregularities arising out of malfunction/ failure of the meters have not been accounted in calculations and reliability.
5. 'Extent of metering' indicator for water supply has not been assessed.
6. Storm water drainage sector is not covered in this phase of the study.



* 'Minimum frequency of measurement of performance indicator' and 'Smallest geographical for measurement of performance indicator'

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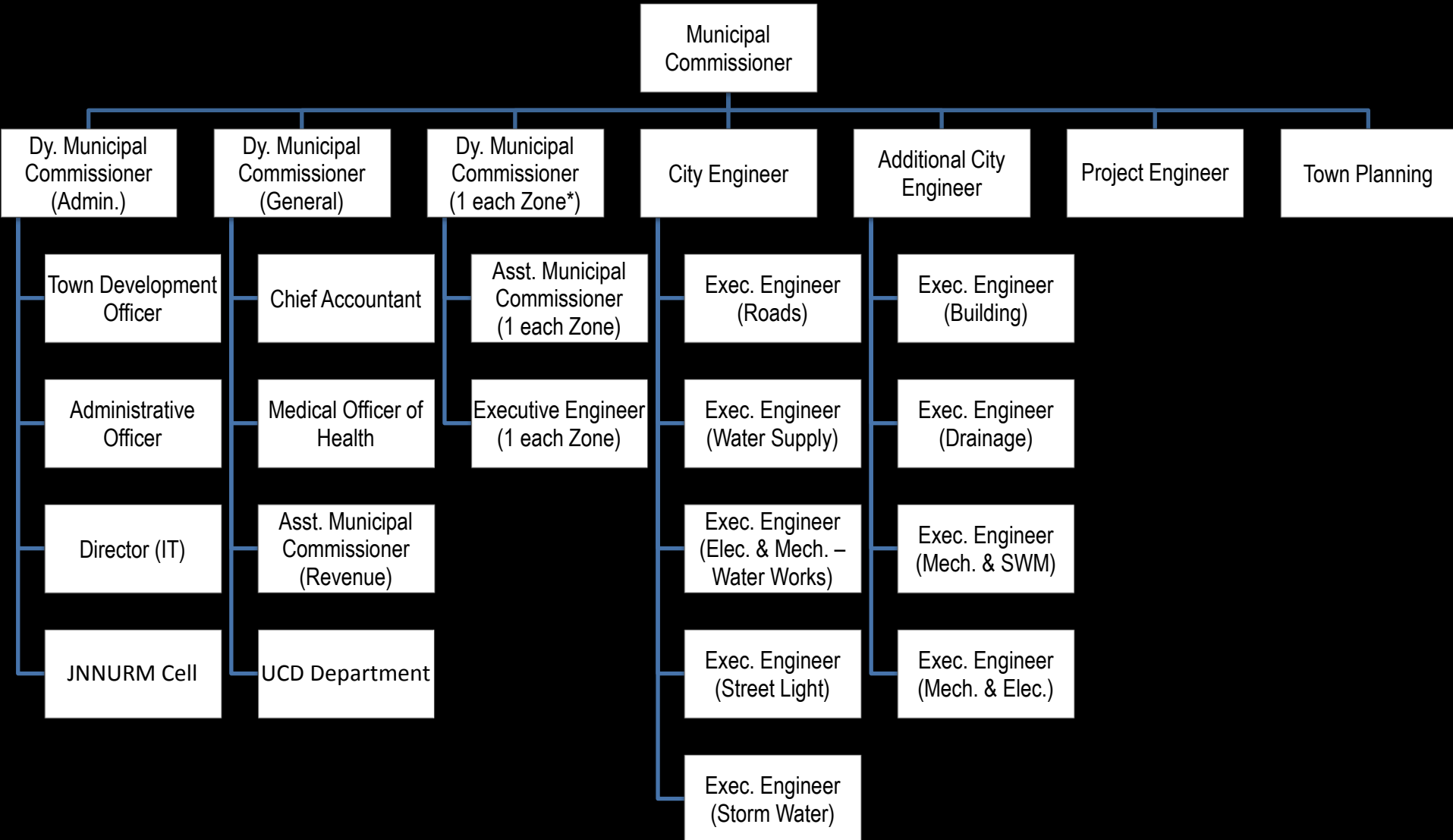
Departments in VMSS

Accounts	Fire & Emergency	Storm Water Drainage
Administration	Garden & Museums	Street Lighting
Audit	Gas	Tax
Drainage	Health	Town Development
EDP	Housing & Building	UCD Department
Education	Public Relations	Vigilance
Election	Revenue	Water Supply
Estate	Roads & Bridges	-

Departments in VMSS

Accounts	Fire & Emergency	Storm Water Drainage
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Estate	Roads & Bridges	-

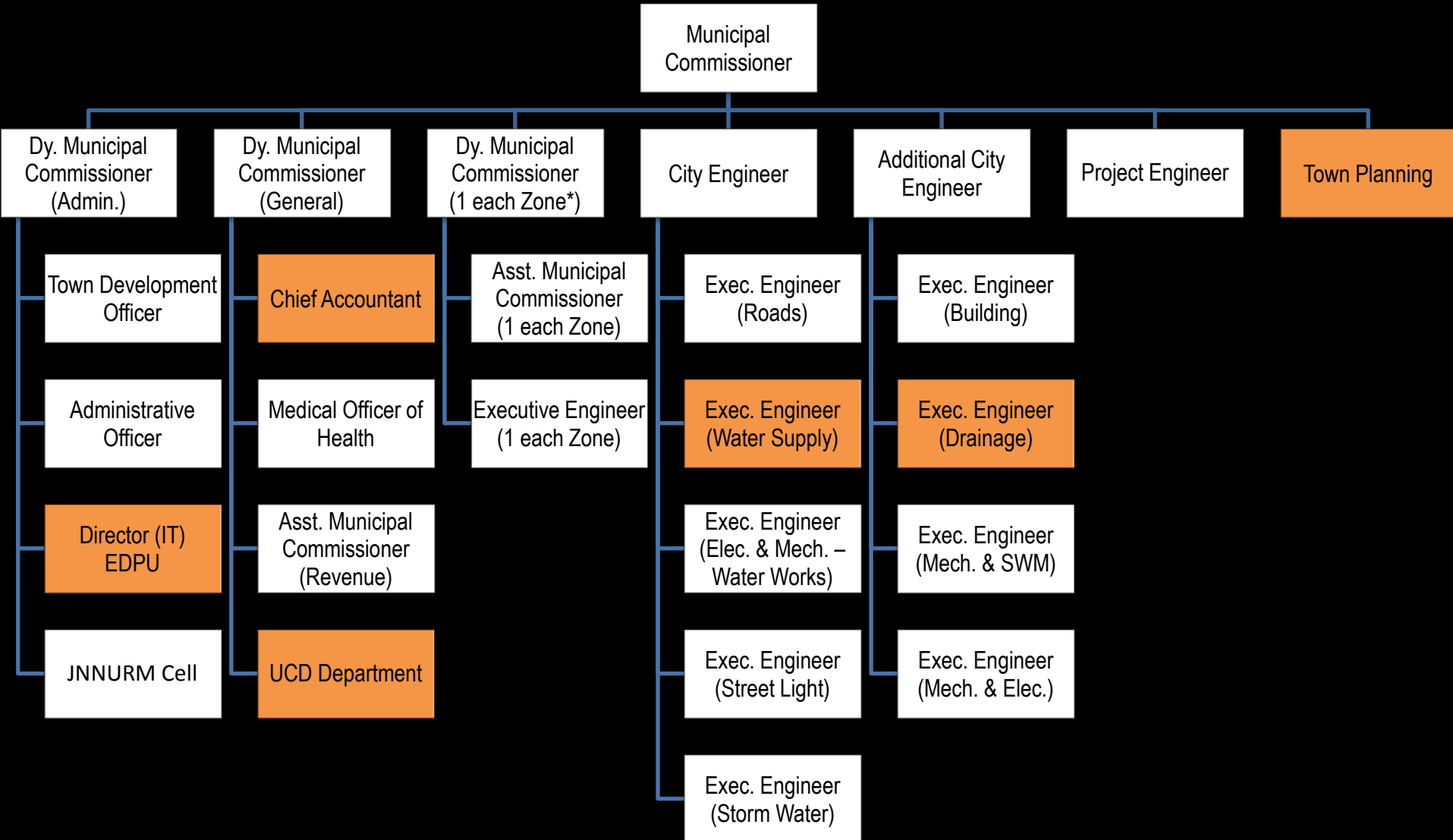
Organisation Structure, VMSS



Note: * There are 4 administrative zones in Vadodara.

Source: http://www.vmcegov.com/administrative_wing.aspx

Relevant Departments/ Officers for SLB Data



 Relevant departments for ISIP

Note: * There are 4 administrative zones in Vadodara.

Relevant SLB data provided by each department/ officer

Town Planning	Chief Town Planner	Annual population projections, floating population estimates,
Dy. Municipal Commissioner (Admin.)	Director (IT) EDPU	Property tax data, census data, water supply & sewerage connections data, public grievances redressal data
Dy. Municipal Commissioner (General)	Chief Accountant	Expenses and revenues of water supply, sewerage & SWM, demand and actual collection of charges for W/S, sewerage & SWM
	UCD Department	Community data, access of poor to basic services
	Asst. MC Revenue	Data collected from property tax re-assessment
City Engineer	Exec. Engineer (Water Supply)	Data on water supply supplied and water quality
Additional City Engineer	Exec. Engineer (Drainage)	Data on sewage collected, treated, reused and quality of treated sewage
	Exec. Engineer (Mech. & SWM)	Data on SWM generation, collection, processing, disposal, recovery, etc.

