City of Carrollton

North Transmission Water Line

American Public Works Association

CARROLLTON
TEXAS

Where Connections Happen

Public Works Project of the Year Nomination

February 2011

Public Works Project of the Year Award
Nomination Form

Deadline **March 1, 2011**
(received, not postmarked)

Project Name
City of Carrollton North Transmission Water Line

Project Completion Date
Must be substantially completed (90%) and available for public use as of December 31, 2010.
April 2009

Public Agency
City of Carrollton, Texas

Project Category
- ☐ Structures
- ☐ Transportation
- ☒ Environment
- ☐ Historical Restoration/Preservation
- ☐ Disaster or Emergency Construction/Repair

Project Division
- ☐ Less than $5 Million
- ☒ $5 Million, but less than $25 Million
- ☐ $25 Million–$75 Million
- ☐ More than $75 Million

Managing Agency

Thomas S. Geier, P.E.
Name

C.I.P. Manager
Title

City of Carrollton
Agency/Organization

1945 E. Jackson Road
Address (if post office box, include street address)

Carrollton TX 75006
City State/Province Zip/Postal Code

972/466-4230 972/466-3193
Phone Fax

thomas.geier@cityofcarrollton.com
E-mail

Primary Contractor

Justin Whitman
Name

Project Manager
Title

S.J. Louis Construction of Texas
Agency/Organization

520 South 6th Avenue
Address (if post office box, include street address)

Mansfield TX 76063
City State/Province Zip/Postal Code

817/477-0320 817/477-0552
Phone Fax

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Primary Consultant

John Birkhoff, P.E.
Name

President
Title

Birkhoff, Hendricks & Carter, LLP
Agency/Organization

11910 Greenville Avenue, Suite 600
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Dallas TX 76063
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jbirkhoff@bhcllp.com
E-mail

Continued...

2011 APWA Projects Awards

Public Works Project of the Year Award
Supporting Data Form

Please address each of the following areas in your supporting documentation, adhering to the sequence below when possible.

- Completion date contained in contract. Any time extensions granted should be addressed in the submittal.
- Construction schedule, management, and control techniques used.
- Safety performance including number of lost-time injuries per 1,000 man-hours worked and overall safety program employed during the construction phase.
- Environmental considerations including special steps taken to preserve and protect the environment, endangered species, etc., during the construction phase.
- Community relations—a summary of the efforts by the agency, consultant and contractor to protect public lives and property, minimize public inconvenience and improve relations.
- Unusual accomplishments under adverse conditions, including but not limited to, adverse weather, soil or site conditions, or other occurrences over which there was no control.
- Additional considerations you would like to bring to the attention of the project review panel, such as innovations in technology and/or management applications during the project.

NOTE: Supporting documentation is **limited to 20 pages,** exclusive of photographs and nomination form. **This submittal will not be returned.** When possible, please provide original photographs (color preferred), as photographs will be used for promotional purposes by the association. Original submittal and all copies should include nomination form and supporting documentation. Six copies of submittal are required.

Nominated by: *(Can only be nominated by managing public agency or APWA chapters.)*

Marc Guy
Name

Assistant City Manager
Title

City of Carrollton
Agency/Organization

1945 E. Jackson Road
Address (if post office box, include street address)

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These materials should be sent to:

Public Works Project of the Year Awards Program
American Public Works Association
2345 Grand Boulevard, Suite 700
Kansas City, MO 64108-2625

