BANGALORE WATER SUPPLY AND SEWERAGE BOARD
Revenue Billing and Collection System

1. Background

Bangalore is one of the fastest growing cities in Asia and also the IT hub of India, renowned as the silicon valley of India. Bangalore is also called the garden city because of its lush greenery.

Evolution of Water supply to Bangalore

The people of Bangalore were using open wells, lakes and kalyanies as water sources prior to 1896. The first piped filter water supply was started in the year 1896 from Hesaraghatta lake built across river Arkavathy. Raw water was pumped to CJF (Combined Jewel Filter) where it was treated and supplied. The supply was augmented in the year 1933 Chamaraja Sagar Reservoir built across river Arkavathy at T.G.Halli, on down Stream of Hesaraghatta Lake. The water supply was managed by the city corporation till 1964. Due to increase in population & demand the present source was not adequate and dependable. To bring water from perennial source like river Cauvery with external assistance, the World Bank insisted to form an independent Board. The Bangalore Water Supply and Sewerage Board was formed in 1964.

Revenue Billing and Collection System

BWSSB Ganakeekrutha Grahakara Seve (BGS) - Revenue Billing and Collectiion System of Bangalore Water Supply and Sewerage Board (BWSSB) is delivering G2C services to more than five lakh citizens of Bangalore which is managed by 36 sub division offices. All the 26 Subdivision offices are well connected through LAN and offer many services of BWSSB to the citizens of Bangalore. Services offered at these centers are transparent, empowering the people in real terms and generally provide a more responsive and empathic administration. The stakeholders include all the officers of Bangalore Water Supply and Sewerage Board, Bangalore – One (Single Window Collection System) and Banks handling Electronic Clearance. Many stakeholders are involved in successful e-Governance – Government officials, citizens, system integrators and vendors who help to put together and later support the

BGS System. These Stakeholders were consulted at different stages in the project from the Requirement Analysis to successful implementation. An IT Team was formed with Chair Person of BWSSB, Financial Advisor, Chief Engineers, Executive Engineer and Field Level officers to review the SRS and the progress of the project executed by National Informatics Centre (NIC), Bangalore. NIC deployed a Team of Professionals to complete the process in the specified time frame. The application was tested by the third party identified by BWSSB before rolling out to the subdivisions. After the success of the pilot run the project has been deployed in the Subdivisions. Feedback from all the levels was collected which helped in improving the application regularly.

2. Situation Prior to the Initiative

Before computerizing the Revenue Billing activity**,** manually written bills were issued. These bills were not giving clear picture about the consumption and other details to the consumer. Most of the time the percentage of accurancy of the bill was very less. Manual ledgers were maintained by ledger clerks. As it is said to err is human, errors were dominating the ledger details. MIS reports required to improve the overall efficiency were not available.

- In the manual system, the meter reader visits the customers place notes down the current meter reading and gives the details to the concerned dealing assistant who calculates the consumption and arrives the amount to be paid by the customer as per the consumption.
- There is every possibility that the human errors can be committed by the meter reader while calculating the consumption, bill by applying various types of tariff and customer type.
- For every 400 customers one ledger was maintained wherein details of consumption, bill raised, amount realized, balance etc. for each of the customer in respective ledger folio.
- Customers have to visit respective sub divisional cash counter centers which is located at BWSSB service station, sub divisional office for payment. These counters were opened for 4 hours during office hours.
- The payment details are updated in the concerned ledger folio of the customer by the dealing assistant.

- Any information customer requests BWSSB, the details has to be referred to the ledger. Similarly for the top management of the Board the information has to be manually compiled sub-division wise by referring to the ledgers, which is a time consuming process. This may also lead to error in the final statement like Demand Collection Balance.
- The top management could not review some of the cases like house locked, meter damaged, abnormal or subnormal consumption, faulty meters, arrears etc.
- Large number of manpower has to be deployed of processing the bills and updating the ledgers.
- The ledger folio, meter reading etc. are not tamper proof.
- Errors in reconciliation of bills paid and delay in money deposited in the bank was an issue
- The citizens have to visit a number of times in getting new water and sewage connection.
- There was no mechanism to verify whether the grievances of the citizens were addressed by the concerned official.
- The management could not have the number of customers, category wise in each sub divisions. Also consumption details, pumped details and loss of water could not be arrived.

