

APPENDIX A
SPECIFICATIONS
IN RELATION TO THE CONSTRUCTION, ETC., OF THE
FARMINGTON CANAL.

GRUBBING AND CLEARING, PREPARATORY TO EXCAVATION.—All the trees, logs, stumps, bushes, roots, and timber of every kind shall be dug, grubbed, cleared, eradicated and wholly removed from a space of 58 feet, viz: 29 feet on each side of the middle of the Canal; and on each side of the part so grubbed, the trees, bushes and timber shall be cut and removed in such manner as the Engineer shall direct.

EXCAVATION.—All the top soil, vegetable mould and every other substance of a porous or perishable nature, shall be first removed from the surface of the ground to be excavated, into the outer extremities of the banks; and wherever the earth to be excavated, at or below the top water-line, is composed of materials which are porous, perishable or permeable to water, such material shall be removed as aforesaid, not only from the surface of the ground to be excavated, but also from the base of the bank or banks where such materials are to be found, for the space of ten feet horizontally measured from the top water-line; and the bank or banks, in such cases, for the said space of ten feet horizontally measured from the top water-line, and also above and *below* the same, shall be wholly made and constructed of the most pure, solid, compact and water-tight earth, which can be procured from the adjoining excavation.

DIMENSION AND SLOPE OF THE CANAL.—The Canal shall be constructed in such manner, that the water may, in all places, be at least 20 feet wide at the bottom, and shall be 34 or 36 feet at the surface or top water-line, as the Superintendent or Engineer shall direct, and shall be four feet deep, reference being had to the levels, surveys and maps of Davis Hurd, Esq., Engineer.

TOWING PATH BANK.—The bank to be occupied for a towing path, shall, in all places, be at least ten feet wide, at its surface; it shall be smooth and even, without any sudden inequalities in its height, nor shall it in any place, be less than two, nor more than five feet perpendicular measurement above the top water-line; its surface shall be composed of the best materials for a towing-path, which the adjoining excavation can supply.

OPPOSITE BANK.—The bank opposite the towing-path shall be, at least, seven feet wide on its surface, and at least two feet perpendicular measurement above the top water-line.

SLOPE OF BANK.—The inner sides of the banks, as well above as below the top water-line, shall have such a slope, as that every foot perpendicular rise, shall give a horizontal base, of at least two feet; the outer sides of the banks shall have the same slope, unless otherwise directed by the Engineer.

DEEP CUTTING.—Wherever the top water-line will be more than five feet below the natural surface of the earth, the towing-path shall be ten feet wide, and not less than two feet, nor more than five feet perpendicular measurement above the top water-line, and on the opposite side of the canal, there shall be no horizontal basin or recess unless directed by the Engineer.

EMBANKMENTS.—The ground which is to be occupied as the base of an embankment, shall be effectually grubbed and cleaned, and all the trees, logs, stumps, roots and timber, and every other substance of a vegetable or perishable nature, shall be removed therefrom. The embankment shall be wholly composed of pure, solid, compact and water-tight earth, and shall have the form, slope, height and dimensions, heretofore specified, subject to the direction of the Engineer, as to the slope of the cut and outer banks, as before mentioned. No sticks, logs, roots or timber of any kind shall be left, laid, or admitted into, or under any bank or embankment.

SPOIL BANKS, RUBBISH, &c.—The Spoil banks or surplus earth shall be laid with as much evenness and regularity, and as little injury to the adjoining land as may be, and all the trees, logs, stumps, roots, bushes and rubbish shall be disposed of, with the like precaution; nor shall any unnecessary injury of any kind be done to the owners or occupants of the land through which the Canal passes. No Contractor shall place any logs, timber, earth or rubbish, in such a situation as to obstruct the works on any adjoining contract or part of the Canal. No highway or road which crosses the line of the Canal, shall be obstructed by excavation or otherwise, until the materials for a bridge have been collected, nor until the Contractor shall have received notice from the Superintendent or the Engineer, to complete the construction of the Canal across such highway or road.

APPENDIX B

Items, quantities and prices of the original estimates. The actual work, however, was changed somewhat.

