THE GEOLOGY AND ENGINEERING STRUCTURES

of the

CHESAPEAKE AND OHIO CANAL

An Engineering Geologist's Descriptions and Drawings

William E. Davies

Draft 1989
Published 1999

The C&O Canal Association is an all-volunteer citizens organization established in 1954 to help conserve of the natural and historical environment of the C&O Canal and the Potomac River basin. The Association works with the National Park Service in its efforts to preserve and promote the 184-mile towpath.

PREFACE TO THE ELECTRONIC EDITION, 2014

Over the past 15 years William Davies' uncompleted manuscript has established itself as an invaluable resource for students of the C&O Canal. The document benefits from Davies' experience as an engineer, knowledge of geology, and extensive archival research.

In 1954 Davies was part of the famous hike led by Justice William O. Douglas over the entire length of the canal. That hike dissuaded the editors of the *Washington Post* from their support of the plan to convert the towpath into a highway. Increased public awareness of the canal's scenic beauty and historic significance set in motion a sequence of events that culminated in the creation of the C&O Canal National Historical Park January 8, 1971.

The C&O Canal Association could think of no better way to mark the 60th anniversary of the Douglas Hike than to make Davies' seminal work available to a wider audience.

Friends trace the start of Davies' love affair with the canal to the 1954 Douglas Hike. When the editors of the *Washington Post* accepted Douglas' challenge to hike the canal, he recruited various experts to join the hike. Justice Douglas thought these experts could bolster the case for preservation. Davies became part of the hike when Justice Douglas approached the United States Geological Survey in search of a geologist.

Davies was a charter member of the C&O Canal Association and its president in 1962. Even though his career took him around the world, Davies continued to serve as an officer or director of the association from 1955 until his death in 1990.

This unfinished manuscript is product of Davies' love of the canal and his love of learning. After Davies died, his friend Bruce Wood wrote, "Because he did not cease researching, he did not cease writing. I do not know how large the book is today, but I knew it would never be finished in his lifetime because of his love for learning and for passing that learning on to others."

PREFACE

William E. Davies began collecting and organizing data for this manuscript on the engineering geology of the Chesapeake and Ohio Canal late in the 1940s. He was still pursuing relevant data on the canal when he died on June 27, 1990. For Bill, the consummate engineering geologist, the effort was both a labor of love and an intellectual challenge.

The manuscript provides an excellent example of how a capable engineering geologist does field work. It is also a fascinating historical document. The material is reproduced from his draft without changes but with these additions:

1. Consecutive page numbers have been added at the bottom of each page; they are enclosed in parentheses to differentiate them from Bill's earlier pagination.
2. The report has been divided into sections relating to consecutive sections of the canal; they correspond to the informal organization of his notes, which (along with the page numbers) make it easier to find particular sections.
3. Bill drew the frontispiece and Figure 1, which show the geologic/geographic setting of the canal.
4. Bill's wife, Geraldine H. Davies, made available diagrams of an aqueduct, a culvert, and a lock from Bill's large collection.
5. Bill wrote the introduction, which was previously printed in Field Trip Guidebook T206, published for the 28th International Geological Congress.

The memorial to Bill (Appendix A) was written by a longtime colleague, Daniel B. Krinsley of the U.S. Geological Survey. The Geological Society of America originally published this memorial, and graciously allowed its inclusion in this work. Dr. Krinsley has added five vignettes that reflect Bill's character.

Appendix B is a piece that Bill wrote to illustrate some of the trials and tribulations faced by those who built the canal.

Appendix C is a selected bibliography of William E. Davies prepared by Dr. Krinsley. It was published by the Geological Society of America.

The research supporting this manuscript constitutes 38 linear feet of well-organized materials, including copies of original sources, field notes, sketches, maps, drawings, and photographs concerning the canal. This collection will be deposited in the Western Maryland Room of the Washington County Free Library in Hagerstown, Maryland, and will be available to scholars and others interested in the C&O Canal.

In compiling and arranging this report, I have had considerable assistance. The effort would not have been possible without the help of Gerry Davies, who gave Bill the same type of wholehearted support during his field work. Her initials are found on many field note pages from source materials.