3. Objectives and Aims

- Computerization of Revenue Billing and Collection Process
- Citizen should get error free bill
- Citizen should be able to pay the bill at their convenient time and place
- The complete billing process to be transparent
- Citizen should get the services from the respective sub divisions without any hassles
- GIS based customer details
- Top Management should be able to get the accurate Demand Collection and Balance
- Monitor cases like door locked, meter damaged, meter not working, abnormal and sub normal consumption etc.
- Work flow based New Connection

4. Strategies Adopted and Implementation Process

Strategies Adopted

- National Informatics Center has studied the manual system, existing sub divisional level computerization and the requirements of BWSSB
- The existing procedure of generation of bills at Sub Divisional office has to continue so that the concerned Sub Divisional Staff can own the operations.
- With the existing technology and resources, it was decided that Citizens could pay their bills ANY WHERE ANY TIME instead of standing in long queues at respective Sub Divisional cash counters.
- Complete billing process, ledger maintenance etc. should be transparent
- Primary and secondary servers were installed with five client systems at each of the 26 sub divisional offices
- All the sub divisional offices, divisional offices and head office were networked though leased line.
- 74 Cash Collection KIOSKs (ATM) were installed at existing cash counters and also at strategic locations which are convenient to the citizens of Bangalore to pay their water and sewerage bills.
- Citizens can also opt for payment of their water bill through ECS facility.
- BangaloreOne data center is connected to the BWSSB Head Office through leased line, so that the citizen can pay their bills in any of the BangaloreOne center.
- The complete billing and collection process is handled by the BWSSB employees
- The software was designed and developed by NIC and audited by third party
- Any change in the customer details like commercial / domestic connection, bore size, meter reading, write off etc. is through Bio-metric authentication
- Audit trial is enabled so that each and every crucial transaction is recorded.
- Access to the BGS application is through user login and passwd
- The bill should be Barcoded so that the details cannot be tampered
- Spot Billing

Implementation Process

The citizens are the primary stakeholders in any equation of governance, and it is their right to expect service from public servants. BGS strive beyond public expectation in setting the standards of service. Pre-fixed Reading Days for Meter Readers and Monitoring the Abnormal, Subnormal Consumption, Issuing of bill showing detailed demand and previous month Collection details are few unique services offered by the BGS System. Different levels of Security is maintained in the system - the Bill is secured by BARCODE, Cash Counter information are Encoded with MAC Address of the System. Biomatric Authentication is implemented for major operations and Audit trailing is enabled for major events. The Collection Centres of BGS are 74 KIOSKS Accepting Cash/Cheque , Bangalore One , Cash Counters attached to each Subdivision and ECS Clearance System. The Collection Data is Captured at the above Centres through the BARCODE Reader and transmitted to the Head office. From Head office the data is posted to the respective Subdivisions through SQL Replication. ANY WHERE ANY TIME PAYMENT is an additional facility provided to the citizen. The System manages the Collection facility through SQL Merge Replication Technology which runs 24X7. Single bill with Multiple Payment and Multiple Bills with Single payment are also accepted in these centres. With all these facilities there has been a sustained increase in collection and the system is helping Customers and the Department. After seeing the success the department has integrated workflow based New Water Connection Module and SPOT Billing is another service which gives openness and transparency in billing and this ensured more speedy and fool proof working of the department. Facility is provided for the Customers to lodge their Grievance through BWSSB Website and IVRS System

5. Situation after Implementation of Initiative

- The complete billing and collection process is transparent
- Citizen is happy to pay ANY WHERE ANY TIME from the nearest KIOSK instead of cash counter which were in operation for 4 hours.
- Citizen is able to pay the bill as and when they find time and convenient location. For example when citizen goes for morning or evening walk or BDA shopping complex etc., the bills are paid since the Cash KIOSK is operational 24 X 7
- Citizens pay at their convenient time instead of waiting till due date. This has benefited the Board by reducing the credit time (interest to be paid to bank)
- Responsibility of each task is well defined for each of the BWSSB staff