Item	Unit	Farmington		Hampshire & Hampden		
		Quantity	Cost	Quantity	Cost	
Earth excavation	Cu. yd.	4c		52,918	\$2,116.72	
	" "	4½		9,247	416.11	
	" "	5		280,030	14,001.50	
	" "	6		148,623	8,917.38	
	" "	6½		48,991	3,184.41	
	" "	7	820,660	\$57,441.30	264,060	18,484.20
	" "	8	369,407	29,552.56	184,104	14,728.32
	" "	9	129,792	11,681.28	134,506	12,105.54
	" "	10	384,374	38,437.40	92,044	9,204.40
	" "	12	79,567	9,548.04		
	" "	15			186,750	28,012.50
	Total, Farmington	Cu. (Av. 8.22)	1,783,800	\$146,660.58		
	" Hampshire	" (" 7.93)			1,401,273	\$111,171.08
	" Both	" (" 8.10)	3,185,073	cu. yds.		\$257,831.66
	Embankment	Cu. yd.	5c		5,816	\$290.80
" "		6		51,625	3,097.44	
" "		7		98,482	6,893.74	
" "		7½		20,315	1,523.62	
" "		8		195,756	15,660.48	
" "		9	8,800	\$791.17	131,190	11,807.10
" "		10	159,019	18,621.80		
" "		12	166,356	19,962.72		
" "		13	39,361	5,116.93		
" "		14	85,712	11,999.68		
" "	16	32,349	5,175.84			
Total, Farmington	Cu. (Av. 12.54)	491,597	\$61,668.41			
" Hampshire	" (" 7.80)			503,183	\$39,273.18	
" Both	" (" 10.15)	994,780	cu. yds.		\$100,941.32	
Rock excavation	Cu. yd.	25c		1,403	\$350.75	
	" "	30		8,539	2,561.70	
	" "	40		888	355.20	
	" "	50		1,812	906.00	
	" "	60		721	432.60	
	" "	75	650	\$487.50		
Total, Farmington						

Item	Unit Price	Farmington		Hampshire & Hampden	
		Quantity	Cost	Quantity	Cost
Total, Hampshire	(Av. yd. 34.47)			13,363	\$4,606.25
" Both	(" 36.35)	14,013	cu. yds.		\$5,093.75
Removing rock	Lump Sums				\$800.00
Diking	Lump Sum				
Towing Path	Lump Sum		40.00		
	Chain \$3.00	36	108.00		
floating (700 ft.)	Lump Sum				\$350.00
on aqueduct	" "				175.00
Grubbing & Clearing	Lump Sums		\$4,965.00		\$4,180.00
Masonry	Perch \$2.00			6,446	\$12,892.00
Culverts	Lump Sums		\$18,350.00		
Dams, Munn Brook, feeder	" "				100.00
Little River feeder	" "				130.00
20' long x 8' high	" "		150.00		
Unionville feeder	" "		250.00		
Little River, pool	" "				350.00
Westfield R. feeder	" "				3,000.00
Waste weirs (H&H with fence)	" "		5,000.00		
Slope walls	yd. 30c	5,049	1,514.70		
	" 50	396	198.00		
Drain, stone	Lump Sum				50.00
Aqueduct, Trunk only	lin. ft. 5.12½			654	\$3,351.75
8 Mile River (20 ft.)	Complete		\$1,000.00		
Mill " (40 ")	" "		1,600.00		
Farmington River (200 ")	" "		10,000.00		
Bridges, Farm	Each \$60.00			20	\$1,200.00
	" 80.00	3	\$240.00		
	" 100.00	74	7,400.00		
Road	" 85.00			35	2,975.00
	" 100.00	3	300.00	1	100.00
	" 150.00	63	9,450.00		
	" 187.50			2	375.00
in New Haven	" 500.00	9	4,500.00		
Feeder canal	Lump Sum				627.00
Lockage	ft. lift \$160.00			40	\$6,400.00
	" " 164.00			134	21,976.00
	" " 170.00			48	8,160.00
	" " 200.00	218	\$43,600.00		
Double	" " 324.00			76	24,624.00
Guard	Lump Sum		500.00		
	" "		1,000.00		
	" "			2	3,000.00
Keepers' Houses	Lump Sum		10,000.00		
Fences	Lump Sum		29,000.00		
and waste weirs	" "				\$15,400.00
Puddling	Lump Sum		10,000.00		
Engineering & Superintendence			19,000.00		
Contingencies	Lump Sum		32,063.00		
Total			420,697.88†		290,000.00

* The extensions of Wright's figures, in the only copy known are incorrect in several cases; they actually total \$420,014.22.