Department/ officer contributing to SWM		Household level coverage of SWM services	Collection efficiency	Extent of segregation of waste	Extent of recovery of waste collected	Extent of scientific disposal of waste	Efficiency in complaints	Cost recovery	Efficiency in collection of charges
Town Planning									
Dy. Municipal Commissioner (Admin.)	Director (IT) EDPU	✓					✓		
Dy. Municipal Commissioner (General)	Chief Accountant UCD Department Asst. MC Revenue							✓	✓
City Engineer	Exec. Engineer (Water Supply)								
Additional City Engineer	Exec. Engineer (Drainage) Exec. Engineer (Mech. & SWM)		✓	✓	✓	✓			

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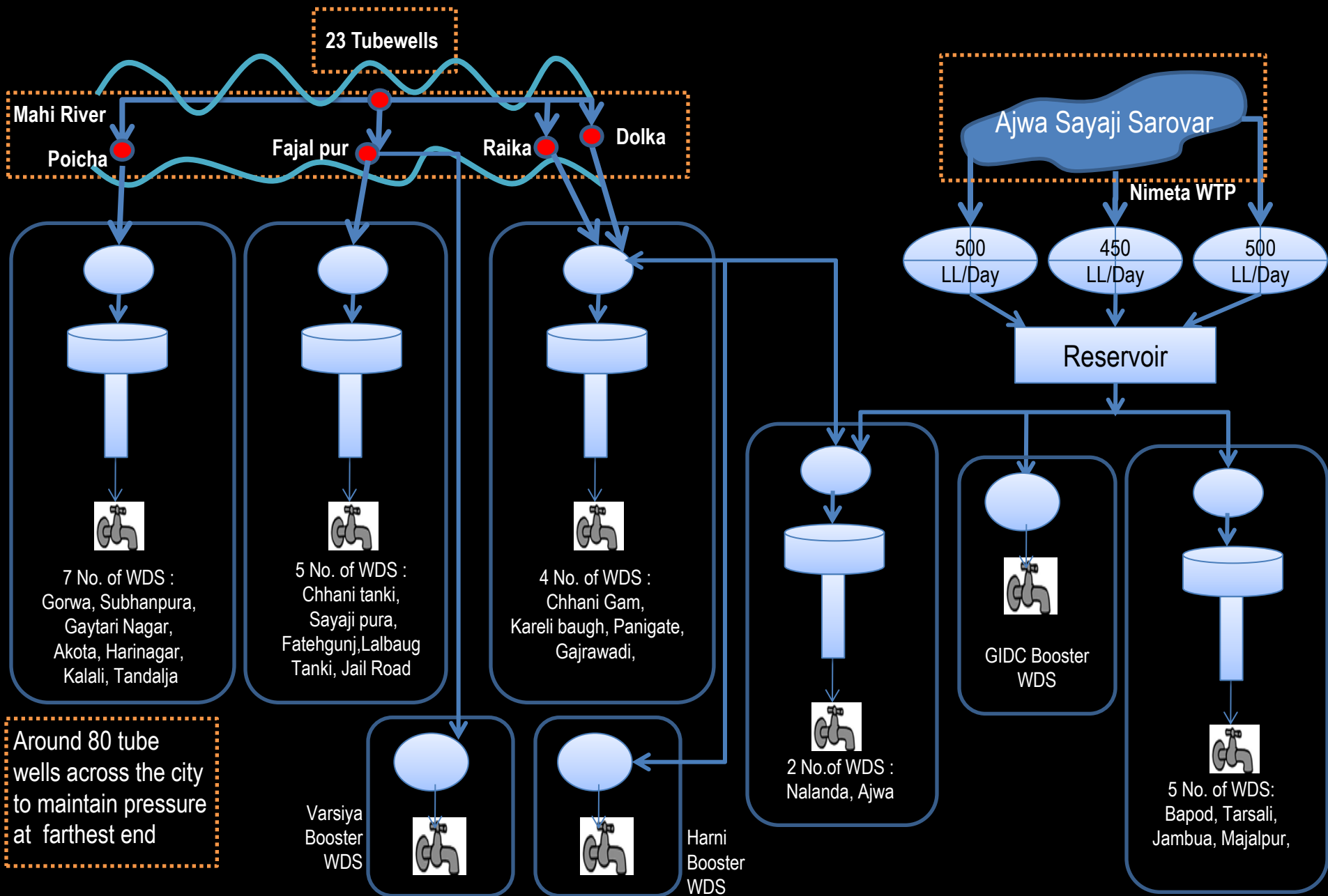
Understanding existing water supply system in Vadodara

Sources of water supply in Vadodara

1. Ajwa Sayaji Sarovar (surface source)
2. Four french wells in River Mahi
3. Twenty three Tubewells in River Mahi (riverbed)
4. Eighty borewells (within the city)



Vadodra - Water Supply Flow Diagram



All units are in lakh litres data as on 2011-12.

Source: Urban Management Centre

SLB indicators of VMSS in water supply

Indicator	Definition	2012-13	Reliability
Coverage of Water Supply Connections *	$[\text{Total number of households with direct water supply connection} / \text{Total number of households in service area}] \times 100$	78	B
Per capita supply of water	$[\text{Water supplied to distribution system} / \text{No. of days in a month}] / \text{Population served}$	156	D
Extent of metering	$[\text{No. of metered direct service connection} + \text{metered standposts}] / (\text{Total no. of direct connections} + \text{total no. of standposts}) \times 100$	3	-
NRW	$[(\text{Total water put in distribution system} - \text{Total water received at consumer end}) / \text{Total water put in distribution system}] \times 100$	32	D
Continuity of Water Supply	No. of hours for which water is supplied at pressure greater than 7m head	1	D
Efficiency in redressal of consumer complaints **	$[\text{Total number of complaints redressed within the month} / \text{Total number of water supply-related complaints received per month}] \times 100$	97	B
Quality of Water Supplied	$[\text{Total number of samples that meet potable water standards} / \text{Total number of samples tested for quality}] \times 100$	99	C
Cost Recovery in Water Supply Services	$[\text{Total annual operating revenues} / \text{Total annual operating expenses}] \times 100$	49	B
Efficiency in Water Supply-related Charges	$[\text{Current revenues collected in the given year} / \text{Total operating revenues billed during the given year}] \times 100$	91	A

Note: * Data exists as demanded by SLB framework for reliability 'A' but is not used by VMSS for generating SLB indicators. It could be used from the current year onwards

** New public grievance redressal system has been implemented in June 2013. Data required for reliability 'A' is now available and could be used from the current year onwards.

Existing data flow for water supply system

Water Supply Information Flow Diagram for SLB Indicators Generation



Nature of Recommendations

1. Process improvements, studies and surveys
2. Infrastructural improvements
3. Design of forms to record data
 - i. Existing forms – minor additions/ summation
 - ii. Collation forms – for internal reporting
 - iii. New forms – for data which is not captured



Coverage of Water Supply Connections

$$\text{Coverage of Water Supply Connections} = \frac{\text{Total number of households with direct water supply connection}}{\text{Total number of households in service area}} \times 100$$

Minimum frequency of measurement

: Quarterly- Annually (suggested by UMC)

Smallest geographical jurisdiction of measurement

: Zone/ DMA Level

EDP (No format) ⚠

Total number of HHs in the service area

Property Tax Data, EDP (No format) ⚠

Total number of HHs with direct water supply connection

Coverage of Water Supply

Vadodara Mahanagar Seva Sadan

EDP Unit

Month / Year:

Filled by:

Households, properties and establishment details							
Ward No.	Total population in service area	Total number of households in service area	Total number of properties in service area	Total number of households served with individual water supply connection	Total number of properties with sewerage connection	Total number of properties with septic tank/ soak-pits	Total number of properties with individual toilet
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
Total							

To be filled once a year by EDP Unit.

Assumptions:

The OSD Census or planning department undertakes population projection exercise and providing the information to EDP unit.

Revenue department conducts property tax re-assessment every 4 years. While filling the forms, they record properties with access to septic tanks/ soak-pits. This information should be transferred to EDP unit annually.

During the property tax reassessment, the form would include additional information about whether the HH has an individual toilet. This information would also be transferred to EDP unit annually.

Proposed Form GE01: Households, properties and establishment details

EDP Department maintains data collected through property tax assessment surveys carried out by the Revenue Department. The data contains total number of HHs served and total number of connections.

Note: SLB framework suggests measuring this indicator 'Quarterly'. UMC feels that in case of Vadodara, measuring this indicator 'Annually' shall suffice as quarterly changes may not be significant.

Per Capita Supply of Water

Per capita
supply of
water

=

(Water supplied to distribution system / No. of days in a month)

Population served

Minimum frequency of measurement

: Quarterly

Smallest geographical jurisdiction of measurement

: Zone/ DMA Level

Outflow from WTP 01, W/S Dept. (Unmetered estimate) (Form 05)

Outflow from WTP 02, W/S Dept. (Unmetered estimate) (Form 05)

Outflow from WTP 03, W/S Dept. (Unmetered estimate) (Form 05)

Water supplied to the distribution system (per month)

Outflow from 23 tubewells, Mahi River, W/S Dept. (No recording) (Form 03)

Outflow from French Wells, Mahi River, W/S Dept. (Unmetered estimate) (Form 04)

Per Capita Supply of Water

Outflow from 80 borewells within the city, W/S Dept. (No format) !

