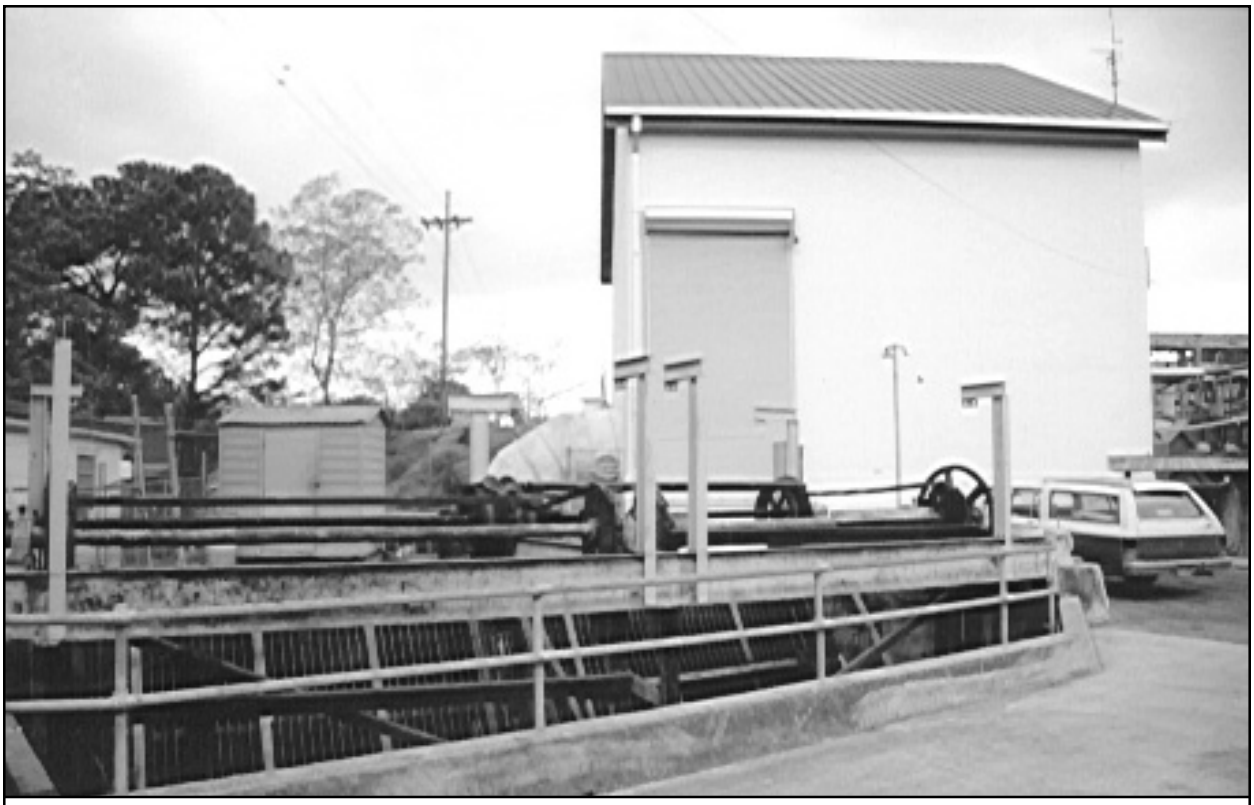

Figure 49. Drainage Pumping Station No. 4, viewed from the east.

Figure 50. Drainage Pumping Station No. 4, viewed from the southwest, across the London Relief Outfall Canal.

Drainage Pumping Station No. 6. Drainage Pumping Station No. 6 is located on the Upper Protection Levee and the Metairie Relief Outfall Canal. The Station was designed to pump the water sent to it from Drainage Pumping Station No. 1 and the runoff of the area on the upper side of the Carondelet (New Basin) Canal up to the Protection Levee and out to the River, and when the system was complete, to pump the water from the area between Broad St. and the Lake, lying between the Metairie Relief and the New Orleans Navigation Canal (Sewerage and Water Board 1909:8). Contract "A", issued by the Drainage Commission on August 9, 1897 to the National Contracting Co., included construction of Drainage Pumping Station 6. Construction of the station was substantially completed in 1898 and the contract finally accepted in 1900. The individual cost of the station's building and foundations was $71,600 (Sewerage and Water Board 1911:129). Figure 15 shows the exterior of Drainage Pumping Station No. 6 as originally constructed.

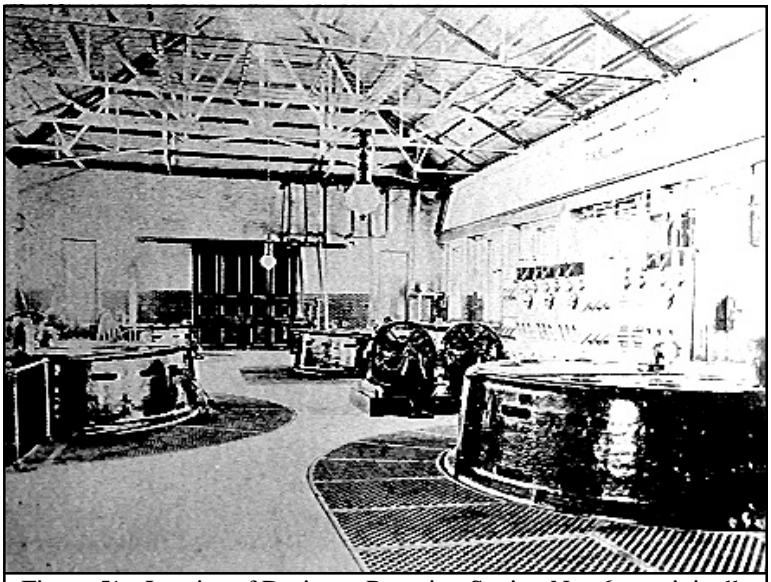

Figure 51. Interior of Drainage Pumping Station No. 6 as originally constructed, showing vertical centrifugal pumps (from Sewerage & Water Board 1904).

Original pumps at the Station were four 250 cfs single-suction vertical-shaft centrifugal pumps, three of them manufactured by the E.P. Allis Co. of Milwaukee, and one manufactured by the I.P. Morris Co. of Philadelphia. These pumps had a lift of 10 feet across the station. The pumps were placed in pits beneath the floor of the station so that their runners were submerged. The impeller diameter of these pumps was 9½', and the suction and discharge pipes of these pumps were 8' in diameter. Each pump was connected to a 400 kilowatt 466-horsepower synchronous revolving field motor, which ran at 62 ½ rpm on three phase energy at 25 cycles and 3000 volts. Figures 51 and 52 are interior views of the Station showing its original vertical centrifugal pumps. Figures 18 through 20 show the interior of the original pumps in Drainage Pumping Station No. 7, identical to those originally installed in Station No. 6. Drainage Pumping Station No. 6 has had the largest pumping capacity of any of the drainage stations in the New Orleans system since its construction (Sewerage and Water Board 1904b:3; 1910:160; 1911:128-129).