2011 APWA Profession Awards

Project Category

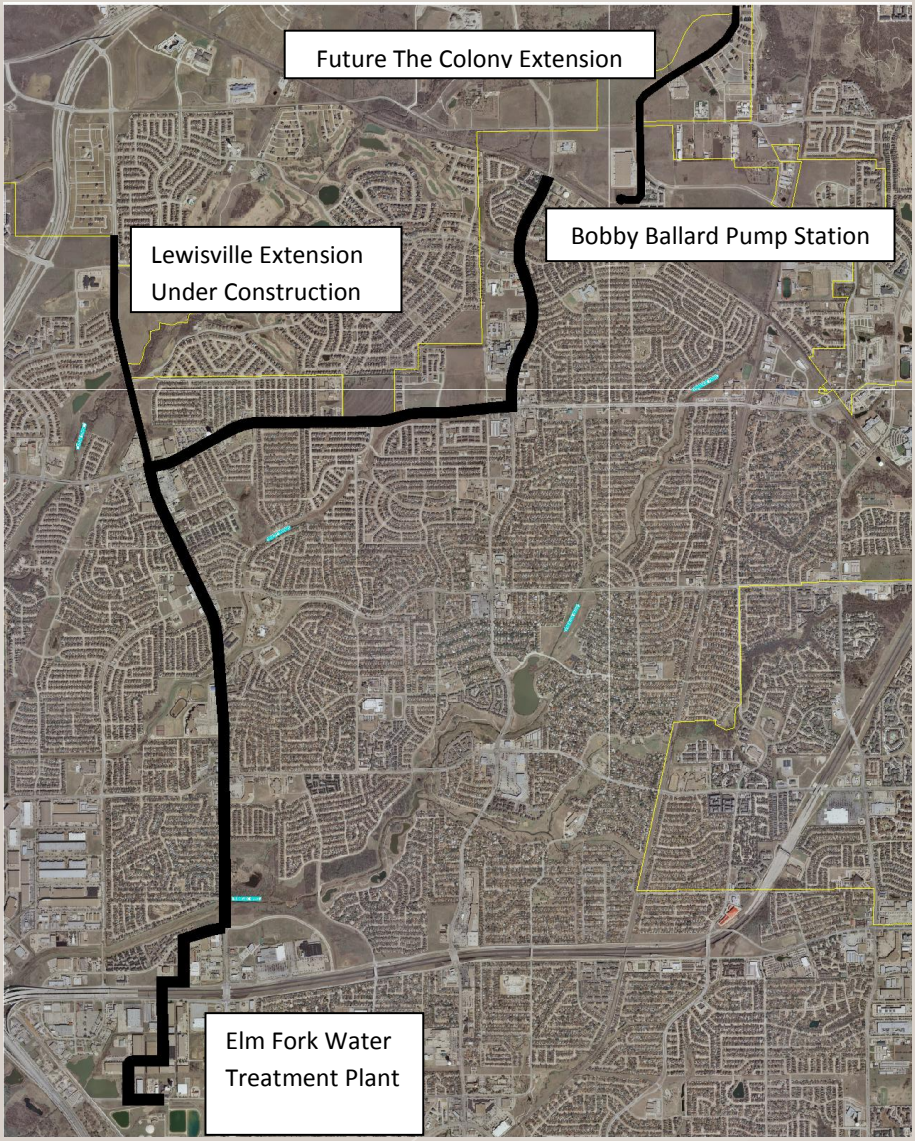
Project Name: City of Carrollton Texas North Transmission Water Line

Division: Projects of $10 million to $100 million

Category: Environmental

Construction Period: April 2007 to April 2009

Project Route



Executive Summary

The North Transmission Water Line project consisted of the construction of a seven mile long water pipeline originating at Dallas Water Utilities' (DWU) Elm Fork Water Treatment Plant located near the center of Carrollton and ending in the northeast section of the city. The line ranges in size from 24 to 54 inches in diameter and incorporated part of an existing 24-inch main that was changed over from a city main to part of the transmission line. The line was constructed in accordance with the city's 2001 Water Master Plan which identified deficiencies and needed improvements to meet future demands.

In the end, the new pipeline was designed and constructed to satisfy the needs of three cities, Carrollton, Lewisville and The Colony, and coordinated with DWU to meet their requirements. By including the cities of Lewisville and The Colony in the project, future additional water lines through Carrollton to serve these cities have been avoided in already crowded right-of-ways. Birkhoff, Hendricks & Conway, LLP provided professional engineering services while S.J. Louis Construction of Texas and Mario Sinacola & Sons constructed the line.