† "Damages to Land, Houses, etc., to be added."

APPENDIX C
LIST OF STRUCTURES
LOCKS IN CONNECTICUT

Locks Nos.	LOCATION	RISE OR FALL	REMARKS
1 to 6 inclusive	North of Granby Station	37½' down	Traces of masonry left.
7 and 8	Southington	18' down	Traces of masonry left.
9	Milledale	8' down	No traces found.
10 and 11	Cheshire	15' down	A little masonry left.
12	Brooksville	9' down	Masonry practically intact.
13	Cheshire-Hamden Line	8' down	Some little masonry left.
14	North of Mount Carmel		Considerable masonry left.
15	North of Mount Carmel		Some little masonry left.
16, 17 and 18	South of Mount Carmel	13' down	No traces found
	South of Skiff Street, Hamden	28' down	Very slight traces left.
19	North of Mather Street, Hamden		No traces found.
20	South of Putnam Avenue, Hamden	24' down	No traces found.
21	Hamden-New Haven Line		No traces found.
22	Near Henry Street, New Haven		No traces found.
23, 24 and 25	Between Temple and Church		No traces found.
26	North of Wall Street	59½' down	Much of west wall remains.
27	Between Chapel and Wooster		No traces found.
28			No traces found.

The 28 Connecticut Locks had a continuous descent from Massachusetts to Long Island Sound, of 220 feet.

LOCKS IN MASSACHUSETTS

Locks Nos.	Location	Rise or Fall	Remarks
1 to 7 inclusive	Just North of Congamond Ponds	56' down	Traces of masonry only.
8 and 9	One mile north of Congamond Ponds	23' down	A little masonry left.
10 to 18 inclusive	Just North of Westfield	90' up	Traces of location only.
19, 20 and 21	Just South of Southampton	40' down	Traces only.
22	Just South of Southampton	20' up	East wall practically intact.
23 and 24	Just North of Southampton	26' up	Traces only.
25, 26 and 27	South of Easthampton	26' up	Traces only.
28 to 32 inclusive	At the Connecticut River	48' up	Some wrecked masonry left.

The 32 Massachusetts Locks had first 79 feet of descent, then 90 feet of rise, then 134 feet of descent. The entire Canal thus had 60 locks, with 292 feet of rise and 213 feet descent, going from the Sound to the Connecticut River.

AQUEDUCTS IN CONNECTICUT

CROSSING	LOCATION	SPAN		ESTIMATE	REMARKS
		TOTAL	No.		
Farmington River	North of Farmington	200	7	\$10,000.	Actually built 280 feet long. North abutment and 3 piers in fair condition; South abutment and 3 piers have been taken down to level of ground. No traces found. No traces found.
Eight Mile River Mill River	Southington Mount Carmel	40 20	1 1	1,600. 1,000.	

AQUEDUCTS IN MASSACHUSETTS

Little River	Westfield	?	?	Not listed	Traces of masonry foundations.
Westfield River	Westfield	300	?	Trunk \$1,537.50 Masonry 2,206.00	Doubtful traces
Manhan River	Southampton	30	1	Trunk 153.75 Masonry 580.00	Abutments in R. R. bridge
North Manhan River	Easthampton	60	1	Trunk 307.50 Masonry 330.00	Abutments in Highway bridge
Lickingwater	Northampton	246	?	Trunk 1,353.00 Masonry 3,510.00	Doubtful traces

"Trunk" @ \$5.12½ per lin. ft.; Masonry @ \$2.00 per "perch" of 24¾ cu. ft.

CULVERTS IN CONNECTICUT

OVER	LOCATION	SPAN	ESTIMATE	CONDITION	CARRYING
Salmon Brook	Granby	40(30)	\$4,000.	Excellent	Railroad
..... Brook	Hoskins	5	150.	Ends gone	Farm road
..... Brook	Simsbury	4	150.	Excellent	25' embankment
Hop Brook	Simsbury	16(14)	1,500.	Middle gone	Private roads
..... Brook	Simsbury-Avon Line	4	150.	Ends gone	6' embankment
Nod Brook	Avon	12(14)	1,500.	Excellent; (partly rebuilt?)	Highway No. 10
Woodruff Brook	South of Avon	6 (6)	500.	Excellent	Highway, no number
Mill Brook	North of Aqueduct	10(14)	800.	Only west end left	Uncovered
Ice Pond	Farmington	4	150.	Excellent	10' embankment
10 Mile River	Milldale	18	3,500.	Excellent	60' embankment
Roaring Brook	Brooksville	18	Excellent	Railroad
Eaton Brook	Mount Carmel	8	150.	Excellent	Railroad
Shepherd's Brook	Centerville	12(14)	1,500.	Excellent; (partly rebuilt?)	Highway No. 10

All except Roaring Brook, which was built by the railroad in 1847, are semi-circular arches, springing either directly from the plank grillage, or from side walls, not over 2 feet high, on the grillage.