- Biometric Authentication for vital process made the Data secure
- Revenue has increased substantially
- New Water Connection to the citizens is through workflow model
- Databank was made with proper validations and Auditing
- Security in Bill, Receipts are introduced by BARCODE
- Improved the efficiency of BWSSB and achieved strong customer relation
- SPOT Billing made the Meter reader to reduce the traveling by a single trip and openness in the process
- Any time the Demand Collection Balance can be obtained
- During water adalat any issue with respect to the error in bill can be corrected in the systems through biometric authentication. Similarly, any issues pertaining to water supply or sanitation etc. for which action are initiated so that the citizens are not deprived of water which is a basic and essential for mankind.
- Complaints received through IVRS and attended by the concerned AEE and the same is updated. Citizen can query the complaint by inputting the complaint number through IVRS to know the status of the complaint.
- Operation costs of Revenue Billing and Collection has reduced

6. Outputs and outcomes

- Citizen is happy to pay ANY WHERE ANY TIME from the nearest KIOSK which functions 24x7, instead at cash counters, which were in operation for 4 hours on working days
- Citizen can also pay the bill by opting for ECS facility
- Citizens pay at their convenient time instead of waiting till due date.
- Early payment has benefited the Board by reducing the credit time
- Revenue has increased substantially from Rs.180 Crores to Rs.455 Crores over a period of time.
- New Water Connection to the citizens is through workflow model so that the citizen can know his / her application status
- Security in Bill, Receipts are introduced by BARCODE
- Improved the efficiency of BWSSB and achieved strong customer relation
- SPOT Billing made the Meter reader to reduce the traveling by a single trip and openness in the process

- Any time the Demand Collection Balance can be obtained
- Day to day interaction with consumers regarding for improved services.
- 99 % of water connections are metered and 100 % billed.
- Citizen gets error free and tamper proof water bill.
- By implementing e-governance the BWSSB revenue has increased
- No user charge is collected from the citizen towards computerization

Future Plan

- Internet payment of bills
- Bill and payment alerts through SMS for those opted for the facility
- Payment through mobile
- Grievances / complaints through SMS and their redressal updated through SMS
- Integration of consumption through BGS and SCADA data (main pumping station)
- Establishment of Data Center

Number of Users and Services

The following table shows the number of consumers using the above System in Bangalore. Around Five lakhs Customers are using the services. Around 65% of the total Customers are through Kiosk and 30 % are in Bangalore One and the rest are in CashCounters, ECS etc.

SubDiv	Metered connections	UnMetered connections	Total no. of connections
1	2	3	4
C-1	18966	319	19285
C-2	12787	491	13278
C-3	18146	158	18304
Total	49899	968	50867
E-1	23098	20	23118
E-2	22313	630	22943
E-3	28264	296	28560
E-4	3550	0	3550
E-5	1621	0	1621
Total	78846	946	79792
N-1	30429	454	30883
N-2	15237	242	15479
N-3	31182	380	31562
N-4	10295	147	10442
S-1	24191	296	24487
S-2	27483	436	27919
S-3	17822	168	17990
S-4	33921	635	34556
S-5	12777	72	12849
Total	116194	1607	117801
SE1	24949	153	25102
SE2	22740	120	22860
SE3	16388	240	16628
Total	64077	513	64590
W-1	31473	325	31798
W-2	32552	272	32824
W-3	25948	1219	27167
W-4	28916	181	29097
W-5	18330	66	18396
W-6	4854	1	4855
Total	142073	2064	144137

Total Number of Users/Connections	545553

7. Sustainability

It is important that BGS is designed in a financially, legally, and technologically sustainable manner. NIC is the technology partner, consultant, developer and implementer of BWSSB projects. Software was developed using Microsoft based Visual Basic and SQL Server 2000/2005 with Barcode and Biometric technology. All The Core business Logic / procedures are written as Database level Procedures. The core BGS systems was given to reputed third party for testing the functionally and security. The Board has recruited 4 Technical Engineers and two temporary staff specialized in Software to support the smooth implementation of the project under the Guidance of NIC. NIC has given Training to all subdivision staff at the operator, supervisory and Officer Levels. Since BGS is citizen centric application and water distribution, billing and collection is core business of BWSSB, NIC has place team at BWSSB head office to address any critical issues and enhancement of the application.

8. Potential for replication

- The Revenue Billing and Collection Software can be replicated in other Water Boards, Urban Local Bodies, and Municipalities etc.
- By seeing the success and sustainable the Software was also implemented at Mandya District in Karnataka
- The software was also implemented at 5 demonstration zones at Belgaum, Dharwad and Gulbarga Districts in Karnataka
- Other water boards from Kerala and Delhi also studies the success, sustainable story of the BWSSB.