The project was divided into four phases to make it more manageable and to enable more contractors to bid on the project. However, as it turned out, S.J. Louis Construction of Texas wound up with three of the segments (1, 3 & 4) while Mario Sinacola & Sons had one (Segment 2). The four segments were divided as follows:

Segment 1: 3.0 miles, $9,626,816.84
Segment 2: 1.1 miles, $5,383,532.39 (includes a Carrollton parallel line, cost included)
Segment 3: 2.6 miles, $5,645,651.95
Segment 4: 0.4 miles plus meter station, $2,319,541.04
Total Cost: $22,975,542.22

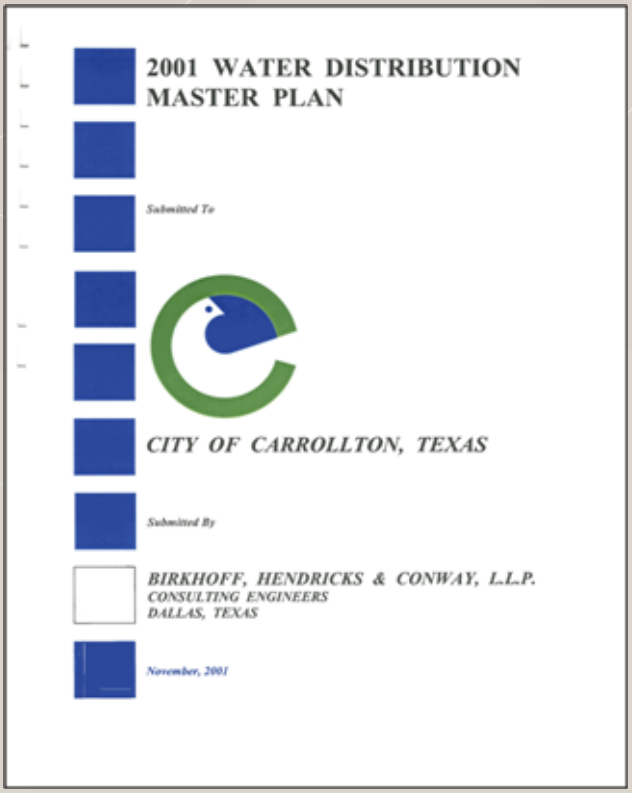
In total, the project consisted of the design and construction of the following components:

- 20,090 LF of 54-inch RCCP Water Mains
- 11,490 LF of 42-inch RCCP Water Mains
- 6,330 LF of 36-inch RCCP Water Mains
- 5,670 LF of 24-inch RCCP Water Mains
- 15 MGD Meter Station
- Upgrade of a 20 MGD DWU Meter Station
- Replacement of 6.2 lane miles of deteriorating pavement
- Traffic Control
- Erosion Control
- Coordination with Dallas Water Utilities, the North Texas Tollway Authority, the Union & Pacific Railroad, and several franchise utility companies

The total project cost was almost $1,000,000 (4.66%) over the original bid price. The increased costs were primarily the result of increasing tunnel or bore lengths to clear existing utilities, line modifications to clear improperly marked and located franchise utilities, and increasing pavement removal and replacement limits. The city has already realized substantial savings in electrical costs with the more efficient pipeline.

Background

A professional services contract to update Carrollton's Drinking Water Master Plan was awarded in May 2000 to identify water system deficiencies and needed improvements to meet future demands (buildout conditions) and ensure continued compliance with TCEQ (Texas Commission on Environmental Quality) standards. The results were presented in the 2001 Water Master Plan and Supplemental Report which identified several improvements including the construction of a new meter station and water main from the Elm Fork Water Treatment Plant (WTP) to the city's north pump station (Bobby Ballard Pump Station). The purpose of the line was to provide for a more efficient operation of the water distribution system by supplying water to Bobby Ballard directly from DWU Elm Fork Water Treatment Plant instead of from Carrollton's central pump station (Don Cline Pump Station).


2001 WATER DISTRIBUTION MASTER PLAN

Submitted To

CITY OF CARROLLTON, TEXAS

Submitted By

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
DALLAS, TEXAS

November, 2001

The new transmission main:

1. freed capacity at Don Cline for Medium Zone Demands,
2. reduced the size of the final two pumps at Don Cline,
3. maximized the use of the city's Bobby Ballard Pump Station,
4. removed the requirement for a third bank of High Zone Pumps at the city's eastern pump station (Columbian Club) and
5. allowed for better hydraulics of existing elevated tanks.

The project was initially focused on Carrollton's water needs only, without consideration of the neighboring cities of Lewisville and The Colony.

As part of the Master Plan and prior to beginning the design phase, meetings were held with DWU regarding delivery points as stated in Carrollton's contract with DWU. Since the north pump station was listed as a possible delivery point, the city wanted to exercise that part of the contract. However, the water would have to be transported to that location for that to occur.