Roaring Brook is a 3 centred, 50° 30' skew arch, with radii of 6 feet, 12 feet, and 6 feet. Normal Span, 18 feet; face span, 28 feet.

CULVERTS IN MASSACHUSETTS

OVER	LOCATION	SPAN	ESTIMATE	CONDITION	CARRYING
..... Brook	Southampton	3' box	\$ 134.	Excellent	Railroad
..... Brook	Southampton	3' box	180.	Excellent	Railroad
Saw Mill Brook	Easthampton	10' Arch (10)	542.	Excellent	Highway
..... Brook	East-North. Line	(3)	130.	Traces only	In woods
Rocky Hill Brook	Northampton	3' box (3)	192.	Excellent	Railroad
..... Brook	Northampton	3' box (3)	200.	Excellent	Railroad

Hurd's report lists 15 culverts under the main canal, but the above are all that were located. It is a question whether or no the box culverts are canal culverts; they evidently are old, but Hurd refers to them as arches.

WESTFIELD RIVER FEEDER CULVERTS

Moose Meadow Brook	12'	\$ 380.	Only south end remains	Uncovered, in fields
Sacketts Brook	6' (6')	Only wrecked grillage remains	Uncovered, in fields

A total of \$376 is given for this and a 3' span culvert over "Powder Mill Brook." Span figures in parentheses are those given in the estimate.

APPENDIX D

A partial bibliography of the Northampton Canal, with some notes as to the material.

An / Account of the / Farmington Canal Company / etc.

Twenty-four page official report issued by direction of the President of the New Haven and Northampton Company in 1850. Excellent account.

A Connected View / of / The Whole Internal Navigation / of / The United States / etc. George Armroyd.

Brief notes with some little data.

History / of / The City of New Haven / etc. Edward F. Atwater.

Excellent article by George D. Watrous.

History / of / Southington, Conn. / etc. Francis Atwater.

Good account.

Farmington Canal / To the / Citizens of New Haven.

Pamphlet opposing proposed location.

1786 Centenary of Hamden, Connecticut, 1886 / etc. Wm. P. Blake.

A brief account.

Farmington, Connecticut / The Village of Beautiful Homes / etc.

Excellent local account by Julius Gay. Brandegee & Smith.

Calm Considerations Relative to the Canal.

Local propaganda—8 page pamphlet.

History / of / Plainville / Connecticut / etc. Henry A. Castle.

Excellent local account.

A History of / Connecticut / etc. George L. Clark.

Just an outline.

Amendment / of the / Charter / of the / New Haven and Northampton Company / etc. (To permit construction of railroad.) Pamphlet.

The / Act of Incorporation / of the / Farmington Canal Company / with the / Reports / of the / Hon. Benjamin Wright / etc. 16 page pamphlet.

The / Act of Incorporation / of the / Farmington Canal Company / also the / Act of Incorporation / of the / Mechanics Bank of New Haven / etc. 22 page pamphlet.

The Act / Incorporating the / President, Directors and Company / of the / Farmington Canal; / The Act / Incorporating the / Hampshire & Hampden Canal Company / etc. Pamphlet.

Report and Resolutions / in favor of / A Loan of Credit. By the City / in / Aid of the Canal/ etc. 8 page pamphlet.