Citizen is paying water bill at one of the 74 KIOSK (ATM)

Special Achievement in GIS Award by ESRI

SPECIAL ACHIEVEMENT IN GIS

A W A R D

Presented to

BWSSB, Bangalore

Karnataka, India

ESRI

ESRI USER CONFERENCE

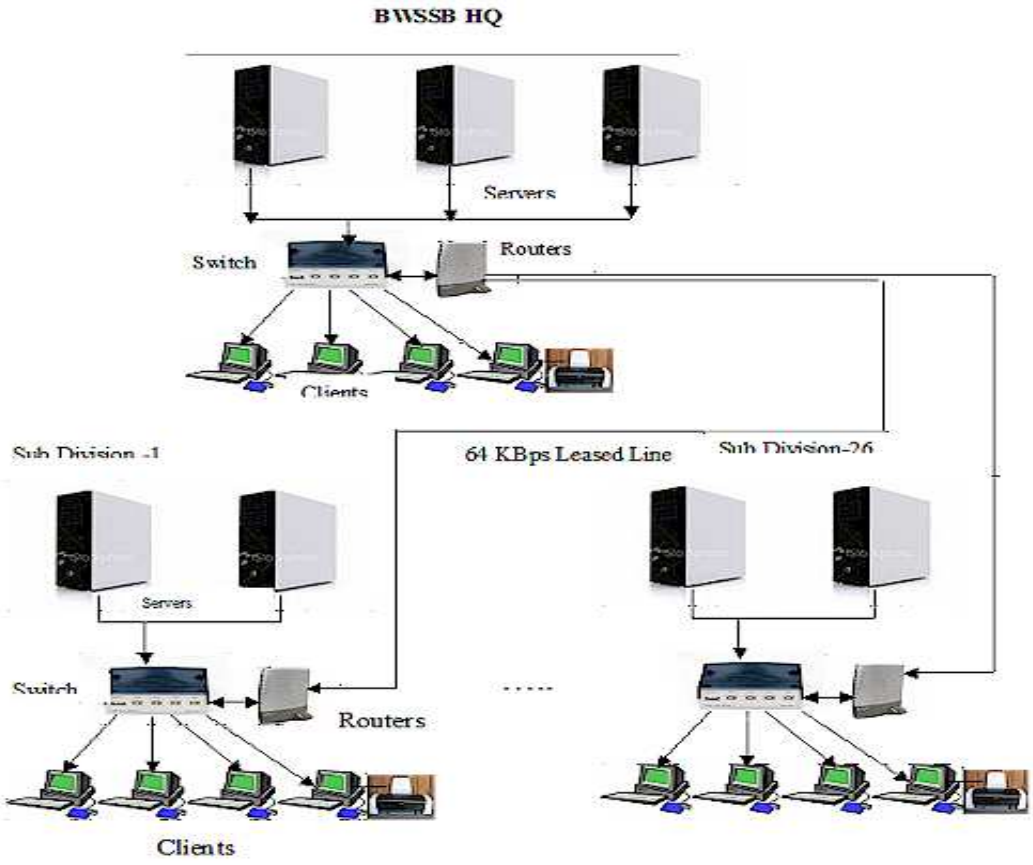
August 2004

San Diego, California

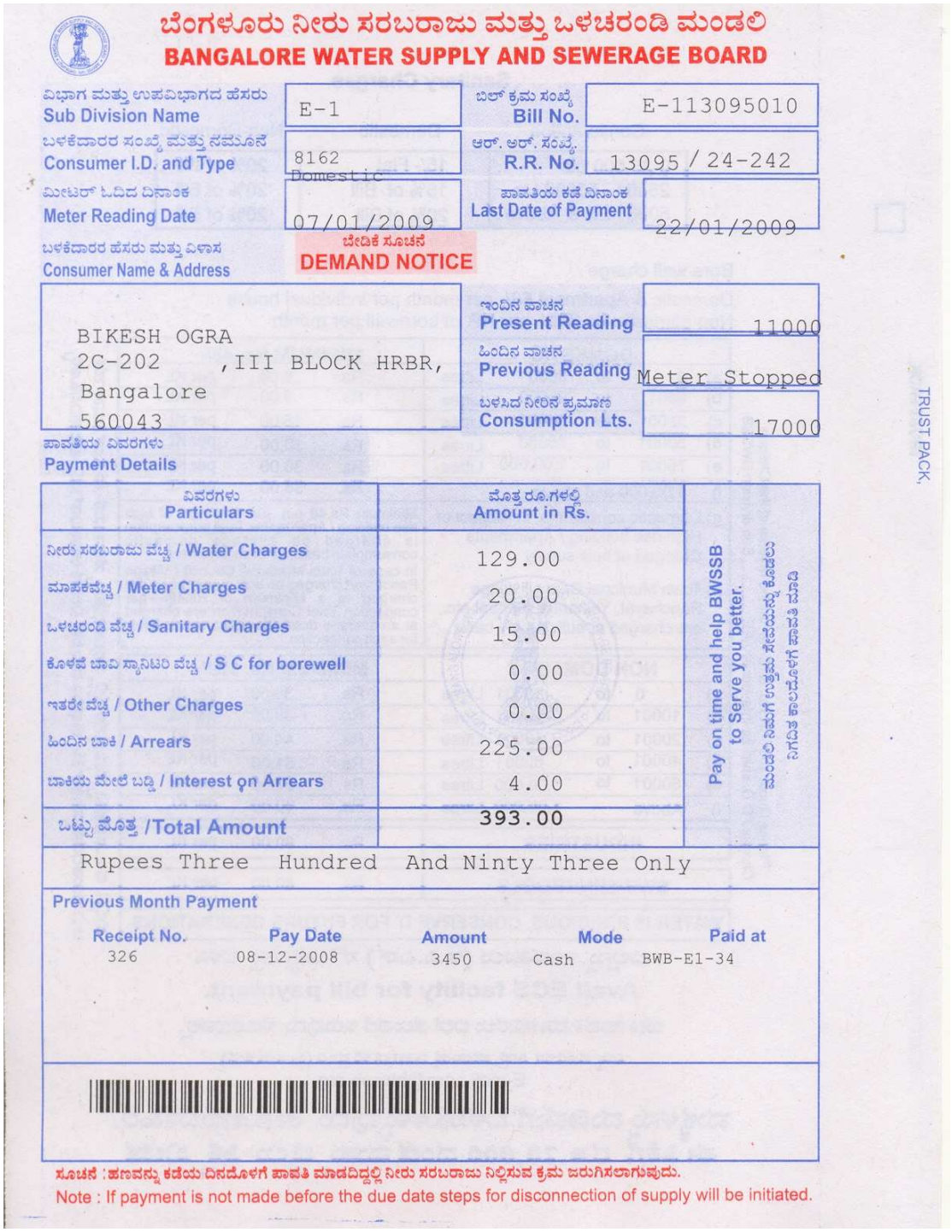
Jack Dangermond

President, ESRI

Present Setup



Regular Bill Generated through the Package and given to the citizen



ಬೆಂಗಳೂರು ನೀರು ಸರಬರಾಜು ಮತ್ತು ಒಳಚರಂಡಿ ಮಂಡಲಿ
BANGALORE WATER SUPPLY AND SEWERAGE BOARD