The new transmission main will handle the ultimate flow demand for Carrollton.

The first hurdle to overcome would be to determine who would own and operate the line and by whose design standards the line would be designed to. After several meetings, it was decided that Carrollton would be responsible for all. However, DWU would now be responsible for pumping the water to that delivery point and as a result would have to upgrade their pumps at the treatment plant to meet future demands. Then, as the project was nearing the design phase, Carrollton entered discussions with the two cities to assess collaborative opportunities to maximize future water distribution expansion needs for all partners. Each city indicated that they would be agreeable to an Interlocal Agreement that would proportion costs to construct a new shared transmission main eliminating more expensive parallel distribution lines and the associated difficult-to-obtain easement acquisition at a future date.

With a preliminary agreement underway, a routing study was performed which considered four alternate alignments that delivered water to all three cities. Concurrently, the city began discussions and a study involving the Upper Trinity Regional Water Supply District to determine if receiving water from them was a better option for the city. After alternatives and costs were developed, the best option was to obtain water from DWU and partner with the other cities. Based on the results of the study, a professional services contract for the design of the North Transmission Water Main was awarded in August 2004 and an Interlocal Agreement (ILA) between the three cities was approved in the same month. The design for each segment was completed between May and November 2006 and construction began in April 2007.

Construction in Carrollton won't cease soon

MATT NACHTRIEB/STAFF PHOTO

The congestion along Josey Lane and Hebron Parkway may continue to persist until February. The city is digging a seven-mile pipe that will pump water to Carrollton, Lewisville and The Colony.

BY SARAH BLASKOVICH
STAFF WRITER

The traffic that's jamming up Josey Lane and Hebron Parkway isn't going to let up anytime soon, said Tom Geier, project manager for the city of Carrollton. The barricaded streets are the fruits of a four-phase project to build a seven-mile water line through Carrollton.

The $10.2 million project will supply water to developing areas of northeast Carrollton. When the project is finished in February, Carrollton will begin pumping 12.5 million gallons of water from Dallas Water Utilities.

Geier has been getting an almost-endless supply of phone calls from concerned residents, frustrated by the heavy traffic.

Street closings:

One lane closed **northbound on Josey Lane**, between Branch Hollow and Hebron Parkway.

Two lanes closed **southbound on Josey Lane**, between Cheyenne Road and Cherokee Path (both just north of Hebron Parkway). One lane closed southbound on Josey Lane between Cherokee Path and Hebron Parkway.

Currently, workers are putting in water pipes underneath Old Denton Road, Hebron Parkway and Josey Lane.

"They're major arterials through the city," Geier said. "People need to look for alternate routes."

City planners decided to run the water pipes below the street because other utilities were already buried under sidewalks and in other areas of the city that might have caused less traffic. There really wasn't a better place to build this seven-mile project, Geier said.

The Colony and Lewisville will also use parts of the water main to filter water into their own communities. They will each pump about 15 million gallons of water from Dallas Water Utilities. But both cities will have to build their own water lines that extend beyond the Carrollton city limits. All three cities will share the cost of the water main

See THREE, Page 10A

Construction

The project generally progressed on schedule but DWU required key scheduled maintenance in December that forced the project to be delayed for a few months. Pipe manufacturing took about four months for each segment so the first segment started in April 2007 and construction progressed prior to the treatment plant connection in the summer of 2008. Work was stopped at that time and resumed in early December to comply with scheduled DWU maintenance at the treatment plant. Once the connection was made, work continued and the project was completed in April 2009. The project had no man-hours lost due to injury. Pipeline depths reached 15 feet and work included hand tunneling a 450-foot long 7-foot diameter tunnel under the President George Bush Tollway.

"It was good business, good government and good planning"

- Marc Guy
Assistant City Manager

Community relations included coordination with businesses and schools along the project route as well as local newspaper coverage and construction updates on the city website. Despite the extensive media coverage, project management remained challenged to respond to emails and phone calls when construction was at its peak in the summer and fall of 2007.

Environmental stewardship and concerns were addressed but were not major issues as most of the work was contained within the existing road network since the adjacent right-of-way was already full of utilities. Erosion control consisted of inlet protection devices, good housekeeping and other construction best management practices.