- Resolves / and / Private Laws / of the / State of Connecticut / etc.
 Volumes I, II and III. (Charters in Connecticut.)
- The / Old Mount Carmel Parish / etc. Geo. S. Dickerman.
 Good outline, largely local.
- Minutes of the Proceedings of / The Directors of / The Farmington Canal Com-
 pany / etc.
- Gazetteer / of / Hampshire County, Mass. / etc. W. B. Gay.
 Very brief account.
- Reminiscences / of / Old Northampton /etc. Henry S. Gere.
 Local account, brief.
- Plan /of the Town of / Northampton / etc. John C. Hales.
 Location of canal through Northampton.
- Centennial / Hampshire Gazette / etc.
 Brief account; local.
- Old / Towpaths / etc. Alvin Harlow.
 Good outline.
- A / Gazetteer / of / Massachusetts / etc. John Hayward.
 Mention only.
- New Hartford Side Cut No. 1. William Hillhouse.
 8 page pamphlet.
- Report / of / Jarvis Hurd, Esq. / etc. / With an Estimate of Expense to Complete
 the / Canal, from the termination / of the Farmington / Canal to
 Northampton.
- Map / Exhibiting the / Farmington & Hampshire & Hampden / Canals / etc.
 N. & P. P. Jocelyn.
- Western Massachusetts / A History / etc. J. H. Lockwood.
 Excellent account, chiefly of Massachusetts portion.
- Westfield / and its Historic Influence. / J. H. Lockwood.
 Same account, practically, as in "Western Massachusetts."
- Map / of the / Farmington / Canal.
 Original location plans.
- Town Plans, Massachusetts (In office of the Secretary of the Commonwealth.)
 Easthampton. Atlas No. 14. Map 15.
 Northampton. Atlas No. 14. Map No 22.
 Russell. Atlas No. 10. Map No. 19.
 Southampton. Atlas No. 7. Map No. 15.
 Southwick. Atlas No. 10. Map No. 20.
 Westfield. Atlas No. 13. Map No. 13.
 (Office of Secretary of the Commonwealth, Massachusetts.)

The/ Story of Connecticut / etc. Lewis Sprague Mills.
 Good brief account.

History / of / New Haven County / etc. Mary H. Mitchell.
 Good general account.

Compendium / of the / Internal Improvements / of the / United States, etc.
 Samuel A. Mitchell.
 Brief note, but with much data.

Charters / of / The New York, New Haven and Hartford / Railroad Company /
 etc.

Annual Reports of the New Haven and Northampton Company.

By-Laws / of the / New Haven and Northampton / Company / etc.
 18 page pamphlet.

History / of the / Canal System / of the / State of New York / etc.
 Noble E. Whitford.
 Table with considerable data.

History of Connecticut, etc. Norris G. Osborne.
 Good outline.

Farmington Canal—Northampton Canal. A. J. Ralph.
 Paper before the Hamden Historical Society, February 2, 1932.
 Excellent account, chiefly local.

The Story of a New England Canal. Helena Smith.
 New England Magazine. New Series, Vol. 25, pages 707-711.
 Good general account.

Sketch / of the / Civil Engineering / of / North America / etc. David Stevenson.
 Small scale map and some data.

An Argument / To the Opponents of The Proposed Loan / etc. J. L. Sullivan.
 8 page pamphlet.

Petition / of the / Farmington and Hampshire and Hampden Canal / Companies,
 etc. / for loan from United States / 21st Congress, House of Representatives. Report
 221 and Bill H.R. 276.

Also these newspaper articles:

"Ancient Canal only a Memory Now."

New Haven ? about February 17, 1919.

"Dumping Dollars into a Ditch." R. T. Bulkeley.

New Haven Journal Courier. February 26, 1932.

"Farmington Canal a Miry Memory."

New Haven Sunday Register. March 3, 1929.

"From New Haven to Canada by Canal."

New Haven Sunday Register about April 1, 1913.

- "Old Canal Pleasant Lure, etc." Nadyne Wythe.
New Haven Sunday Register. April 2, 1933.
- "July 4th Marks Centennial." Mabel S. Hurlburt.
Hartford Daily Times. July 3, 1925.
- "Old Farmington Canal Company."
Hartford Courant about August 24, 1908.
- "Old Scrapbook Reveals First Craft."
Hartford Daily Times. November 14, 1931.
- "Plainville Reclaiming Canal."
New Haven Journal Courier. November 15, 1928.
- "Statement as to Canal affairs, etc." Joseph E. Sheffield.
New Haven Daily Herald. August 27, 1847.
- "When and Why of . . . Canal." "Old Timer."
New Haven Register, August 16, 1925.
- "Who was Who on the Old Canal"
New Haven Chronicle about April 28, 1908.

No reference is here made to the extensive material regarding the extension of the canal system north of Northampton, and that which is very closely related to it, the projected improvements of the Connecticut River at that time, nor does the above list pretend to be at all complete; it does, however, include the more important material examined to date by the author.