ವಿಭಾಗ ಮತ್ತು ಉಪವಿಭಾಗದ ಹೆಸರು Sub Division Name	E-1	ಬಿಲ್ ಕ್ರಮ ಸಂಖ್ಯೆ Bill No.	E-113095010
ಬಳಕೆದಾರರ ಸಂಖ್ಯೆ ಮತ್ತು ನಮೂನೆ Consumer I.D. and Type	8162 Domestic	ಆರ್. ಆರ್. ಸಂಖ್ಯೆ R.R. No.	13095 / 24-242
ಮೀಟರ್ ಓದಿದ ದಿನಾಂಕ Meter Reading Date	07/01/2009	ಪಾವತಿಯ ಕಡೆ ದಿನಾಂಕ Last Date of Payment	22/01/2009

ಬೇಡಿಕೆ ಸೂಚನೆ
DEMAND NOTICE

ಬಳಕೆದಾರರ ಹೆಸರು ಮತ್ತು ವಿಳಾಸ
Consumer Name & Address

BIKESH OGRA
2C-202 ,III BLOCK HRBR,
Bangalore
560043

ಇಂದಿನ ಮಾಪನ Present Reading	11000
ಹಿಂದಿನ ಮಾಪನ Previous Reading	Meter Stopped
ಬಳಸಿದ ನೀರಿನ ಪ್ರಮಾಣ Consumption Lts.	17000