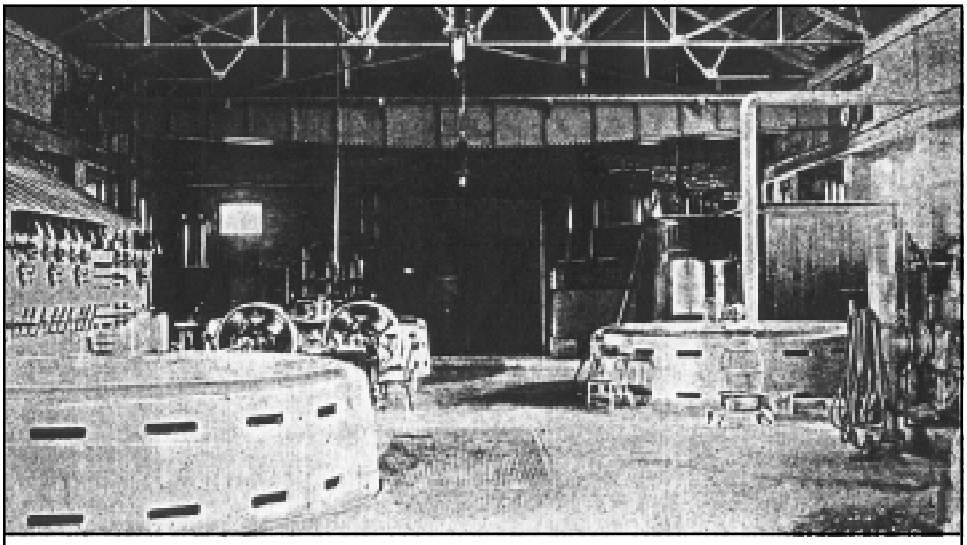

Figure 52. Interior view of Drainage Pumping Station No. 6, showing original vertical centrifugal pumps, 1909 (from Sewerage & Water Board 1909).

In 1902, Contract "Q" was issued to the Camden Iron Works of Camden, N.J., for a 30 cfs constant-duty pump to be installed in Station No. 6. A single-suction vertical shaft centrifugal pump was installed in 1903. This pump was driven by a ten-pole induction motor, "squirrel cage" type, of 100 hp, designed for three phase energy at 25 cycles and 3000 volts, without transformers. The speed of the motor at full load was 285 rpm. The motor was manufactured by the Westinghouse Electric and Manufacturing Co., East Pittsburgh, PA. The cost of this pump brought the total cost of the building and machinery at the station to $223,000.00 (Sewerage and Water Board 1911:129).

On November 4, 1914, John Reiss of New Orleans received contract 67-D for enlarging Drainage Pumping Station No. 6 in anticipation of installation of the new Wood screw pumps. The addition to the station consisted of an extension measuring 67 feet by 50 feet, enlargement of the suction basin, and construction of a reinforced concrete discharge flume. The successful bid for this contract was $57,356.92. On December 19, 1914, John H. Murphy of New Orleans received contract 71-D for construction of the suction and discharge pipes for the constant-duty pump at Station No. 6. Also issued in connection with installation of the 12-foot Wood screw pumps in Station No. 6 was contract 74-D, issued to the Northern Engineering Works, of Detroit, for a 15-ton hand operated crane. The contract was issued on June 1, 1915 and the crane delivered and erected in December 1915; by the end of the year the crane was hoisting the castings of the 12-foot Wood pumps into position in the Station (Sewerage and Water Board 1914:137; 1915:112-113, 184).

In Drainage Pumping Stations No. 6 and 7, the pump pits for the original vertical-shaft centrifugal pumps were altered in 1915. These alterations were made to facilitate starting the pumps under load. On October 22, 1914, the Roe, Stephens Manufacturing Co. of Detroit received contract 70-D for the construction and delivery of hydraulic cylinders, gate valves, and sluice gates for Drainage Pumping Stations Nos. 6 and 7. The hydraulic cylinders were attached to the suction gates so that they could be operated quickly and safely. A 30-inch tunnel was drilled through the basin masonry to connect all of the large pump suctions and that of the constant-duty pump. If the suction gates were throttled, the constant duty pump, driven by an induction motor, or any of the large pumps, could lower the water behind the gates so as to clear the runners of the other pumps, which could therefore be started with compensators, and the gates then raised (Sewerage and Water Board 1915:114). Installation of the 12-foot Wood pumps and other improvements at Drainage Pumping Station No. 6 were completed in 1916.

Figure 53. Drainage Pumping Station No. 6, after 1914 and 1929 extensions (from Sewerage & Water Board 1929).

Drainage Pumping Stations No. 1 and 6 were the first to receive 14-foot Wood screw pumps. Contract 103-D, for an extension of Drainage Pumping Station No. 6, was issued to H. Pratt Farnsworth in 1928, for a bid of $183,879.80. Figure 53 shows the western end of Drainage Pumping Station in 1929, after extension to receive the 14-foot Wood screw pumps. The four 14-

foot Wood screw pumps added to the station were installed and in operation by February 5, 1930 (Sewerage and Water Board 1930:122, 124). Figure 54 shows the interior of Station No. 6 after installation of the 14-foot Wood screw pumps. Because the required lift was higher at Station No. 6 than at Station No. 1, fourteen feet versus eight feet, the 14-foot pumps at Station No. 6 were equipped with 2,000 h.p. motors, rather than 1200 h.p. motors as at Station No. 1.

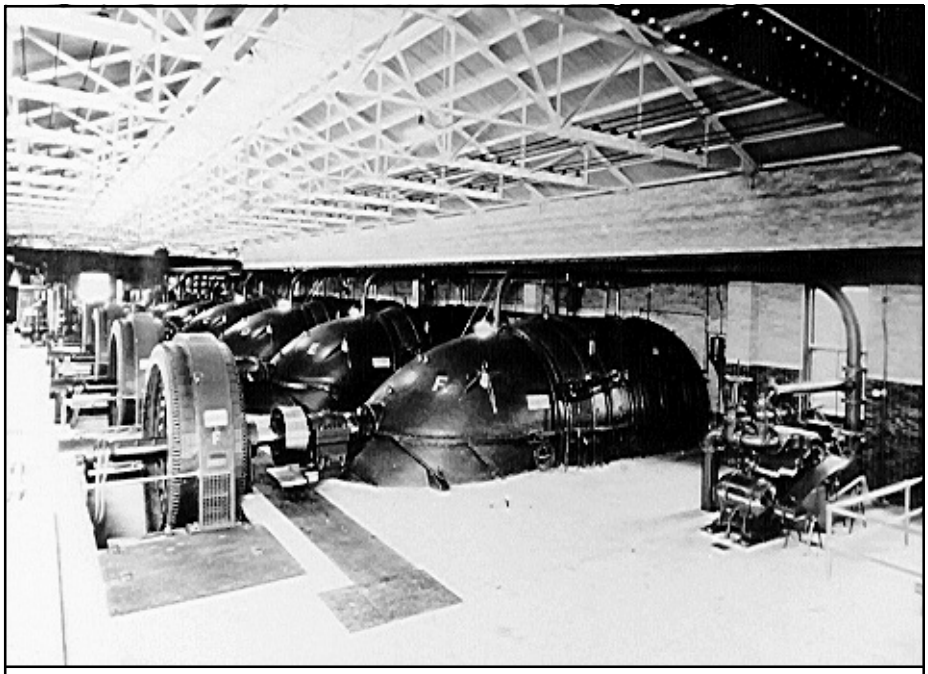

Figure 54. Interior of Drainage Pumping Station No. 6 after installation of 14' Wood screw pumps (from Sewerage & Water Board).

In 1929, H. Pratt Farnsworth received Contract 210-S to alter Drainage Pumping Station No. 6 to receive four 6' vertical centrifugal Wood trash pumps of 250 cfs capacity, for a bid of $13,700. The vertical trash pumps were manufactured by the Hardie-Tynes Mfg. Co. (Contract 208-S), with valves by the Michigan Valve and Foundry Co. (Contract 209-S). These pumps were put into operation in early 1930 (Sewerage and Water Board 1929:112; 1931:16).