EDP (No format)

Residential population

Population served

SLB Cell (No format)

Floating population

Predefined

Number of days in the month

वडोदરા		નિમેટા ફિલ્ટરની										મહાનગર સેવા સહન									
કલોરીન અગર		ફિલ્ટરની										ફિલ્ટરની									
વધત	કલોરીન અગર	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
1
2
3
4
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6
7
8
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10
11
12
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14
15
16
17
18
19
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21
22
23
24
25
26
27
28
29
30

Existing Form 05: Quantity of water supplied from WTPs

ફિલ્ટર ઘોવા માટે વપરાયેલું પાણી બાદ
 ચોખ્ખું થયેલું પાણી રીઝરવોયરમાં ગયું તે
 રીઝરવોયર પાણીની ઊંચાઈ અગર નીચાઈ બાદ
 નિમેટામાંથી પાણી આપવામાં આવ્યું તે

નોંધ :
 ૨૫૫
 ૩-૧૧

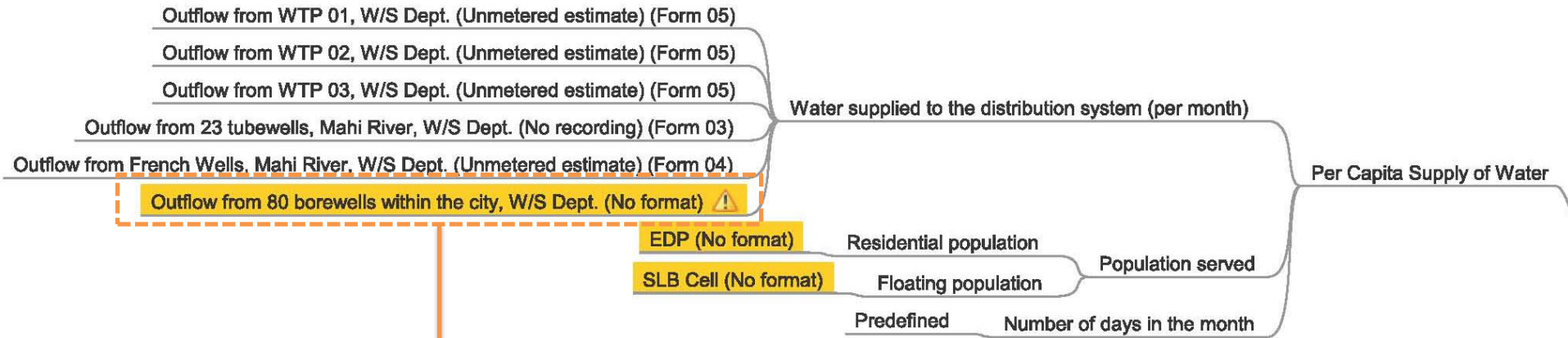
9,24,38,000
 - 28,000
 9,24,90,000
 + ૬૫૨૬૫૪૪
 + ૧૧૦૧૧૨૧.૬૦૦
 ૩૧૬,૩૬,૦૨૪

ફિલ્ટર ઘોવા માટે વપરાયેલું પાણી બાદ
 ચોખ્ખું થયેલું પાણી રીઝરવોયરમાં ગયું તે
 રીઝરવોયર પાણીની ઊંચાઈ અગર નીચાઈ બાદ
 નિમેટામાંથી પાણી આપવામાં આવ્યું તે

નોંધ :
 ૨૫૫
 ૩-૧૧

9,24,38,000
 - 28,000
 9,24,90,000
 + ૬૫૨૬૫૪૪
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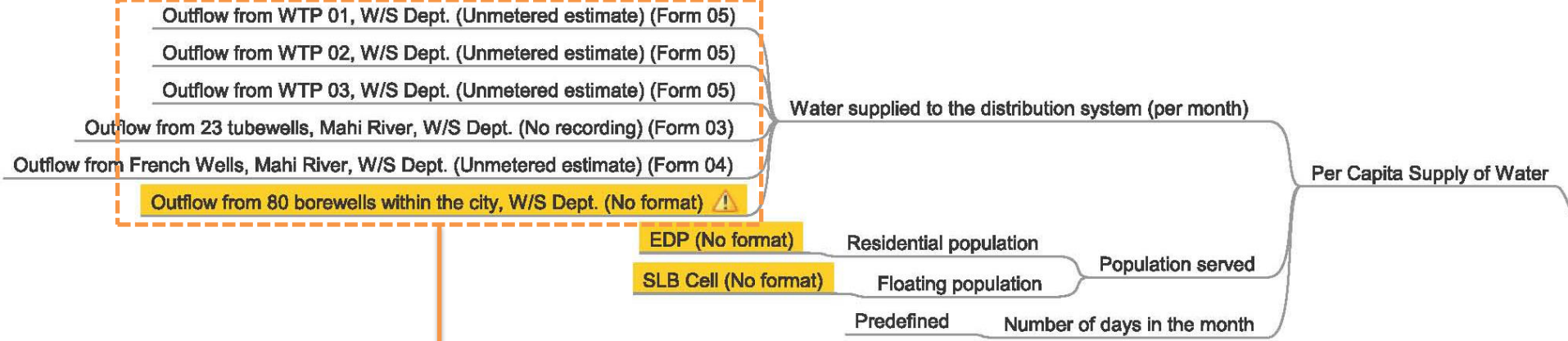
ડેપ્યુટી સુપરિન્ટેન્ડન્ટ
 આજવા સલકીવીલ, નિમેટા



Proposed New Form 04A: City borewells operation

Borewell No.	Location/ Address	No. of Pumps	Flow Rate of the Pump (Cusec)	Efficiency of the pump (%)	Pump Operation		Daily Duration of Operation (Hours)	Quantity of Water Pumped (Litre)
					On Time	Off Time		
1	ABC	Pump 1						
		Pump 2						
		Pump 3						
2								
3								
...								
...								
...								
80								
Total								

Reliability B



Proposed Form WS01: Meter readings at all bulk production points and outlets of WTPs

Vadodara Mahanagar Seva Sadan
 Location: _____

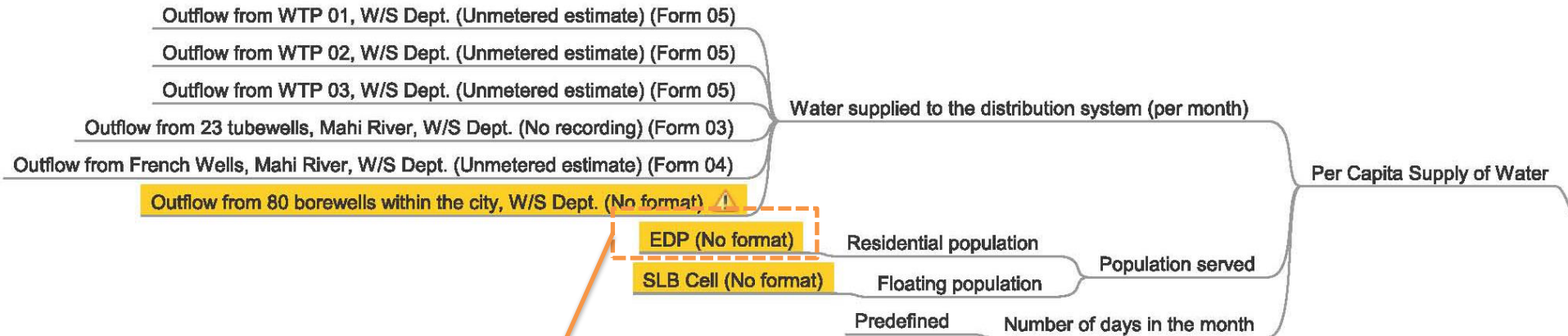
Month / Year: _____
 Filled by: _____

Date	Reading at 0000 hrs	Quantity of Water Pumped (Litre)
1		-
2		-
3		-
...		-
...		-
...		-
31		-
Total		-

Assumptions
 Bulk flow meters are installed at all bulk production points and reading is taken daily.

Note: Meter readings have to be taken at the same time daily. This time can be fixed as per convenience.

Reliability A



Proposed Form GE01: Households, properties and establishment details

Vadodara Mahanagar Seva Sadan

EDP Unit

Month / Year:

Filled by:

Households, properties and establishment details							
Ward No.	Total population in service area	Total number of households in service area	Total number of properties in service area	Total number of households served with individual water supply connection	Total number of properties with sewerage connection	Total number of properties with septic tank/ soak-pits	Total number of properties with individual toilet
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
Total							

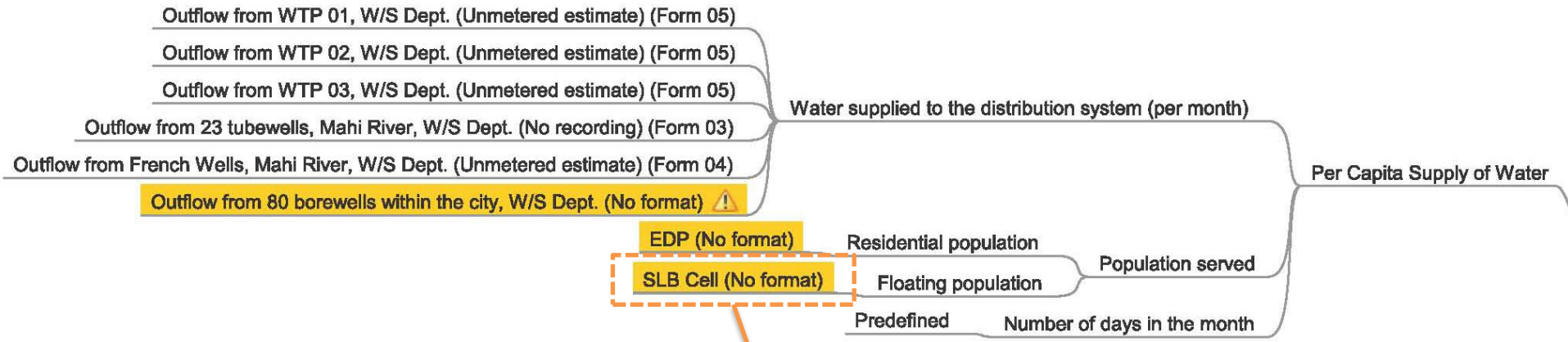
To be filled once a year by EDP Unit.

Assumptions:

The OSD Census or planning department undertakes population projection exercise and providing the information to EDP unit.

Revenue department conducts property tax re-assessment every 4 years. While filling the forms, they record properties with access to septic tanks/ soak-pits. This information should be transferred to EDP unit annually.