ಪಾವತಿಯ ವಿವರಗಳು
Payment Details

ವಿವರಗಳು Particulars	ಮೊತ್ತ ರೂ.ಗಳಲ್ಲಿ Amount in Rs.
ನೀರು ಸರಬರಾಜು ವೆಚ್ಚ / Water Charges	129.00
ಮಾಪಕವೆಚ್ಚ / Meter Charges	20.00
ಒಳಚರಂಡಿ ವೆಚ್ಚ / Sanitary Charges	15.00
ಕೊಳವೆ ಬಾವಿ ಸ್ಯಾನಿಟರಿ ವೆಚ್ಚ / S C for borewell	0.00
ಇತರೇ ವೆಚ್ಚ / Other Charges	0.00
ಹಿಂದಿನ ಬಾಕಿ / Arrears	225.00
ಬಾಕಿಯ ಮೇಲೆ ಬಡ್ಡಿ / Interest on Arrears	4.00
ಒಟ್ಟು ಮೊತ್ತ /Total Amount	393.00

Pay on time and help BWSSB to Serve you better.
ಮಂಡಲಿ ನಿಮಗೆ ಉತ್ತಮ ಸೇವೆಯನ್ನು ಕೊಡಲು ನಿಗದಿತ ಕಾಲದೊಳಗೆ ಪಾವತಿ ಮಾಡಿ

Rupees Three Hundred And Ninty Three Only

Previous Month Payment

Receipt No.	Pay Date	Amount	Mode	Paid at
326	08-12-2008	3450	Cash	BWB-E1-34

ಸೂಚನೆ : ಹಣವನ್ನು ಕಡೆಯ ದಿನದೊಳಗೆ ಪಾವತಿ ಮಾಡದಿದ್ದಲ್ಲಿ ನೀರು ಸರಬರಾಜು ನಿಲ್ಲಿಸುವ ಕ್ರಮ ಜರುಗಿಸಲಾಗುವುದು.
Note : If payment is not made before the due date steps for disconnection of supply will be initiated.

TRUST PACK.

BANGALORE WATER SUPPLY & SEWERAGE BOARD
C-3

TerminalID:012
Date/Time :17-Feb-2009/11:20 AM
Txn No :700

WATER BILL PAYMENT

Transaction Particulars:-

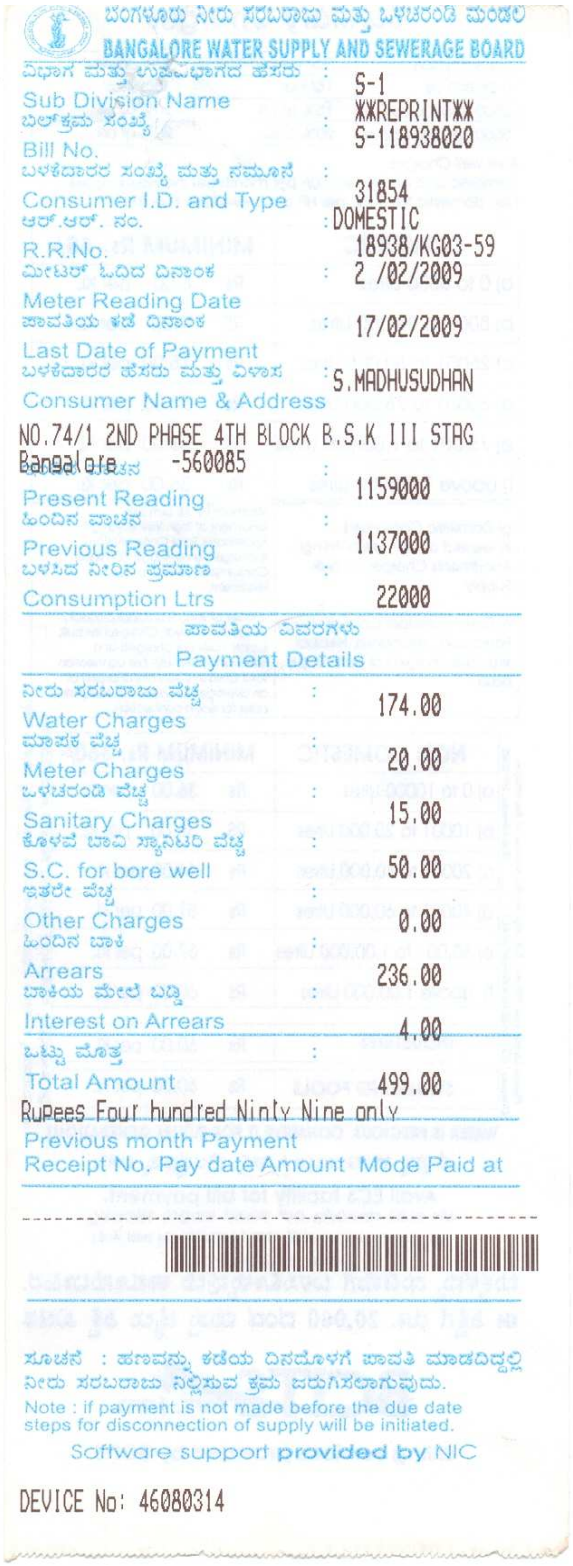
Bill No :N-101804020
Bill Amount:131
Cash Paid :10