As of 1930, Drainage Pumping Station No. 6 had four 14-foot Wood screw pumps (1000 cfs), two 12-foot Wood screw pumps (550 cfs), four vertical shaft 72" Wood centrifugal trash pumps (250 cfs), and one 36" constant-duty vertical shaft centrifugal pump (25 cfs). By this date, the electrical equipment at the station had been divided into three separate operating busses to localize interruptions in the power supply during severe storms (Sewerage and Water Board 1929:112).

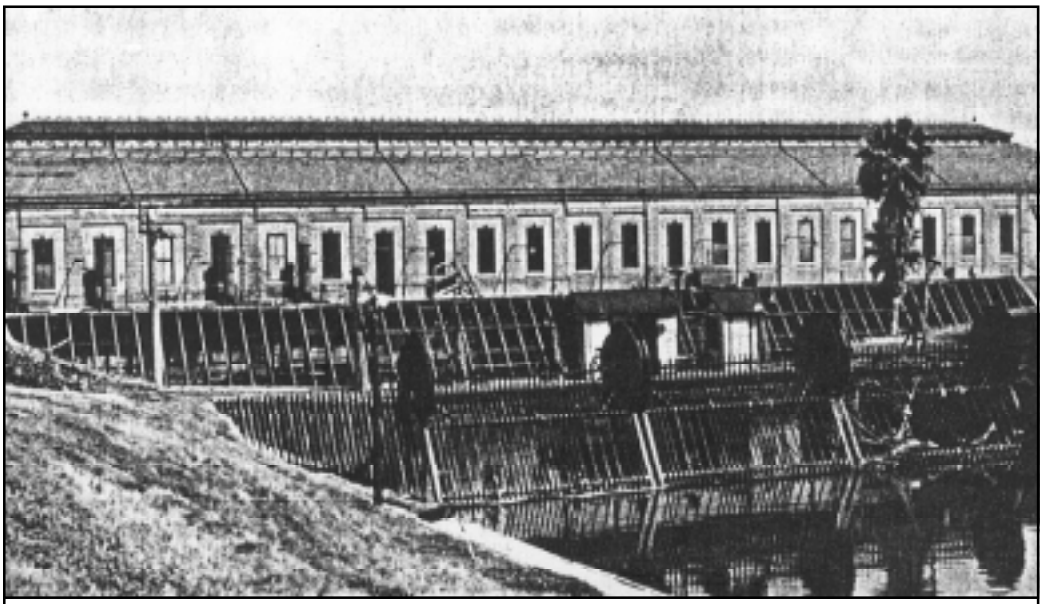

Figure 55. Drainage Pumping Station No. 6, 1966 (from Sewerage & Water Board, 1966).

Figure 55 shows Drainage Pumping Station No. 6 in 1966, before construction of the contemporary trash screen cleaners which obscure the view of the station from the south (Figures

Figure 56. Drainage Pumping Station No. 6, viewed from the southwest.

Figure 57. South facade of Drainage Pumping Station No. 6.

Figure 58. Drainage Pumping Station No. 6, joint of 1897-1899 construction and 1986-1989 addition.

56 and 57), and before enlargement of the suction basin. In 1967, plans were made for an expansion of the Station on its western end, known as the Jefferson Parish Addition because this portion of the Station lies in Jefferson Parish. One 1,000 cfs pump was installed in the western extension. A floodwall was constructed on the Outfall Canal side of the Station in 1983. Construction of another addition on the western end of the Station began in 1986. Ca. 1985-1988, the older 250 cfs vertical pumps were replaced with more modern units. In 1986-1989, the Station was expanded considerably into Jefferson Parish. One 1,000 cfs pump and two 1,050 cfs pumps were installed in the addition. The 1986-1989 addition to Station No. 6 is in a different architectural style than the 1897-1900 and 1929-1930 construction, but utilizes some architectural details from the style of the older portions of the building (Figure 58). Figures 59 and 60 show Drainage Pumping Station No. 6 as it appears today (1996).

Drainage Pumping Station No. 7. Drainage Pumping Station No. 7 is located at the intersection of Taylor Avenue and the Orleans Relief Canal, in City Park. As originally proposed, Station No. 7 was to be strictly a final lift station, but early on the role of the station in the system was modified. As mentioned above, the original conception of the Main (Broad Street and Florida Avenue Canal) was that the daily flow of the area both on the river side and the lake side of the Main Canal would drain into it. Instead, the city drainage engineers determined that it was advantageous to reroute the drainage from the portion of the city on the lake side of Broad Street. In the first decade of the drainage system, Drainage Pumping Station No. 7 pumped the water conveyed from Drainage Pumping Station No. 2 by way of the Orleans Canal, draining the area from Broad Street to Taylor Avenue, the Old and New Basins, and also the area between the Orleans Navigation Canal Orleans Relief Outfall, and from the Lake to Taylor Avenue. It was antici-

Figure 59. Drainage Pumping Station No. 6, viewed from the north.

Figure 60. Drainage Pumping Station No. 6. View of interior looking east; in the foreground are 250 cfs vertical centrifugal pump motors. The remainder of the pumps are Wood screw pumps; in the foreground are two 12' pumps, and in the background are four 14' pumps.

pated (1909) that Drainage Pumping Station No. 7 would pump the water from the area between the Orleans Outfall and Bayou St. John and the Lake and Taylor Avenue.

Drainage Pumping Station No. 7 was one of the first three stations to be built. Construction was contracted with the National Contracting Co. in Contract "A" on August 9, 1897. Figure 16 shows Drainage Pumping Station No. 7 as originally constructed. The contracted price was $192,000.00. Its original complement of pumps was three vertical centrifugal pumps of 250 cfs capacity. The pumps had a 10' lift across the station and suction and discharge pipes of 8' in diameter. The pumps were driven by 400 kilowatt synchronous motors, which ran at 62 ½ rpm. The suction and discharge pipes were provided with eight-foot sluice gates operated by small electric motors, and the discharge pipes had flap gates which automatically closed when the pump was shut down (Sewerage and Water Board 1910:160). These three original vertical centrifugal pumps, manufactured by the E.P. Allis Co. of Milwaukee with motors by the General Electric Co. of New York, are still in place at Drainage Pumping Station No. 7 (Figures 18 through 20). Ca. 1911, one single-suction vertical centrifugal pump was installed in Station No. 7 as a constant duty pump. This 30 cfs pump, manufactured by the Camden Iron Works of Camden, N.J., was driven by a 100 h.p. synchronous motor manufactured by the Westinghouse Electric and Manufacturing Co. of East Pittsburgh (Sewerage and Water Board 1911:130-131).

The pump pits for the original vertical-shaft centrifugal pumps in Drainage Pumping Station No. 7 were altered in 1915. These alterations were made to facilitate starting the pumps under load. On October 22, 1914, the Roe, Stephens Manufacturing Co. of Detroit received contract 70-D for the construction and delivery of hydraulic cylinders, gate valves, and sluice gates for Drainage Pumping Station No. 7. The hydraulic cylinders were attached to the suction gates so that they could be operated quickly and safely. A 30-inch tunnel was drilled through the basin masonry to connect all of the large pump suctions and that of the constant-duty pump. If the suction gates were throttled, the constant duty pump, driven by an induction motor, or any of the large pumps, could lower the water behind the gates so as to clear the runners of the other pumps, which could therefore be started with compensators, and the gates then raised (Sewerage and Water Board 1915:114).