During the property tax reassessment, the form would include additional information about whether the HH has an individual toilet. This information would also be transferred to EDP unit annually.



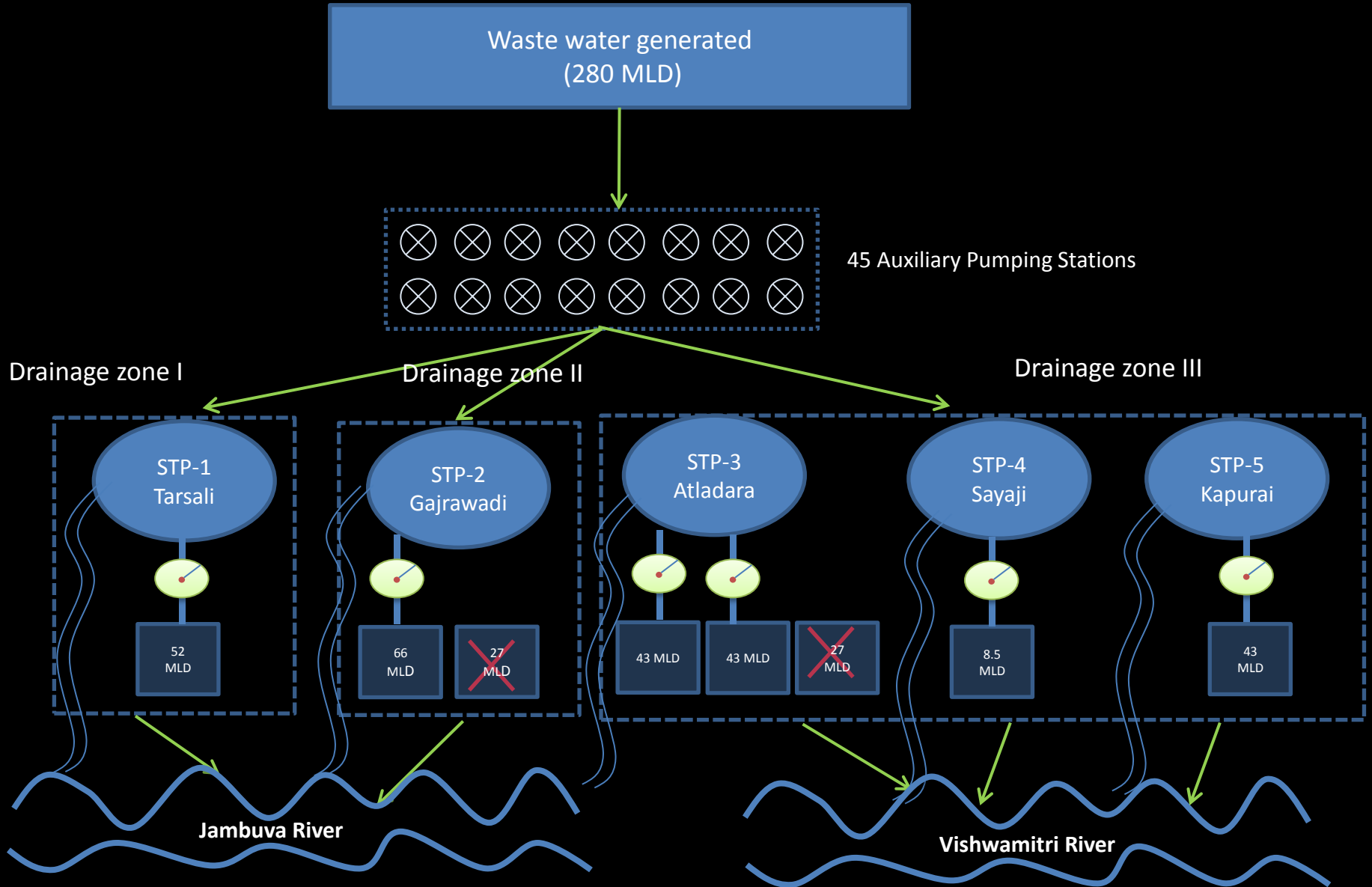
Floating population estimates would be done by Town Planning Officer

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Understanding existing sewerage system in Vadodara

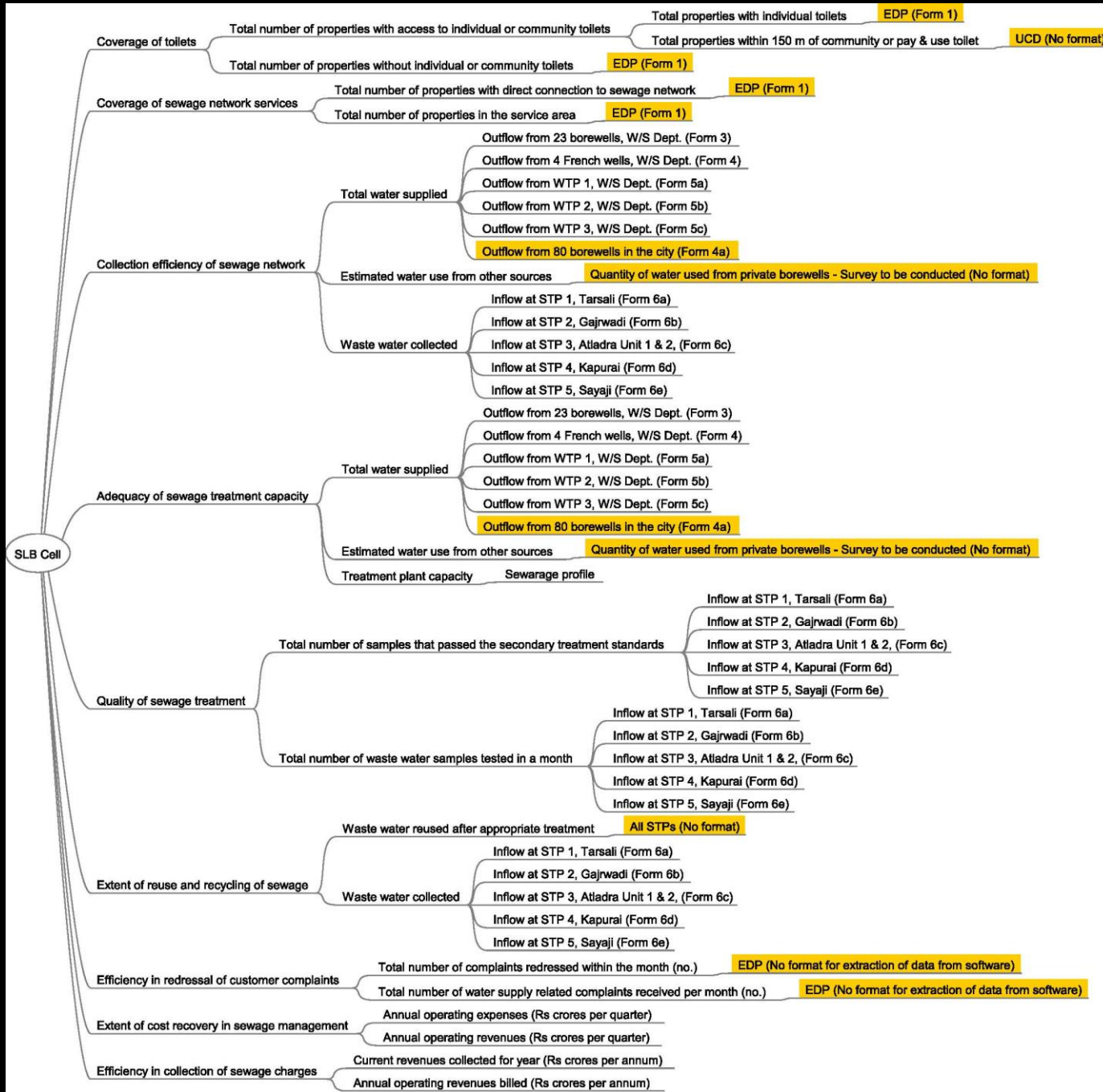
Vadodara – Sewerage Flow Diagram



SLB indicators of VMSS in sewerage

Indicator	Definition	2012-13	Reliability
Coverage of toilets	[Total number of properties with access to toilet/ Total number of properties] x 100	86.5	C
Coverage of sewage network services	[Total number of properties with direct connection to the sewerage network (existing & new) / Total number of properties in the service area] x 100	87	A
Collection efficiency of the sewage network	[Wastewater collected / (Total amount of water supplied municipal & private bore well) x 80%] x 100	97.2	D
Adequacy of sewage treatment capacity	[(Total amount of water supplied (municipal & private bore well) x 80%) / Treatment plant capacity] x 100	106.5	D
Quality of sewage treatment	[Number of samples that pass the specified secondary treatment standards / Total number of wastewater samples tested in a month] x 100	90.5	B
Extent of recycling and reuse of sewage	[Wastewater recycled or reused after appropriate treatment / Wastewater received at STPs] x 100	1.8	D
Efficiency in redressal of customer complaints	[Total number of complaints redressed within the month / Total number of sewage related complaints received per month] x 100	98.3	B
Extent of cost recovery in sewage management	[Total annual operating expenses / Total annual operating revenues] x 100	109.37	B
Efficiency in collection of sewage charges	[Current revenues collected in the given year / Total operating revenues billed during the given year] x 100	89.1	A

Sewerage Information Flow Diagram for SLB Indicators Generation



Coverage of toilets

$$\text{Coverage of Toilets} = \frac{\text{Total number of properties with access to toilet}}{\text{Total number of households in service area}} \times 100$$

Minimum frequency of measurement

: Quarterly

Annually (suggested by UMC)

Smallest geographical jurisdiction of measurement

: Ward Level

Coverage of toilets

Total number of properties with access to individual or community toilets

Total properties with individual toilets

EDP (Form 1)

Total properties within 150 m of community or pay & use toilet

UCD (No format)

Total number of properties without individual or community toilets

EDP (Form 1)

Vadodara Mahanagar Seva Sadan

EDP Unit

Month / Year:

Filled by:

Households, properties and establishment details

Ward No.	Total population in service area	Total number of households in service area	Total number of properties in service area	Total number of households served with individual water supply connection	Total number of properties with sewerage connection	Total number of properties with septic tank/ soak-pits	Total number of properties with individual toilet
1							
2							
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Total							

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Proposed Form GE01: Households, properties and establishment details

Note: SLB framework suggests measuring this indicator 'Quarterly'. UMC feels that in case of Vadodara, measuring this indicator 'Annually' shall suffice as quarterly changes may not be significant.