Payment Status:

ShortPayment Rs. -121

Hand Held Device for Issue of Spot Billing

Bill Generated through Handheld device



ಬಂಗಳೂರು ನೀರು ಸರಬರಾಜು ಮತ್ತು ಒಳಚರಂಡಿ ಮಂಡಲಿ
BANGALORE WATER SUPPLY AND SEWERAGE BOARD

ವಿಭಾಗ ಮತ್ತು ಉಪವಿಭಾಗದ ಹೆಸರು : S-1
Sub Division Name
ಬಿಲ್‌ಕ್ರಮ ಸಂಖ್ಯೆ : **REPRINT**
Bill No. S-118938020
ಬಳಕೆದಾರರ ಸಂಖ್ಯೆ ಮತ್ತು ಸಮೂಹ : 31854
Consumer I.D. and Type DOMESTIC
ಆರ್.ಆರ್. ಸಂ. : 18938/KG03-59
R.R.No.
ಮೀಟರ್ ಓದಿದ ದಿನಾಂಕ : 2 /02/2009
Meter Reading Date
ಪಾವತಿಯ ಕಡೆ ದಿನಾಂಕ : 17/02/2009
Last Date of Payment
ಬಳಕೆದಾರರ ಹೆಸರು ಮತ್ತು ವಿಳಾಸ : S.MADHUSUDHAN
Consumer Name & Address

NO.74/1 2ND PHASE 4TH BLOCK B.S.K III STAG
Bangalore -560085

ಪ್ರಸ್ತುತ ಓದಿರುವುದು :
Present Reading 1159000
ಹಿಂದಿನ ಪಾಚನ :
Previous Reading 1137000
ಬಳಸಿದ ನೀರಿನ ಪ್ರಮಾಣ :
Consumption Ltrs 22000

ಪಾವತಿಯ ವಿವರಗಳು
Payment Details

ನೀರು ಸರಬರಾಜು ಪೆಟ್ಟಿ : Water Charges 174.00
ಮಾಪಕ ಪೆಟ್ಟಿ : Meter Charges 20.00
ಒಳಚರಂಡಿ ಪೆಟ್ಟಿ : Sanitary Charges 15.00
ಕೊಳವೆ ಬಾವಿ ಸ್ಯಾನಿಟರಿ ಪೆಟ್ಟಿ : S.C. for bore well 50.00
ಇತರೇ ಪೆಟ್ಟಿ : Other Charges 0.00
ಹಿಂದಿನ ಬಾಕಿ : Arrears 236.00
ಬಾಕಿಯ ಮೇಲೆ ಬಡ್ಡಿ : Interest on Arrears 4.00
ಒಟ್ಟು ಮೊತ್ತ : Total Amount 499.00

Rupees Four hundred Ninty Nine only

Previous month Payment
Receipt No. Pay date Amount Mode Paid at

ಸೂಚನೆ : ಹಣವನ್ನು ಕಡೆಯ ದಿನದೊಳಗೆ ಪಾವತಿ ಮಾಡದಿದ್ದಲ್ಲಿ ನೀರು ಸರಬರಾಜು ನಿಲ್ಲಿಸುವ ಕ್ರಮ ಜರುಗಿಸಲಾಗುವುದು.
Note : if payment is not made before the due date steps for disconnection of supply will be initiated.

Software support provided by NIC

DEVICE No: 46080314