Station No. 7 was modified on its western end, but was not enlarged, to receive one of the 12' Wood screw pumps ca. 1914-1916; the eastern end was also modified and evidently enlarged to receive two new constant duty pumps (Contracts 58-D, 70-D, 77-D, 78-D, 100-D). The 12' Wood screw pump, manufactured by the Nordberg Manufacturing Co. (Contract 58-D), was installed at Drainage Pumping Station No. 7 in late 1917 or early 1918. In 1931, the Station was expanded in order to receive two 14' Wood screw pumps (Contracts 116-D, 121-D, 175-D, 187-D). Also ca. 1931, two vertical constant duty trash pumps were installed in Station No. 7 (Contract 208-S), evidently replacing the pumps installed as constant duty pumps ca. 1916. These pumps and motors were modernized ca. 1966. In 1976-1977, efforts were made to floodproof Station No. 7. A new control room was constructed ca. 1985.

Drainage Pumping Station No. 7 has several unique features remaining from the its original configuration and early modifications. Among these features are the three original 250 cfs vertical centrifugal pumps and motors, and the station's constant duty pump No. 1, installed ca. 1911. Figures 61 through 66 show Drainage Pumping Station No. 7 as it appears today (1996).

History Of The Drainage Network

The 1895 Drainage Plan (Figure 6) called for the construction of a network of 95 miles of drainage canals, 30 of which were to be masonry lined and covered. This proposed network represented several years of construction. Table 2 contains information on the construction of individual canals in the network, and the dates of canal modification, for the period 1896-1941. The first canals contracted for construction included the Seventeenth Street, London Outfall, and

Figure 61. Drainage Pumping Station No. 7. View from the southwest.

Figure 62. Drainage Pumping Station No. 7. View from the southeast.

Figure 63. Drainage Pumping Station No. 7. Viewed from the northeast, showing trash screen and hydraulic sluice gate mechanisms.

Figure 64. Drainage Pumping Station No. 7. View of interior, showing motor covers of 250 cfs centrifugal “flathead” pumps.

Figure 65. Drainage Pumping Station No. 7. View showing end of monitor.

Figure 66. Drainage Pumping Station No. 7. Wooden vehicle door on west end of building.

Dublin open and unlined canals; the St. Louis, Basin, Canal St., Camp, Chartres, Julia, Constance, Galvez, and Claiborne lined and covered canals; and the Oleander, Claiborne, Orleans St., Orleans Relief, Metairie Relief, and Jourdan Ave. unlined and open canals, all constructed in 1896-1897. Work began on the Main Canal and Main Outfall Canal in 1897-1898, and other major lined and covered canals in 1901. As indicated by Table 2, there is no single date at which the "New Orleans Drainage System" as built, represented the static version of the system proposed in 1895.

The methods utilized in constructing the New Orleans drainage network also did not remain constant over time. As early as initial construction of the network in the period 1897-1902, the construction of small drainage canals was changed from that detailed in the 1896 speci-

Table 2. Drainage Network Construction, 1896-1941.

Contract	Canal Name	Construction	Award Date	Completion Date	Contractor
unk.	Seventeenth St.	unlined and open	1896	unk.	
unk.	London Relief Outfall	unk.	[1897]	unk.	
unk.	Dublin	unk.	unk	unk	
C	St. Louis, Basin, Canal, Camp, Chartres, Julia, Constance, Galvez,	lined and covered	1897	unk.	
D	[Oleander, Claiborne, Orleans St.,] Orleans Relief, Metairie Outfall, and Metairie Relief	unlined and open	1897	unk.	
unk.	Jourdan Ave.	unlined and open	1897	unk.	
unk.	Lafayette, Florida Ave.	unlined and open	1898	unk.	
unk.	Galvez	unk.	unk.	unk.	
unk.	Main	unk.	unk.	unk.	
unk.	Main Outfall	unlined and open	1898	unk.	
F	St. Charles, Third St.	lined and covered	1899	unk.	
G	Melpomene, Claiborne, Orleans Relief	unlined and open	1899	unk.	
unk.	Julia	unk.	unk.	unk.	
unk.	Camp	unk.	unk.	unk.	
J	Third, Constance	lined and covered	1901	unk.	
K	St. Bernard Ave., St. Claude, Esplanade, and Rampart Sts.	lined and covered	1901	unk.	
L	Nashville, Perrier, Constance	lined and covered	1901	unk.	
M	Lowerline, Jeannette, Pearl, Wall, Leonidas, Birch	lined and covered	1901	unk.	
N	Vallette, Eliza	lined and covered	1901	unk.	
O	Lapeyrouse, Whitney	unlined and open	1901	unk.	
R	Leonidas, Lowerline	timber lined and open	1902	unk.	
S	Nashville Ave.	timber lined and open	1902	1906	J.J. Keegan
T	St. Bernard Ave.	unlined and open	1902	1906	Jno. McCoy
unk.	Laurel	unk.	unk.	unk.	
unk.	Canal St.	unk.	unk.	unk.	
unk.	Algiers Outfall	unk.	unk.	unk.	
unk.	Perrier	unk.	unk.	unk.	
27	Broad St.	timber lined and open	1904	1906	WB
31-D	St. Mary	timber lined	1904	1908	Dunn, Philbrick &
U	Orleans and Claiborne	concrete lined and covered	1904	1905	Dowdle and Windett
V		unk.	1904	1906	
Y	Orleans Relief, Melpomene, and Claiborne	unk.	1904		
Z	Hagan Ave.	unk.	1904	1905	
32-D	Melpomene and Claiborne, w/ bypass at DPS 1	timber lined	1905	1906	
33-D	London Ave. Outfall	unlined and open	1905	1905	
unk.	Seventeenth St.	open and unlined	1906	unk.	
unk.	Claiborne	enlarging and grading	1907	unk.	
unk.	Melpomene	cementing I-beams	1907	unk.	
unk.	Algiers Outfall	unlined and open	1907	unk.	S. & W. B..
36-D	Napoleon Ave., suction basin DPS 1	unk.	1911	1915/1916	A.L. Patterson & Co.
42-D	Claiborne, Lafayette	unk.	1912	1913	W.J. Comerford
44-D	Metairie Relief, Broad St.	wood lining of sub-channel	1912	1915	Hampton Reynolds
45-D	New Basin Navigation Canal	siphon	1912	1913	Laing & Freret

Table 2, Continued.