Coverage of toilets

Total number of properties with access to individual or community toilets

Total properties with individual toilets

EDP (Form 1)

Total properties within 150 m of community or pay & use toilet

UCD (No format)

Total number of properties without individual or community toilets

EDP (Form 1)

વડોદરા મહાનગરપાલિકા
 શ્રીવીરૂપ આકારણી ઓર્ગેનિઝેશન ધી ગુજરાત પ્રોવિનિસિયલ મ્યુનિસિપલ કોર્પોરેશન એક્ટ ૧૯૪૮ના પરિશિષ્ટ "અ" ના પ્રકરણ - ૮ ના નિયમ-૮ અનુસાર શ્રીવીરૂપ કોર્મ

ડોન : વોર્ડ : બ્લોક : પાનાં નં. :
 અનુક્રમ નંબર સેવકાર નંબર વિકલતનો એલોખ નંબર (PIN) સ્ટેટસ કોડ મિકલત વેરાનો દર

કર ભરવાને પ્રથમપાત્ર વ્યક્તિનું નામ અને સરનામું :
 ટપાલનું સરનામું :
 કબજેદાર (ઓક્યુપાયર)નું નામ :

This form is carried by the surveyor for reassessment with pre-filled data. Any change is recorded in the reassessment form else this is 'okayed'.

વિન રહેણાકના વપરાશના હેતુનું વર્ણન :		પાણી કનેક્શનની વિગત :			મકાન હાઈરાઈઝ છે ?		
અ.નં.	રહેણાક/બીન રહેણાક કોડ	સાઈઝ	કનેક્શન નંબર	ઉંચાઈ (મીટરમાં) ?	વોટર ઝોનમાં છે ?	ફ્લેટ રેટ પાણી કને. છે ?	મીટર પાણી કને. છે ?

કલોર કોડ	રેકોર્ડ નંબર	કલોરનો પ્રકાર	સ્થળ પરિભવ	માપ (ચો.મી.)	રહે./બીન રહે.કોડ	બાંધકામનું વર્ષ	ઈમારત/ઉપયોગના પ્રકારનો કોડ	ભોગવટાનો પ્રકાર

નોંધ : રહેણાક / બીન રહેણાક કોડ : Resi. - ૧, Non-Resi-2

ઉપર જણાવેલ શ્રીવીરૂપ કોર્મમાં ઉપરોક્ત સ્થાપક મિકલત અંગે એક્ટના પરિશિષ્ટના પ્રકરણ-૮ ના નિયમ નંબર-૮(૨) અનુસાર આ માહિતી આપું છું. જે પુરી અને સાચી છે અને આ સામે કોઈ વાંધો નથી તે પ્રમાણિત કરું છું.

પ્રતિનિધિની સહી : પ્રતિનિધિનું નામ :
 કર ભરવાનો પ્રથમપાત્ર ધારક વ્યક્તિ સાથેનો સંબંધ :
 તારીખ : સમય :
 નોંધ : ઠ.પી.એમ.સી. એક્ટના પ્રકરણ ૮ના નિયમ ૮(૩) મુજબ જો માહિતી નથી અપાય તો ઉપરોક્ત બાબત/ફેક્ટર સામે કોઈ વાંધો લઈ શકાયો નહીં.
 ઉપર જણાવેલ માહિતી તથા માપ ખુબજ ચોકસાઈપૂર્વક લેવામાં આવેલ છે અને કોઈ માહિતી બાકી રાખવામાં આવેલ નથી તેની ખાત્રી આપવામાં આવે છે.
 આકારણી અમલદારનું નામ : ઈ.ડી.પી. રેકૉર્ડ નંબર : 101295
 તારીખ : સમય :

પાનાં નં. :
 ઓળખ નંબર (PIN) સ્ટેટસ કોડ મિકલત વેરાનો દર

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પાણી કનેક્શનની વિગત :			મકાન હાઈરાઈઝ છે ?		
રહેણાક/બીન રહેણાક કોડ	સાઈઝ	કનેક્શન નંબર	ઉંચાઈ (મીટરમાં) ?	વોટર ઝોનમાં છે ?	ફ્લેટ રેટ પાણી કને. છે ?

રહે./બીન રહે.કોડ	બાંધકામનું વર્ષ	ઈમારત/ઉપયોગના પ્રકારનો કોડ	ભોગવટાનો પ્રકાર

Proposed addition to property tax re-assessment form for collecting data about properties with individual toilets.

Coverage of toilets

Total number of properties with access to individual or community toilets

Total properties with individual toilets

EDP (Form 1)

Total properties within 150 m of community or pay & use toilet

UCD (No format)

Total number of properties without individual or community toilets

EDP (Form 1)

Proposed Form SE03: Number of households without individual toilet and not within walking distance (150 metres) of a public toilet

Vadodara Mahanagar Seva Sadan

Ward name/ no. : _____

Month / Year: _____

Filled by: _____

Ward No.	Number of HHs without individual toilet and not within walking distance (150 metre) of a public toilet
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total	

Note: This survey should be conducted in slum properties by the UCD Department.

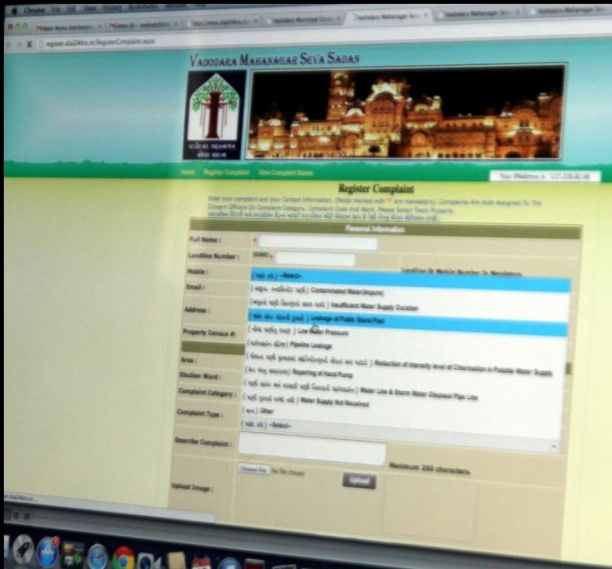
Efficiency in redressal of customer complaints

Total number of complaints redressed within the month (no.)

EDP (No format for extraction of data from software)

Total number of water supply related complaints received per month (no.)

EDP (No format for extraction of data from software)



Complainant/Client Name	Address	Area/Name	Complaint Type	Contact	Escalated To	Level	Status	Staff Remark
D1067	KAPIL NIKHESHVAR PLOT 48/ANANASAR CHAK RASTA	East Gate	Street Light Not Working	972822065 / 2330665	Manish Bhat	1	In Progress	
D1081	SUNIL K.PATEL CHAKULSI PARK SOCIETY BEHIND SHRE	Manjarpur	Street Light Not Working	997817898 / 250230	Manish Bhat	1	Completed	
D1095	ZINE AMANATHI PUNAM CH. OPP MEHA	Manjarpur	Street Light Not Working	940832897	Manish Bhat	1	In Progress	
D1048	PRADIP RIVE SUD KUMAR CHIMBERI OPP SANDHARAJ	Dandia Bazar	Cher Head Line Problem	990991607	Manish Bhat	1	In Progress	
D1082	DILIPKUM GUPTA 102 AMB PARK NH 16/ANANASAR	Wadhwanji	Street Light Not Working	9978934791 / 2651695	Manish Bhat	1	Completed	
V1002	DR ALI ZELA MALAKA OPP DASTI NALA	Vad Ringhranal	Streetside Pole Sparking	9428877026	Manish Bhat	1	In Progress	
D1083	ANUSHI QUA C-14 PRANDHANI SOC NEAR JAYAWADI	Meghoda Road	Street Light Not Working	9016529600	Manish Bhat	1	In Progress	
V1009	UNIRAK TRIVAKAR 107 CHANAL PUNAM OPP POONAM CO	Poonam Complex	Street Light Not Working	9586866713 / 2514059	Manish Bhat	1	Completed	
D1072	KRISHNAKANT SOC. BEHIND JONES HWY	Rajesh Tower Road	Street Light Not Working	760012248	Manish Bhat	1	In Progress	
D1076	SADHANT C PATEL 101 NEW PALS SCHOOL SIKL GOKULAM BINA	New Era School	Street Light Not Working		Manish Bhat	1	In Progress	
D1078	HOMANDESH RUPA RICHARDSONI BANGLA SARAI BILE	Beh Building	Street Light Not Working	2435528	Manish Bhat	1	Completed	
D1074	ROHIT BHARAT KUMAR 17 FANDEDI MOKLA SARDAR STATION	Area Road	Other	9978912056 / 2422291	Manish Bhat	1	In Progress	
D1073	REYESH KARDIKAR NH BYAM SUNDAR	Boost Gate	Other	7602832276	Manish Bhat	1	In Progress	