Branching north to serve the city of Lewisville.

Special Challenges

A project of this magnitude included many challenges although every effort was made to minimize them before they could occur.

These challenges included:

- Working with two other cities – Since all cities were on-board with the project and realized it was in everyone's best interest to do the project, this actually went very smoothly. Part of the effort was keeping track of everyone's prorated share of the work.
- Trying to maintain 2 lanes of traffic during construction on major thoroughfares – At times during non-peak hours, only one lane was open, but traffic kept moving.

- Answering resident and motorist inquiries – emails & phone calls. These generated a lot of work for the project manager. Having three of the city's major streets under construction at one time proved to be the major complaint from most people. Most wanted to know why we had all the roads torn up at once without understanding it was one project. Doing the project over a period of years would just keep the work from getting completed in a timely manner and render the maintenance bond basically worthless for work that was completed early on. Adding to the problem was the city's Public Works Department performing routine maintenance on other city thoroughfares.

Working around existing utilities was a day-to-day challenge throughout the project – especially near street intersections.

- Keeping ahead of the contractors trying to head off delay claims – utility conflicts were the root of these problems. Although coordination was part of the design phase, franchise utilities could not always accurately locate their lines when we were told that they were clear. City water valves were also sometimes difficult to find to isolate water line sections.

- Connecting to old pavement and trying to keep change orders to a minimum. The condition of the streets, whether it be the condition of the concrete or sags in the street, proved to be difficult. Extending removal and replacement to adjacent lanes was the majority of the change order work.

- Coordinating with contractors and trying to get them to speed up and keep on schedule. A difficult task throughout the project, the city wanted the contractors out of the way so all traffic lanes could be opened.
- Working with and keeping DWU informed of the schedule. Four-day work weeks for DWU inspectors, scheduling inspections and scheduled maintenance made it a challenge to keep some of the work progressing smoothly.
- Coordinating school activities at one of the local high schools. It just so happened that of the three Carrollton high schools, the one on the project route, was the one that hosted classes for the summer.

Meter Vault construction at the north pump station that meters water received from Dallas Water Utilities.

What was right?

Although there were many challenges and problems to overcome with a project of this magnitude, many positive things also occurred including:

- Coordination with neighboring cities: a key cost savings collaborative effort!
- Completed the new water line to serve NE Carrollton; significantly lowering pumping costs.
- Replacement of older pavement over the new line and adjacent deteriorated areas.
- Had project profiled in local newspaper to inform residents about the project.
- Kept school district informed of work progress; minimized impacts.
- Kept in contact with merchants along the project route.

Lessons Learned

Although projects like this are rare in Carrollton, there were some lessons learned which have been incorporated into our standard operating procedure including:

- When appropriate, using the city web site to tell the purpose, expected length of project, etc. Could add a webpage to our design contract for them to build and maintain during the construction.
- Coordinating with the Chamber of Commerce to alert businesses to the impact of these large scale construction projects.
- Better inform/prepare and emphasize to contractors during Pre-Bid and Pre-Construction meetings on restoration expectations for components of infrastructure systems such as curbs, buttons, landscaping, etc. to meet the city's current General Design Standards.
- Although preconstruction videos were taken by the contractor, the city's Public Works Department also needs to take preconstruction videos/pictures to prove the existing condition of roadways before construction begins.
- Developing a procedure for inspectors to shut down a project for a deficient traffic control.

"The project provided advance leadership, coordination and common sense management"

- Marc Guy
Assistant City Manager

Traffic control was one of the biggest day-to-day challenges as the line was located in three of the city's largest thoroughfares.

Post Construction

The North Transmission Water Line has been in operation since March 2009 and the city's water system is moving into the final stages of the plan presented in the 2001 Master Plan. Carrollton's pumping energy costs have been reduced $450,000 annually as DWU supplies water directly to the north part of the city under the new alignment. Carrollton's water system is operating much more efficiently as part of the old transmission line has been freed up to serve the adjacent service area while another part has been made part of the new transmission line. With the new construction the city's Parks Department has planted trees and landscaping in adjacent medians making the cityscape along the water transmission line more attractive and sustainable. Although Carrollton is currently the only city using the new main, the City of Lewisville is currently constructing the water line that will transport water to their city while The Colony is in planning stages for extending the main to their city.