Contract	Canal Name	Construction	Award Date	Completion Date	Contractor
48-D	Upper Protection Levee, Claiborne St., Florida Walk, Marigny Ave., Broad St.	open and unlined; wood lining in bottom of Broad St. from Marigny Ave. to St. Bernard Ave.	1912	1914	Etta Contracting Co.
50-D	Broad St. from St. Bernard Ave. to Carondelet Walk, Lapeyrouse St., Maurepas St., Esplanade Ave., Carondelet Navigation Canal	canal, branch canal, pipeline, siphon	1912	1916	Mitchell-Borne Construction Co.
60-D	Upper Protection, Claiborne	wood lined and open	1914	1915/1916	General Contract Co.
65-D	Lowerline, Leonidas	lined and covered	1914	1915	M.M. Wren
66-D	Nashville Ave.	reinforced concrete	1914	1916	W.J. Kane
68-D	Broad St.	reinforced concrete	1914	1916	Victor Lambou
69-D	St. Bernard Ave.	reinforced concrete	1914	1915	Victor Lambou
n/a	Ursuline Ave.	unlined and open	1914	1915	
n/a	Florida Walk, Tupelo St.	unlined and open	1914	1915	
n/a	Marigny Ave.	unlined and open	1914	1916	
n/a	Jourdan Ave., Claiborne Ave.	unlined and open	1914	1915	
n/a	Jourdan Ave. Outfall	unlined and open	1916	1918	
n/a	Canal Boulevard	unlined and open	1916	1917	
n/a	Upper District Center, Avenue C	unlined and open	1917	1919	
n/a	Paris Ave., Marigny Ave.	unlined and open	1917	1917	
n/a	Taylor Ave.	unlined and open	1917	1917	
n/a	Carrollton Ave. Canal	reshaping, deepening	1919	unk.	
n/a	Peters Ave.	reshaping, deepening	1919	unk.	
n/a	St. Anthony	reshaping, deepening	1919	1921	
n/a	Jourdan Ave., St. Claude St.	lined and covered	1919	unk.	
n/a	Algiers Outfall	deepening and widening	1919	1919	
n/a	Alvar St.	lined and covered	1919	1922	
n/a	Marigny Ave.	reshaping, deepening	1920	unk.	
n/a	Peoples Ave.	reshaping, deepening	1920	1921	
n/a	London Ave.	reshaping, deepening	1920	unk.	
n/a	Carrollton Ave.	lined and covered	1920	unk.	
n/a	Calhoun	reshaping, deepening	1920	unk.	
n/a	Lafayette Ave.	lined and covered	1921	1923	
n/a	Dublin St.	pipeline	1921	unk.	
n/a	Florida Ave. Open Canal	cleaning, reshaping	1921	1921	
n/a	Broad St. Wood-lined Canal	cleaning, reshaping	1921	1921	
n/a	Upper Protection Wood-lined Canal	cleaning, reshaping	1921	1922	
n/a	Florida Ave., Industrial Canal	siphon	1921	1921	
n/a	Dublin St.	pipeline	1921	unk.	
n/a	Toledano St.	pipeline	1922	unk.	
n/a	Main [Florida Ave.]	concrete channel lining	unk.	1929	
n/a	S. Claiborne	sub-channel wood lining	unk.	1929	
n/a	Paris Ave.	reshaping, deepening	unk.	1929	
n/a	Prentiss Ave. (formerly Calhoun St.)	reshaping, deepening	1929	1930	
n/a	S. Liberty St.	pipeline	1929	1929	
n/a	Algiers Outfall	reshaping, deepening	1929	1929	
n/a	St. Roch Ave.	pipeline	unk.	1930	
200-D	N. Rocheblave St.	reinf. conc. canal	1929	1929	A.P. Boh & Co.

Table 2, Continued.

Contract	Canal Name	Construction	Award Date	Completion Date	Contractor
201-D	Mirabeau Ave. Canal	reinf. conc. canal and pipeline	1929	1929	John B. Mooney
202-D	Nashville Ave. Extension, McKenna Street, S. Lopez, Fontainebleau Dr.	reinf. concrete, lined and covered	1929	1930	Thos. H. Brockman
203-D	N. Prieur St	reinf. concrete, lined and covered, pipelines	1929	1930	O'Brien Construction Co.
204-D	St. Claude Ave.	reinf. concrete, lined and covered	1929	1930	A.P. Boh & Co.
205-D	Metairie Relief [Melpomene, Washington Ave., Palmetto St., North Line St., Upper Protection Canal]	reinf. concrete, lined and open	1929	unk.	Fuller Construction Co.
n/a	S. Derbigny, S. Prieur, S. Galvez, and S. Tonti Sts.	pipelines	1930	1930	
n/a	Marigny Ave. Open	lining	1930	1930	
n/a	Mirabeau Open, St. Anthony	connection	1930	1930	
n/a	Peoples Ave. Open	deepening	1930	1930	
n/a	Tupelo Open	deepening	1930	1930	
n/a	Jourdan Ave. Open	reshaping	1930	1930	
n/a	Canal Blvd. Open	clearing	1930	1930	
206-D	Magellan	unk.	1930	1930	J.L. McWilliams
207-D	Algiers Outfall	unk.	1930	1931	McWilliams Dredging
208-D	Metairie Outfall	unk.	1930	1930	M.T. Ducros
209-D	Orleans Relief	lining	1930	1931	Co., Inc.
210-D	Florida Ave. (Main Canal)	lined and open	1930	1932	Co.
n/a	Lavender St.	concrete pipeline	1930	1931	M.T. Ducros
n/a	S. Murat St.	concrete pipeline	1930	1931	M.T. Ducros
n/a	S. Claiborne Ave.	wood lining	1931	1931	
n/a	Upper Protection	reinforc. conc. apron	1932	1932	
212-D	Orleans Relief	suction basin approach	1932	1932	A.P. Boh & Co.
214-D	S. Claiborne Ave. at Mistletoe St.	lined and covered	1932	1933	
n/a	Paris Ave.	enlarging and reshaping	1933	1934	
n/a	Peoples Ave.	enlarging	1933	1934	
n/a	Florida Ave.	enlarging	1933	1934	
n/a	Avenue C	enlarging	1933	1934	
n/a	Viavent St.	enlarging	1933	1934	
n/a	Norman	enlarging and reshaping	1933	1934	
215-D	Orleans Relief Canal and Bayou St. John	pipeline and gate	1933	1934	
216-D	Orleans Outfall Canal	re-dredging	1934	unk.	
217-D	Almonaster Ave.	lined and covered	1934	unk.	
218-D	St. Charles Ave.	conc. pipeline	1934	unk.	
219-D	S. Claiborne Ave.	lined and covered, pipeline	1934	1938	
220-D	N. & S. Olympia, Baudin St., S. Murat, and St. Claude Ave.	conc. pipelines	1934	unk.	
221-D	Lamarque St., Whitney Ave., Numa St., Genl. Meyer Ave.	lined and covered	1934	1938	
222-D	Genl. Taylor St.	lined and covered	1934	unk.	
223-D	Jefferson Ave.	pipeline	1934	unk.	

Table 2, Continued.

Contract	Canal Name	Construction	Award Date	Completion Date	Contractor
224-D	London Ave., Broad St.	widening & partly lining, lining and covering	1934	unk.	
n/a	Ursuline Ave.	subsurface drainage	1937	1938	
n/a	Orleans Ave.	subsurface drainage	1937	1937	
n/a	Florida Ave.	subsurface drainage	1937	1937	
n/a	Canal Blvd.	subsurface drainage	1937	1939	
n/a	N. Claiborne Ave.	subsurface drainage	1937	1938	
n/a	St. Roch Ave.	subsurface drainage	1937	1937	
n/a	St. Peter St.	subsurface drainage	1937	1937	
n/a	Esplanade Ave.	subsurface drainage	1937	1937	
n/a	Poydras St.	subsurface drainage	1937	1937	
n/a	Louisiana Ave.	subsurface drainage	1937	1937	
n/a	Pontchartrain Blvd.	subsurface drainage	1937	1937	
n/a	Gentilly Blvd.	subsurface drainage	1937	1937	
n/a	N. & S. Claiborne	subsurface drainage	1937	1937	
n/a	Gravier St.	subsurface drainage	1937	1937	
n/a	Perdido St.	subsurface drainage	1937	1937	
n/a	Gen. Pershing St.	subsurface drainage	1937	1937	
n/a	Nashville Ave.	subsurface drainage	1937	1937	
n/a	S. Johnson St.	subsurface drainage	1937	1937	
n/a	N. Carrollton Ave.	subsurface drainage	1937	1937	
n/a	Hamilton, Hollygrove, Mistletoe, Nelson Sts.	subsurface drainage	1937	1937	
n/a	La Salle St.	subsurface drainage	1937	1937	
n/a	Verna, Leda Sts.	pipeline	1938	unk.	
n/a	Broad St.	monolithic conc. canal	1938	1940	
n/a	Elysian Fields	subsurface drainage	1938	unk.	
n/a	Tchoupitoulas	subsurface drainage	1938	unk.	
n/a	Florida Ave.	enlarging	1939	unk.	
n/a	Milne Canal	enlarging	1939	unk.	
n/a	N. Claiborne	enlarging	1939	unk.	
n/a	Broad St.	extending, enlarging	1940	1940	
n/a	Peoples Ave.	extending, enlarging	1940	unk.	
n/a	Protection	extending, enlarging	1940	1940	
n/a	Florida Ave., Tupelo	extending, enlarging	1940	1940	
n/a	Milne, Harrison	extending, enlarging	1940	1940	
n/a	Paris Ave., Mirabeau, Pratt Dr.	extending, enlarging	1940	1940	
n/a	N. Claiborne, Jourdan	extending, enlarging	1940	1940	
n/a	Thomy Lafon	unk.	1940	1940	
n/a	Viavant No. 2	unk.	1940	1940	
n/a	Argonne	unk.	1940	1940	
n/a	Harrison Ave	unk.	1940	1940	
n/a	S. Claiborne Ave.	lined and covered	1941	1941	
n/a	Louisiana Ave., St. Charles	lined and covered	1941	1941	
n/a	Melpomene Canal	unk.	1941	1941	