Minimum frequency of measurement

: Monthly

Smallest geographical jurisdiction of measurement

: Zone/ DMA Level

ComplaintID	CitizenName	Address	AreaName	ComplainType	Contact	EscalatedTo	Elevel	Status	Staff Remark
D10827	KAPIL MAHESHVARI	48 SUJATA PLOT, HARINAGAR CHAR RASTA	Gotri Gam	Street Light Not Working	9723822065, 2330665	Manish Bhatt	1	In Progress / Completed	
D10831	SUNIL K PATEL	C35, NALINI PARK SOCIETY, BEHIND SHRE	Manjalpur	Street Light Not Working	9978917894, 2652030	Manish Bhatt	1	In Progress / Completed	
D10846	SHANTILAL PATEL	E90 AMARNATH PURAM SOC, OPP MEGHA	Manjalpur	Street Light Not Working	9408352881, 2664768	Manish Bhatt	1	In Progress / Completed	
D10648	PRADIP KHE	302 RUDRA CHEMBER, OPP GANDEVKAR J	Dandia Bazaar	Over Head Line Problem	9909918571	Manish Bhatt	1	In Progress / Completed	
D10652	DILIPBHAI GUPTA	A/10 AMIN PARK, NR VISWAMITRI RAILW	Vishwamitri Railway Station	Street Light Not Working	9978934791, 2661566	Manish Bhatt	1	In Progress / Completed	
V10683	ON ALI DELA WALAMOLA	250 WADI BADRI WALA	Vadi Rangmahal	Streetlight Pole Sparking	9428877026	Manish Bhatt	1	In Progress / Completed	
D10693	ANKUSH OJA	C 14 PAVANDHAM SOC, NEAR NARAYAN VI	Waghodia Road	Street Light Not Working	9016528605	Manish Bhatt	1	In Progress / Completed	
V10699	VINAYAK THAKKAR	101 CHIMAN LAL PARK, OPP POONAM CO	Poonam Complex	Street Light Not Working	9566668713, 2514059	Manish Bhatt	1	In Progress / Completed	
D10702	KRISHNAKANT	27 VANITANAGAR SOC, RAJESH TOWER MA	Rajesh Tower Road	Street Light Not Working	7800012249	Manish Bhatt	1	In Progress / Completed	
D10716	SASKANT C PATEL	NR NEW ERA SCHOOL, BAL GOKULUM RIMA	New Era School	Street Light Not Working	2435526	Manish Bhatt	1	In Progress / Completed	
D10738	HOMINADESAH	KOTHI ROAD HUMAYU MANJIL, SAMIR BULI	Kothi Building	Street Light Not Working	9978912059, 2422291	Manish Bhatt	1	In Progress / Completed	
D10742	ROHIT BHARAT KUMAR	72 RAMDEV NAGRA, 1 SARDAR ESTSTE AJW	Aywa Road	Other	7802832276	Manish Bhatt	1	In Progress / Completed	
D10743	RITESH KAREKAR	149 SATADHAR SOC, NR SYAM SUNDER	Bapod Gam	Other					

Proposed Collation Form 12c: Sewerage related complaints

Vadodara Mahanagar Seva Sadan

Location: _____

Month / Year: _____

Filled by: _____

Date	Total complaints received	Total complaints resolved within 24 hours
1		
2		
3		
...		
...		
31		
Total		

Database from software is compatible with MS Access and MS Excel.

Minimum frequency of measurement

: Monthly

Smallest geographical jurisdiction of measurement

: Zone/ DMA Level

Extent of cost recovery in sewage management

$$\text{Cost recovery in sewage management} = \frac{\text{Total annual operating revenues}}{\text{Total annual operating expenses}} \times 100$$

Minimum frequency of measurement

: Annually

Smallest geographical jurisdiction of measurement

: ULB Level

Annual operating expenses should be calculated from the actual budget by summation of the expenses incurred against each of the following 35 codes.

Budget Code	Headings
Regular Staff and Administration	
B0501101	Permanent staff(schedule no. 88)
	Permanent staff on work site (schedule no. 89) Sewage laboratory staff
	Permanent staff(schedule no. 90)
B0502101	Permanent staff(schedule no. 91)
	Permanent staff on work site (schedule no. 92) Sewage laboratory staff
Outsourced /Contract Staff Costs	
B0501201	General contingency
B0501202	General contingency
B0502201	General contingency
B0502202	General contingency
Electricity Charges /Fuel Costs	
B0501401	electricity bill
B0502421	electricity bill
Parisist 6 electricity	electricity bill
Chemicals Costs	
B0501330	Sewage laboratory chemicals and glassware maintainance
B0501303	store
B0502344	store(ward)
Others (Specify)	
B0501329	Inspection fee
B0502342	water prevantion and control pollution cess act 1987
B0504301	Maintainance of Toilet & Urinal electric light and connection in chawl,tribal area,slum?(ward)
B0504302	sulabh toilets

Budget Code	Headings
Repairs/Maintenance Costs	
B0503301	gutter maintainance by ward
B0501301	to buy oil and equipment
B0501302	Underground sewerage maintainance
B0501328	pumping station maintainance
B0502301	to buy oil and equipment
B0502343	temporary pump maintainance
B0503302	store(ward)
B0503303	underground sewerage maintainance by ward
B0503304	store
B0503305	drainage line cleaning by ward
B0503306	store(ward)
B0503307	drainage pressure and gravity line maintainance and inspection,imergency work
B0503308	store(ward)
B1303301	storm water drainage maintainance
B1303302	store
Parisist 6 nibhavani	maintainance
Parisist 6 store kharidi	store(ward)
Contractor Costs for O&M	
B1303201	General contingency
B0503309	drainage line cleaning and to run contract basis temporary electric & dieseal pump

Extent of cost recovery in sewage management

Annual operating expenses (Rs crores per quarter)

Annual operating revenues (Rs crores per quarter)

Existing DCB Table

1

2

ALL WARD																															
Sl. No.	Hos. of property	No. of bills	Category	Property Tax Demand				Disputed Property Tax Demand				Recoverable Property Tax Demand				Recovered Demand (As on 31-1-2012)				Recoverable Out Standing Demand				percentage of Total Demand				percentage of Recoverable Demand			
				Rental base property tax Demand	Arrears 03-04 To 10-11	current (2011-12)	Total	Rental base property tax Demand	Arrears 03-04 To 10-11	current (2011-12)	Total	Rental base property tax Demand	Arrears 03-04 To 10-11	current (2011-12)	Total	Rental base property tax Demand	Arrears 03-04 To 10-11	current (2011-12)	Total	Rental base property tax Demand	Arrears 03-04 To 10-11	current (2011-12)	Total	Rental base property tax Demand	Arrears 03-04 To 10-11	current (2011-12)	Total	Rental base property tax Demand	Arrears 03-04 To 10-11	current (2011-12)	Total
Property Tax	447664	548924	All	542.67	5496.92	8901.25	14540.84	383.04	1662.87	441.71	2487.62	159.63	3834.05	8459.54	12453.22	18.72	1123.56	6551.92	7694.2	140.91	2710.49	1907.62	4759.32	3.45	20.44	73.61	51.50	11.73	29.30	77.45	61.78
Corp. Tax				2388.67	2285.15	0.01	4673.83	1628.02	1129.83	0	2755.85	762.65	1155.32	0.01	1917.96	15.24	198.23	21.53	235	747.41	957.09	-21.52	1682.98	0.64	8.67	5.03	2.00	17.16	#DIV/0!	41.89	
Water Tax				7.56	22.1	0	29.66	4.1	9.16	0	13.26	3.46	12.34	0	16.4	0.04	3.11	3.72	6.87	3.42	9.83	-3.72	9.53	0.53	14.07	#DIV/0!	23.16	1.16	24.03	#DIV/0!	
Notice Fee				0.13	0.42	0	0.55	0.06	0.16	0	0.22	0.07	0.26	0	0.33		0.07	0.15	0.22	0.07	0.19	-0.15	0.11	0.00	16.67	#DIV/0!	40.00	0.00	26.92	#DIV/0!	
Warrant Fee																															
Total				2939.03	7804.59	8901.26	19644.38	2013.22	2802.02	441.71	5256.95	925.81	5002.57	8459.55	14387.95	34	1324.97	6577.32	7936.29	891.81	3677.6	1882.23	6451.64	1.16	16.98	73.89	40.40	3.57	26.49	77.74	61.18
Water Charge				186.74	3462.7	3520.07	7170.11	68.18	490.38	107.11	665.67	118.56	2972.32	3413.56	6504.44	8.59	444.36	2506.84	2959.79	109.97	2527.96	906.72	3544.65	4.60	12.83	71.20	41.28	7.25	14.95	73.44	45.50
Water chg. Interest				0	663	0	663	0	103.46	0	103.46	0	559.54	0	559.54		66.45	0.1	66.55	0	493.09	-0.1	492.99	#DIV/0!	10.02	#DIV/0!	10.04	#DIV/0!	11.88	#DIV/0!	11.89
Total				186.74	4125.7	3520.07	7833.11	68.18	593.84	107.11	769.13	118.56	3531.86	3413.56	7063.98	8.59	510.81	2506.94	3026.34	109.97	3021.05	906.62	4037.34	4.60	12.38	71.21	38.64	7.25	14.46	73.44	42.84
Sp.Sani. Crss (For rental base)				1.02	0	0	1.02	0.68	0	0	0.68	0.34	0	0.34	0.01	0		0.01	0.33	0	0	0.33	0.98	#DIV/0!	#DIV/0!	0.98	2.94	#DIV/0!	#DIV/0!	2.94	
Cons. & Sewerage Tax				441.7	1089.52	2729.12	4260.34	307.7	280.9	145.75	734.35	134	808.62	2583.37	3525.99	14.49	256.61	1937.98	2209.08	119.51	552.01	645.39	1316.91	3.28	23.55	71.01	51.85	10.81	31.73	75.02	62.65
Cons. & Sewerage Tax Interest				0	226.8	-0.01	226.79	0.71	103.97	0	104.68	-0.71	122.83	-0.01	122.11		30.78	6.71	37.49	-0.71	92.05	-6.72	84.52	#DIV/0!	13.57		16.53	0.00	25.06		30.70
Cons. & Sewerage Tax Notice Fee				0	5.05	0	5.05	0	1.64	0	1.64	0	3.41	0	3.41		0.9	1.33	2.23	0	2.51	-1.33	1.18	#DIV/0!	17.82	#DIV/0!	44.16	#DIV/0!	26.39	#DIV/0!	65.40
Total				442.72	1321.37	2729.11	4493.2	309.09	386.51	145.75	841.35	133.63	934.86	2583.36	3651.85	14.5	288.29	1946.02	2248.81	119.13	646.57	637.34	1403.04	3.28	21.82	71.31	50.05	10.85	30.84	75.33	61.58
File Tax				7.79	29.7	3.43	81.19	5.28	14.14	3.59	23.01	2.51	15.83	39.84	58.18	0.85	5.39	31.54	37.78	1.66	10.44	8.3	20.4	10.91	17.98	72.62	46.53	33.86	24.05	79.17	64.94
File Tax Notice Fee				0	0.29	0.65	0.94	0	0.1	0	0.1	0	0.19	0.65	0.84		0.03	0.03	0.06	0	0.16	0.62	0.78	#DIV/0!	10.34	4.62	6.38	#DIV/0!	15.79	4.62	7.14
Total				7.79	30.26	4.08	82.13	5.28	14.24	3.59	23.11	2.51	16.02	40.49	59.02	0.85	5.42	31.57	37.84	1.66	10.6	8.92	21.18	10.91	17.91	71.62	46.07	33.86	33.83	77.97	64.11
Safal Charge				0	175.13	512.11	687.24	0	31.94	22.86	54.8	0	143.19	489.25	632.44		47.07	334.44	381.51	0	96.12	154.81	250.93	#DIV/0!	28.88	65.31	55.51	#DIV/0!	32.87	68.35	69.32
GST Pro. Tax				3576.28	13457.05	15707.23	32740.56	2395.77	3828.55	721.02	6945.34	1180.51	9628.5	14986.21	25795.22	57.94	2176.56	11396.3	13630.8	1122.57	7451.94	3589.92	12164.4	1.62	16.17	72.55	41.63	4.91	22.61	76.05	52.84
Edu.Cess				431.52	1320.05	1938.97	3690.54	284.73	508.44	119.73	912.9	146.79	811.61	1819.24	2777.64	11.68	213.11	1342.29	1567.08	135.11	598.5	476.95	1210.56	2.71	16.14	69.23	42.46	7.95	26.26	73.78	56.42
Edu.Cess Penalty				86.86	218.25	0	305.11	65.34	128.16	0	193.5	21.52	90.09	0	111.61	2.57	24.31	39.34	66.22	18.95	65.78	-39.34	45.39	2.96	11.14	#DIV/0!	21.70	11.94	26.98	#DIV/0!	59.33
Total				518.38	1538.3	1938.97	3995.65	350.07	636.6	119.73	1106.4	168.31	901.7	1819.24	2889.25	14.25	237.42	1381.63	1633.3	154.06	664.28	437.61	1255.95	2.75	15.43	71.26	40.88	8.47	26.33	75.95	56.53
Grand Total				4094.66	14995.35	17646.2	36736.21	2745.84	4465.15	840.75	8051.74	1348.82	10530.2	16805.45	28684.47	72.19	2413.98	12777.9	15264.1	1276.63	8116.22	4027.53	13420.4	1.76	16.10	72.41	41.55	5.35	22.92	76.74	53.21
Equipement				4094.66	14995.35	17646.2	36736.21	2745.84	4465.15	840.75	8051.74	1348.82	10530.2	16805.45	28684.47	72.19	2413.98	12897.11	15383.29	1276.63	8116.22	4027.53	13420.38	1.76	16.10	73.09	41.87	5.35	22.92	76.74	53.63