fications issued to contractors (Figure 67). As originally specified, the covered small canals were to have vertical masonry walls, regular concave bottoms, and concrete caps. This was changed in construction to a plan with steeply sloped walls, more angular bottom sections, and a masonry cap supported by iron or steel I-beams. These changes in the 1896 specifications were approved by the Board of Inquiry, headed by Rudolph Hering, in 1902 (Hering et al 1902:139). In addition, even major canals were built incrementally, with some sections built years before the full length of the canal was completed. Figure 68 shows the excavation of the Orleans Canal ca. 1904. Figure 69 shows the construction of a typical covered canal, the Hagan Avenue Canal, built 1904-1906.

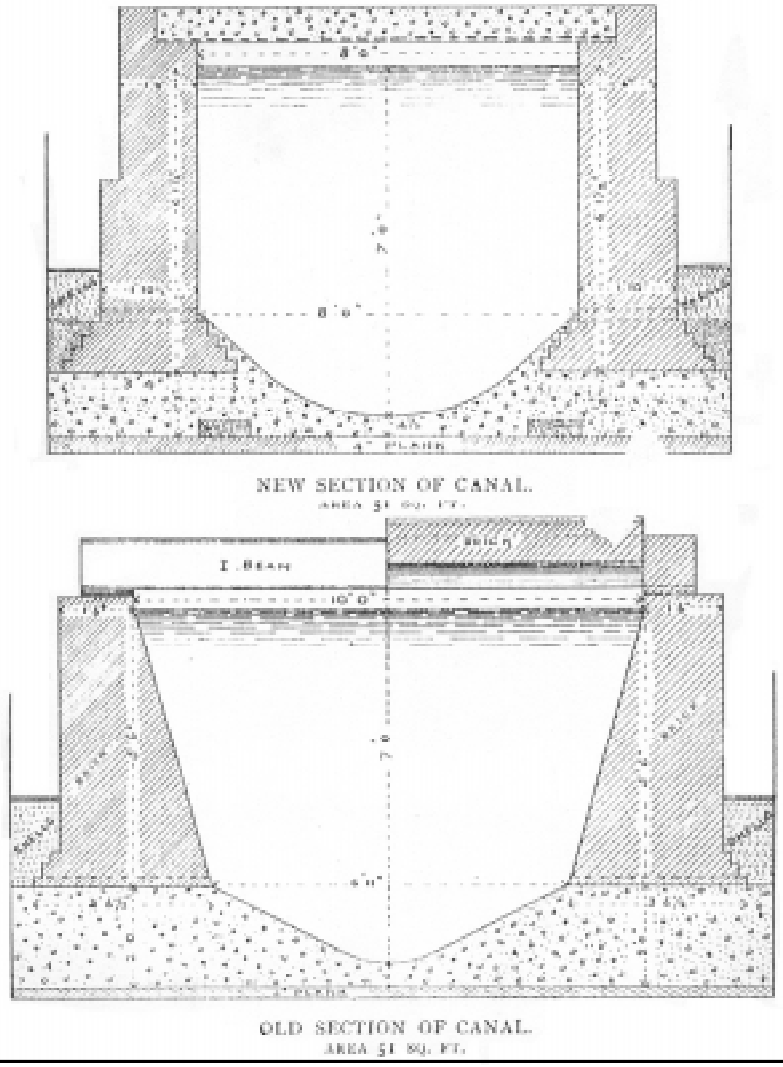

Figure 67. Old and new sections of small canals, from the 1902 Board of Inquiry Report (from Hering et. al 1902).

Even before the canals proposed in 1895 were nearly all completed, the process of modifying the construction of the older canals had already begun. Unlined canals were never fully satisfactory, since they more easily became obstructed by sediment and vegetation (Figures 8 and 9), and open canals were a constant hazard to vehicles, children, and livestock. For example, the Orleans and Claiborne canals were constructed as unlined and open canals beginning in 1897, and in 1904, work began to line and cover them. Another example is the Melpomene Canal, begun in 1899 as an unlined and open canal. It was timber-lined in 1905-1906 (Figures 70 and 71), and a portion of the Melpomene Canal began to be covered in 1907.

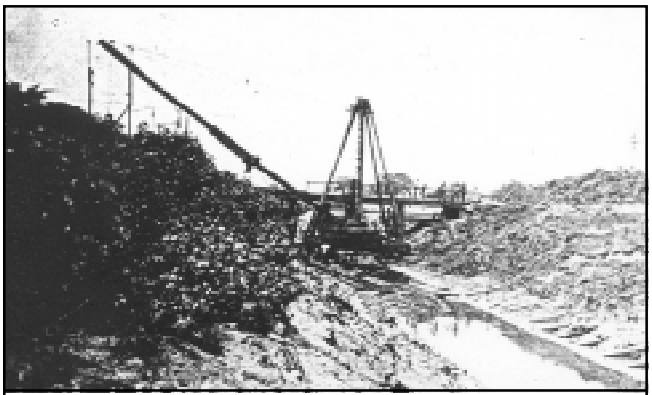

Figure 68. Excavation of the Orleans Canal, n.d.; possibly ca. 1904 (from Louisiana Collection, Howard-Tilton Memorial Library, Tulane University).

About 1910, the method of constructing the large lined and covered canals utilized in the New Orleans network also changed. Originally, the linings of the large canals had walls constructed of masonry with the bottom of the canal channel made of concrete. The

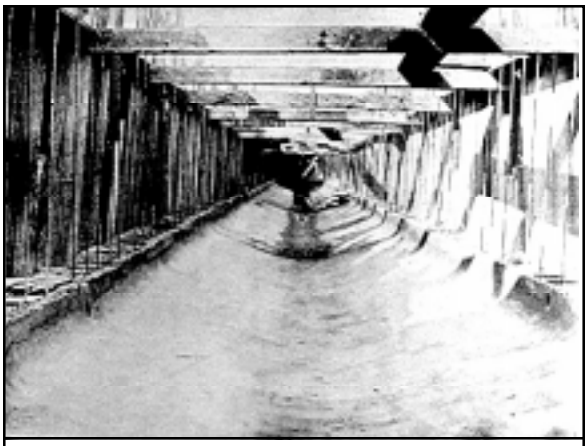

Figure 69. Interior of the Hagan Avenue Canal, shown during construction, ca. 1906. This concrete-lined and covered canal was constructed 1904-1906 (from Sewerage & Water Board 1906a).

Figure 70. Melpomene Outfall Canal, 1906. The canal was timber lined and the banks graded, 1905-1906. Drainage Pumping Station No. 1 is in the background (From Sewerage & Water Board 1906a).

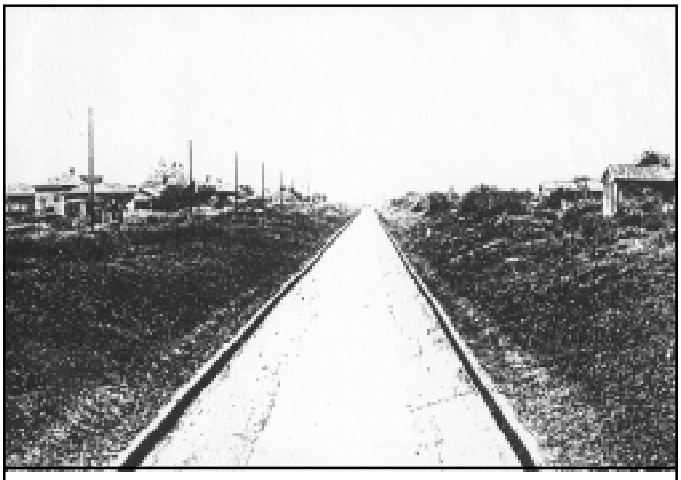

Figure 71. Melpomene Outfall Canal after timber lining and grading, 1906 (from Sewerage & Water Board 1906b.

coverings of the canals were constructed on steel I-beams spanning the canal. After 1910, the entirety of the linings and coverings of canals were constructed of reinforced concrete (Figure 72). The sections of the all-concrete canals was also modified from the older masonry canals, to improve the dry-weather flow. The move to reinforced concrete was part of the trend in drainage and sewerage engineering begun by D.E. McComb in the late nineteenth century. McComb demonstrated the structural integrity and economic efficiency of concrete for sewer construction in Washington, D.C. (Metcalf and Eddy 1914:16), and after 1910 New Orleans joined other major cities in changing from masonry to concrete canal construction.

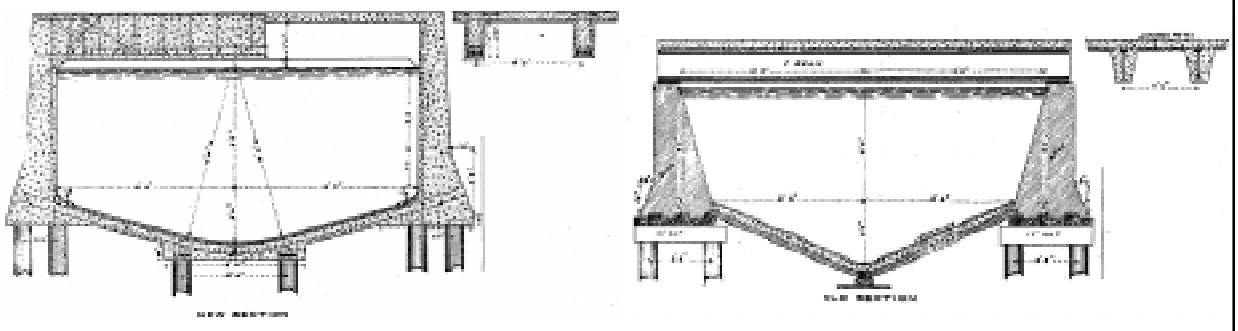

Figure 72. Sections of covered canals; old masonry and new concrete sections, 1910 (from Sewerage & Water Board 1910).

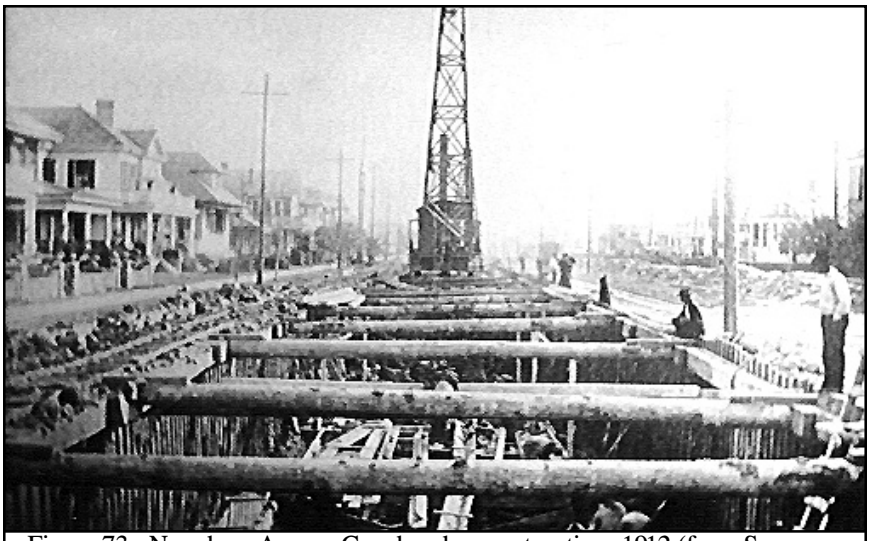

Figure 73. Napoleon Avenue Canal under construction, 1912 (from Sewerage & Water Board, 1912).

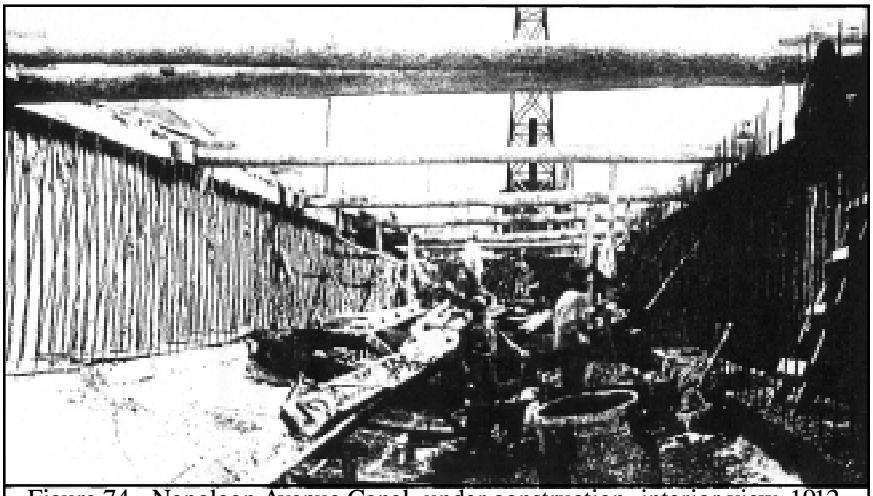

Figure 74. Napoleon Avenue Canal, under construction, interior view, 1912 (from Sewerage & Water Board 1912).

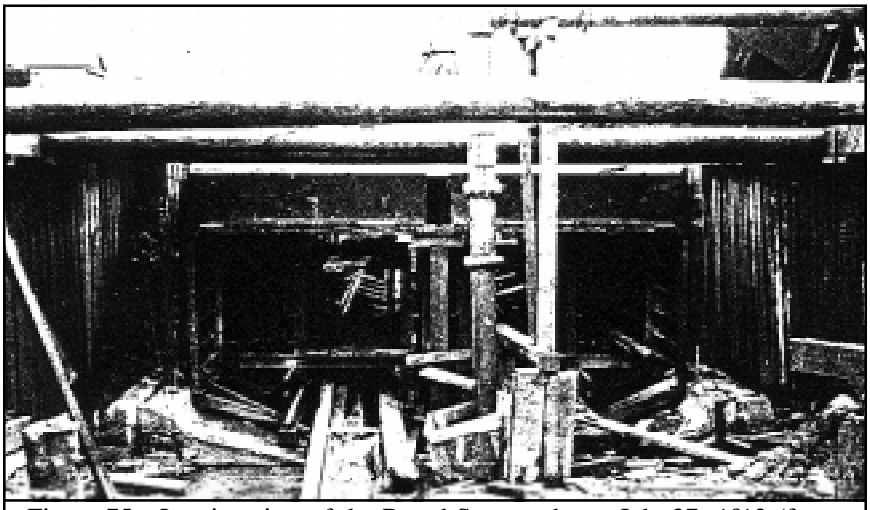

Figure 75. Interior view of the Broad Street culvert, July 27, 1913 (from Louisiana Collection, Howard-Tilton Memorial Library, Tulane University).