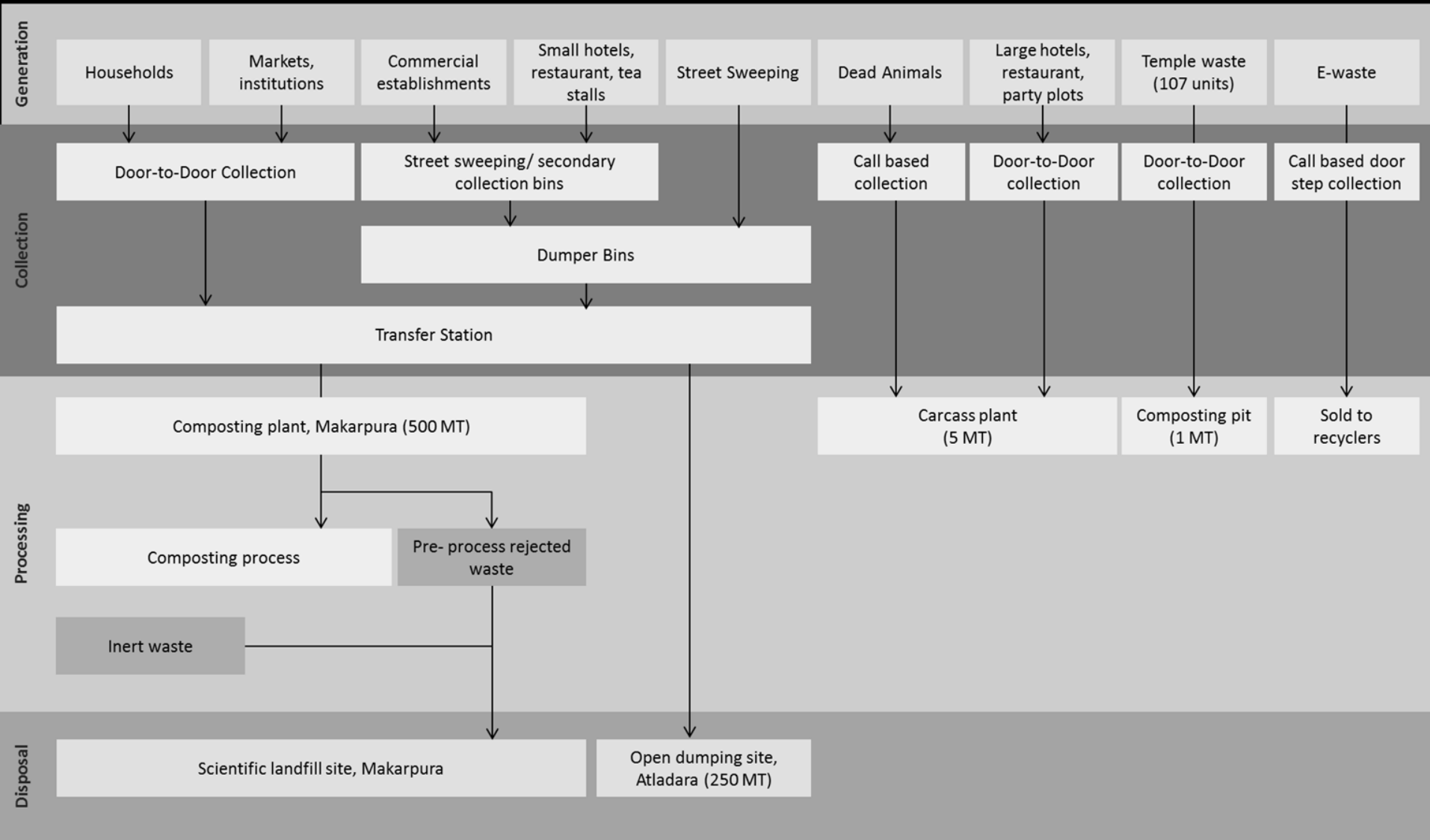
15% of total properties are Commercial properties.

Contents

1. Objectives of ISIP
2. VMSS and service level benchmarking
3. Water supply
4. Sewerage
5. Solid waste management
6. Way forward

Understanding existing solid waste management system in Vadodara

Vadodara – Municipal Solid Waste Flow Diagram

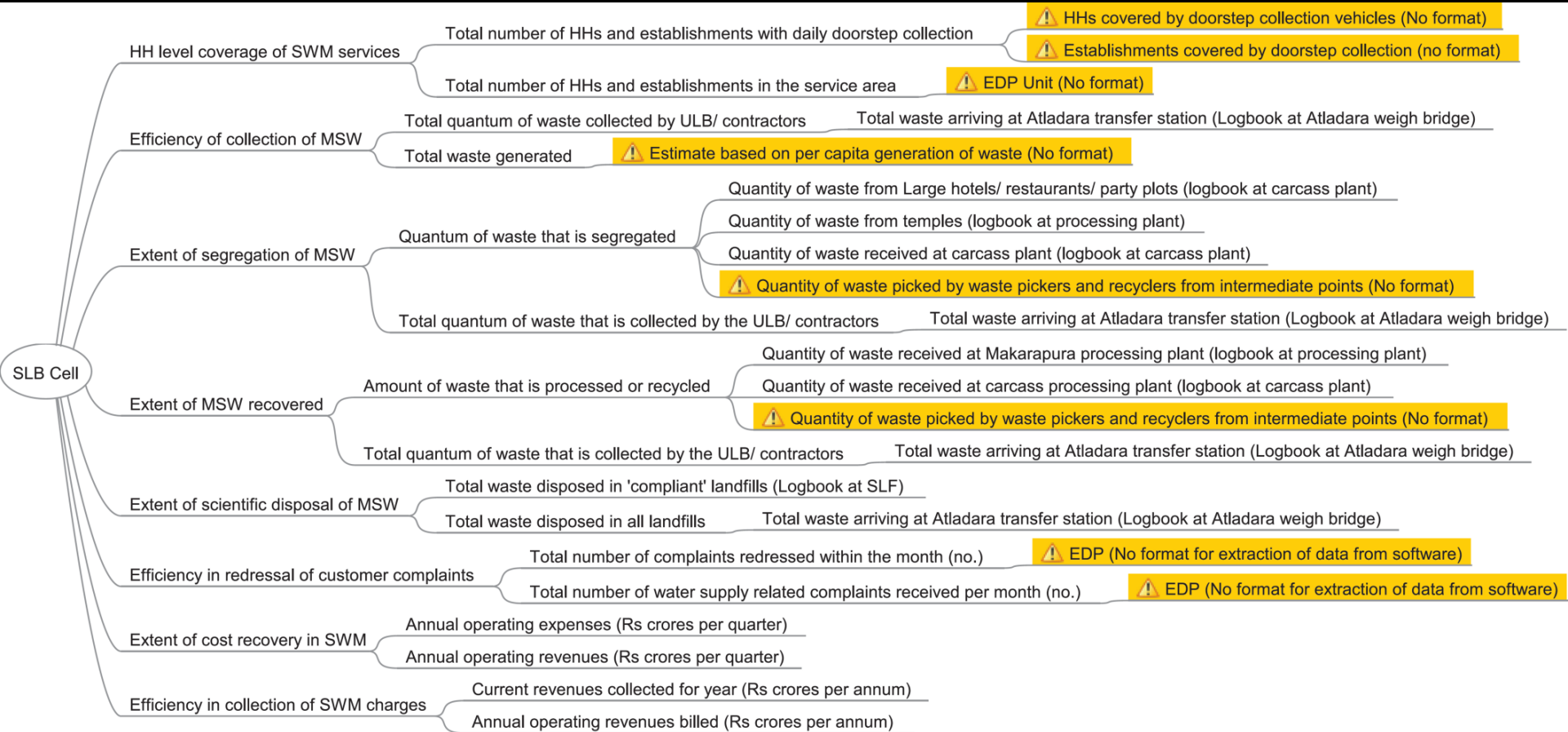


SLB indicators of VMSS in SWM

Definition	2012-13	Reliability
Household level coverage of solid waste management services	100.0	D
Efficiency of collection of municipal solid waste	98.56	B
Extent of segregation of municipal solid waste	0	D
Extent of municipal solid waste recovered	100	B
Extent of scientific disposal of municipal solid waste	100.0	A
Extent of cost recovery in solid waste management services	6.7	B
Efficiency in collection of solid waste management charges	84.2	A
Efficiency in redressal of customer complaints	100.0	B

Department/ officer contributing to SWM		Household level coverage of SWM services	Collection efficiency	Extent of segregation of waste	Extent of recovery of waste collected	Extent of scientific disposal of waste	Efficiency in complaints	Cost recovery	Efficiency in collection of charges
Town Planning									
Dy. Municipal Commissioner (Admin.)	Director (IT) EDPU	✓					✓		
Dy. Municipal Commissioner (General)	Chief Accountant UCD Department Asst. MC Revenue							✓	✓
City Engineer	Exec. Engineer (Water Supply)								
Additional City Engineer	Exec. Engineer (Drainage) Exec. Engineer (Mech. & SWM)		✓	✓	✓	✓			

SWM Information Flow Diagram for SLB Indicators Generation



Contents

1. Objectives of ISIP
2. VMSS and service level benchmarking
3. Water supply
4. Sewerage
5. Solid Waste Management
6. Summary of recommendations

Summary of Recommendations for ISIP in Water Supply in VMSS

S. No.	Proposed/ Modified	Form No.	Title of the form
General			
1	Proposed	Form GE01	Households, properties and establishment details
2	Existing	Form GE02	Summary of complaints
Water supply			
3	Proposed	Form WS01	Bulk flow meter readings
4	Proposed	Form WS02	Quantity, duration and pressure of water at consumers' end
5	Proposed	Form WS03	Summary of quality of water
Sewerage			
6	Modified	Form SE01	Bulk flow measurement of sewage inflow, sewage bypassed and treated water produced by STP
7	Proposed	Form SE02	Quantity of water produced by borewells
8	Proposed	Form SE03	Number of HHs without individual toilet and not within walking distance (150 metre) of a public toilet
Solid waste management			
9	Proposed	Form SW01	Households and establishments covered by door-to-door collection of waste
10	Proposed	Form SW02	Waste segregation
11	Proposed	Form SW03	Waste recovered in the city
12	Existing	Form SW04	Total waste collection
13	Existing	Form SW05	Waste disposed at scientific landfill site

Budget for implementation of ISIP

The following table provides a detailed budget estimate for implementation of the recommendations of this ISIP. The key categories of budgeting are:

Items	Amount (INR)
Computerisation	32,10,000
Setting up SLB cell	14,80,000
Water Supply	3,94,20,000
Sewerage	1,01,50,000
SWM	65,00,000
TOTAL	6,07,60,000

The costs are either one-time costs (such as infrastructure) or annual recurring costs (such as salaries, consumables, etc.).

Year 1 cost - INR 6.07 crores
Annual recurring cost of - INR 2.33 crores.



Way forward

1. Explore technological options for automated SMS/ GPRS based meter/ valve operation data recordings mechanisms and assess their suitability for water supply system in VMSS.*
2. Design dashboards for staff at various levels (Junior Engg., Deputy Executive Engg., Executive Engg., Additional City Engg., City Engg., Municipal Commissioner, etc.) based on their needs.
3. Design/ modify/ augment internal data flow and reporting within VMSS.

Note:

* Based on the existing situation assessment, it revealed that VMSS has minimal reliable data recording practices/ equipment, and hence most of the indicators fall in reliability grade D. In order to implement any ISIP initiative, a bulk metering to assess the total quantity of water supplied is absolutely essential. With this premise, in order to proceed with the ISIP the following hardware/ equipment installations are necessary

- Installation of bulk meters at all sources (4 French Wells & 100+ tubewells) and 27 WDS
- Installation of automatic (SMS/ GPRS based) data recording devices and software at all bulk meters
- Installation of bulk meters and devices to record valve operation timings for 2000+ valves in the distribution network alongwith installation of SMS/ GPRS based automatic recording devices
- Software for data compilation, processing and reporting

Form GE01: Households, properties and establishment details

Vadodara Mahanagar Seva Sadan

EDP Unit

Month / Year:

Filled by:

Households, properties and establishment details							
Ward No.	Total population in service area	Total number of households in service area	Total number of properties in service area	Total number of households served with individual water supply connection	Total number of properties with sewerage connection	Total number of properties with septic tank/ soak-pits	Total number of properties with individual toilet
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
Total							

To be filled once a year by EDP Unit.

Assumptions:

The OSD Census or planning department undertakes population projection exercise and providing the information to EDP unit.

Revenue department conducts property tax re-assessment every 4 years. While filling the forms, they record properties with access to septic tanks/ soak-pits. This information should be transferred to EDP unit annually.

During the property tax reassessment, the form would include additional information about whether the HH has an individual toilet. This information would also be transferred to EDP unit annually.

Form GE02: Summary of complaints

Vadodara Mahanagar Seva Sadan

Location: _____

Month / Year:

Filled by:

Date	Total complaints received	Total complaints resolved within 24 hours
1		
2		
3		
...		
...		
31		
Total		

Vadodara Mahanagar Seva Sadan

Location: _____

Month / Year:

Filled by:

Date	Reading at 0000 hrs	Quantity of Water Pumped (Litre)
1		-
2		-
3		-
...		-
...		-
...		-
31		-
Total		-

Assumptions

Bulk flow meters are installed at all bulk production points and reading is taken daily.

Note: Meter readings have to be taken at the same time daily. This time can be fixed as per convenience.

Vadodara Mahanagar Seva Sadan

Location: _____

Month / Year: _____

Filled by: _____

Date	Total samples taken			Total Samples Passed		
	Source/ Outlet of WTP	Intermediate Point	Consumer End	Source/ Outlet of WTP	Intermediate Point	Consumer End
1						
2						
3						
4						
..						
..						
..						
31						
Total samples tested :						
Total samples passed :						

Vadodara Mahanagar Seva Sadan

Ward name/ no. : _____

Month / Year:

Filled by:

S. No.	Property tax number of the property	Number of borewells	Estimated water produced from borewells
1			
2			
3			
..			
..			
..			
n			
Total			

Vadodara Mahanagar Seva Sadan

Ward name/ no. : _____

Month / Year:

Filled by:

Ward No.	Number of HHs without individual toilet and not within walking distance (150 metre) of a public toilet
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total	

Vadodara Mahanagar Seva Sadan

SWM Department

Month / Year:

Filled by:

Households and establishments covered by door-to-door collection of waste

Ward No.	Total residential properties service area	A. Total residential properties covered by door-to-door collection of waste	Total non-residential properties service area	B. Total non-residential properties covered by door-to-door collection of waste	Total properties covered by door-to-door collection of waste (A+B)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total					

Vadodara Mahanagar Seva Sadan

SWM Department

Month / Year:

Filled by:

Waste segregation						
Date	A. Intake at Carcass plant	B. Intake at composting pit (Kamatibaug)	C. Waste picked by waste pickers/ recyclers	D. Segregated waste intake at proposed composting plant (Atladara)	E. Segregated waste intake at Makarpura composting plant	Total segregated waste (A+B+C+D+E)
1						
2						
3						
...						
...						
...						
31						
TOTAL						

Vadodara Mahanagar Seva Sadan

SWM Department

Month / Year:

Filled by:

Waste recovered in the city

Date	A. Intake at composting pit (Kamatibaug)	B. Waste picked by waste pickers/ recyclers	C. Waste intake at proposed composting plant (Atladara)	D. Waste intake at Makarpura composting plant	E. Waste intake at _____ processing plant (for new facilities developed)	E. Waste processed by all private neighbourhood plants	Total waste recovered
1							
2							
3							
...							
...							
...							
31							
TOTAL							



Thank you.