Several major canals proposed in 1895 remained to be constructed in 1910, among them the Napoleon Avenue Canal (Figures 73 and 74), begun in 1911 and completed in 1915/1916. Other major canals, such as the Broad Street Canal (Figures 75 and 76) were in the process of completion during the period between 1910 and American involvement in World War I. In 1914-1916, a portion of the Broad Street Canal, formerly unlined, began to be lined in reinforced concrete. Figures 77 and 78 show the Metairie Relief Canal in 1914, with a timber-lined channel. Almost all older canals were cleaned and reshaped beginning after World War I, and many were lined with concrete and covered in the later 1920s and 1930s. One example is the Carrollton Avenue Canal, built in 1907, reshaped and deepened in 1919, and lined and covered beginning in 1920. The large relief canals, in particular, have been altered since their original construction. As drainage demands have increased, all of the outfall canals have been fully lined with reinforced concrete and provided with walls at street level to prevent pedestrians and vehicles from falling into the canals.

The Sewerage and Water Board began an intensive three-year construction program in 1929 for extensions of the Sewerage, Waterworks, and Drainage system. Almost $8 million was spent on construction

in 1929-1931, including the manufacture and installation of the 14' Wood screw pumps at the older drainage pumping stations and the construction of Drainage Pumping Station No. 9 on the West Bank. However, The *64th Semi-Annual Report* (1931) noted that because of business depression and unemployment, Sewerage and Water Board revenues were much below projected levels. Sewerage and Water Board expenditures for drainage construction would not again approach pre-Depression levels until after the conclusion of World War II. Only three contracts for new drainage construction were issued in 1932 and two in 1933. Circumstances improved in 1934, and by 1937, the federal Works Progress Administration was actively assisting in drainage construction, particularly subsurface drainage. However, in the late 1930s most drainage construction consisted of minor improvements to the existing system (Sewerage and Water Board 1931-1941).

Following the Second World War, the New Orleans drainage system continued to expand, including in areas of the West Bank and east of the Industrial Canal that were not included in the coverage of the 1895 Drainage Plan (see Figure 12). Drainage Pumping Stations 4, 10, and 11 came into service between 1946 and 1954. Expansion of the drainage system has continued in recent decades. Figure 79 shows

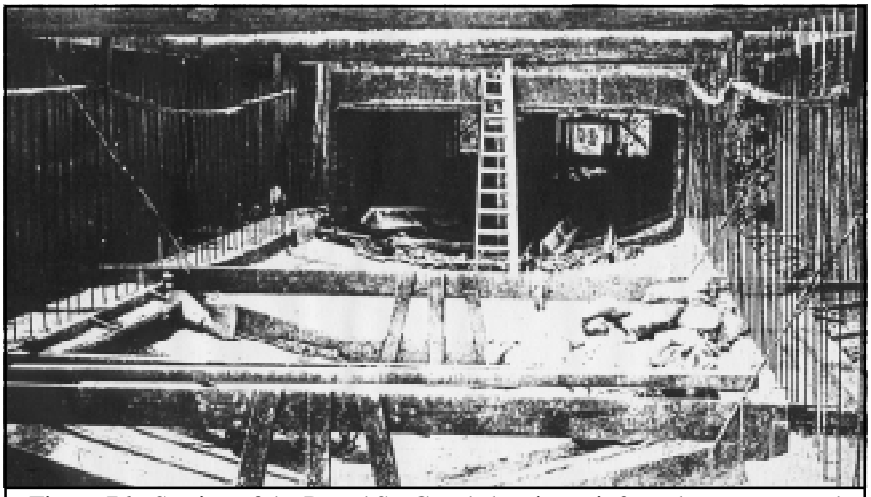

Figure 76. Section of the Broad St. Canal showing reinforced concrete canal construction, 1914 (from Sewerage & Water Board 1914).

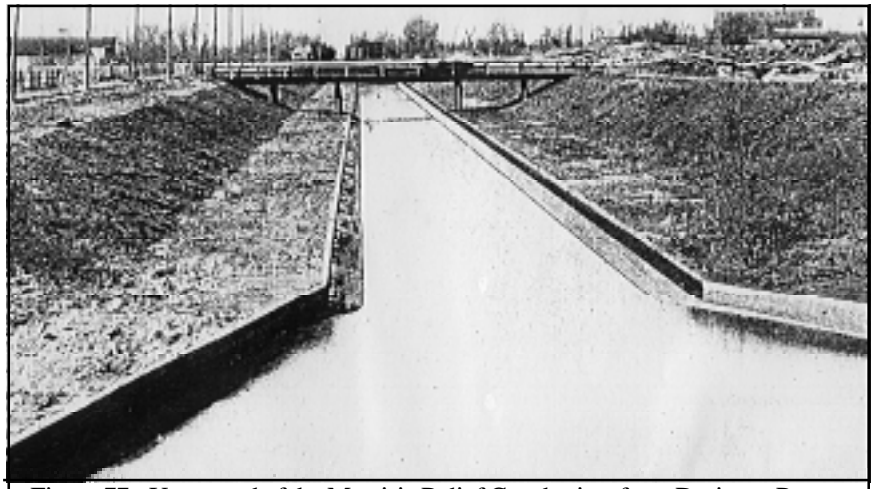

Figure 77. Upper end of the Metairie Relief Canal, view from Drainage Pumping Station No. 1, 1914 (from Sewerage & Water Board 1914).

Figure 78. Lower end of the Metairie Relief Canal, approaching Pumping Station No. 6, 1914 (from Sewerage & Water Board 1914).

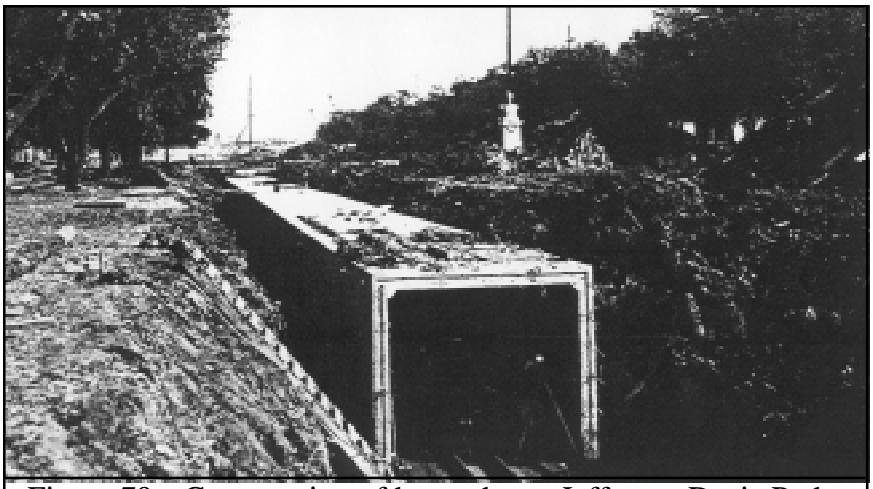

Figure 79. Construction of box culvert, Jefferson Davis Parkway, ca. 1961-1962 (from the Louisiana Collection, Howard-Tilton Memorial Library, Tulane University).

the installation of a box culvert on Jeff Davis Avenue, typical of the major drainage improvements undertaken in the 1960s.