Amber Edmiston inserted the page numbers and clarified some of Bill's manuscript insertions that were barely legible.

Dedra L. Davis and Veronica Santos-Mazzuchi provided typing support. Scott Schramm helped with layout and Stephanie S. Babcock assisted with book design and paper selection.

The introduction is printed with permission of the American Geophysical Union. The C&O Canal Association (as reflected by longtime member and former president Carl Linden) retained an interest over the years in having Bill's work made available.

Blair T. Bower, P.E., was a continual help and prod to achieving the final product.

Thomas W. Richards
Arlington, VA 30 June 1999

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INTRODUCTION

The Chesapeake and Ohio Canal was one of the more ambitious transportation projects of the early 19th century. As originally planned, it was to extend from Georgetown, D.C. to Pittsburgh, Pennsylvania by way of the Potomac, Youghiogheny, and Monongahela valleys with a summit tunnel over four miles long.

The canal was begun at the west end of the Georgetown level on 4 July 1828 and after 13 years of hard financial and physical labor construction came to a halt at Dam No. 6, 134 miles from Washington, D.C. After lying fallow above Dam No. 6 for eight years, construction resumed and the canal reached Cumberland in 1850, eight years after its rival, the Baltimore and Ohio Rail Road, had gained entry to the same point. All hopes of reaching Pittsburgh disappeared even though a tunnel had been constructed to connect the C & O Canal with the Pennsylvania Canal.

The C & O Canal assumed the role of hauling coal to the nation's capital for the rest of its life. The canal did this job well but its original cost of at least $11,000,000 saddled it with a huge debt that never permitted a profitable operation. The canal held its own against the railroad until the middle 1870's when the efficiency of air brakes and larger locomotives permitted rates so low on the railroad that the canal could not compete.

In default of interest on a major bond issue, the canal accepted bankruptcy after the disastrous flood of June 1889. Normally the canal should have died then. However, its old rival, the B & O Railroad, saw that the canal could be used by the then growing and competing Western Maryland Railroad to reach Cumberland and Washington and open new rivalry in transporting coal. After litigation the canal fell under the influence of the B & O and was restored as an operating waterway in 1891.

The canal, operated by trustees, continued to haul coal until the 1924 floods caused serious damage. With little coal to haul, and with the Western Maryland Railroad under B & O control, there was little reason to continue operation. To retain the charter and franchise, the canal was held to be in a state to accept traffic if adequate tonnage was offered. None was offered and the canal continued to decay slowly. In 1938 the B & O Railroad found it hard pressed to make payments on a Reconstruction Finance Corporation loan and the canal was offered for sale to the U.S. government. The canal was purchased by the U.S. Department of Interior in 1938 for $2,000,000 with the proceeds going to ease the B & O's plight. The canal was turned over to the National Park Service for use as a recreation area and was restored between Georgetown and Seneca, Md. The canal was made a national historical park in 1971. By 1988 it was among the top 10 national parks in attendance with about 4,000,000 visitor days in that year.

The canal crosses four major geological provinces (see frontispiece). From Washington to Point of Rocks the canal is in the Piedmont Province, a low rolling terrane of Precambrian to Lower Paleozoic metamorphic rocks. The western part of the Piedmont contains rocks of Triassic age, mainly red sandstone, shale and conglomerate intruded by diabase dikes and sills. The Blue Ridge province between Point of Rocks and Harpers Ferry consists of three ridges formed of Precambrian gneiss and metabasalt and lower Cambrian quartzite and phyllite. West of the Blue Ridge is the Great Valley province, a lowland up to 26 miles (41.8 km) wide in the Potomac River area. West of the Great Valley is the Valley and Ridge province consisting of folded Paleozoic rocks, (see Figure 1: Geologic Map of the Potomac Appalachians).

The Allegheny Plateau lies just west of the Cumberland terminus of the canal. It is an area of high rolling uplands on relatively horizontal Carboniferous (Mississippian and Pennsylvanian) and Permian shale, sandstone and coal formations.

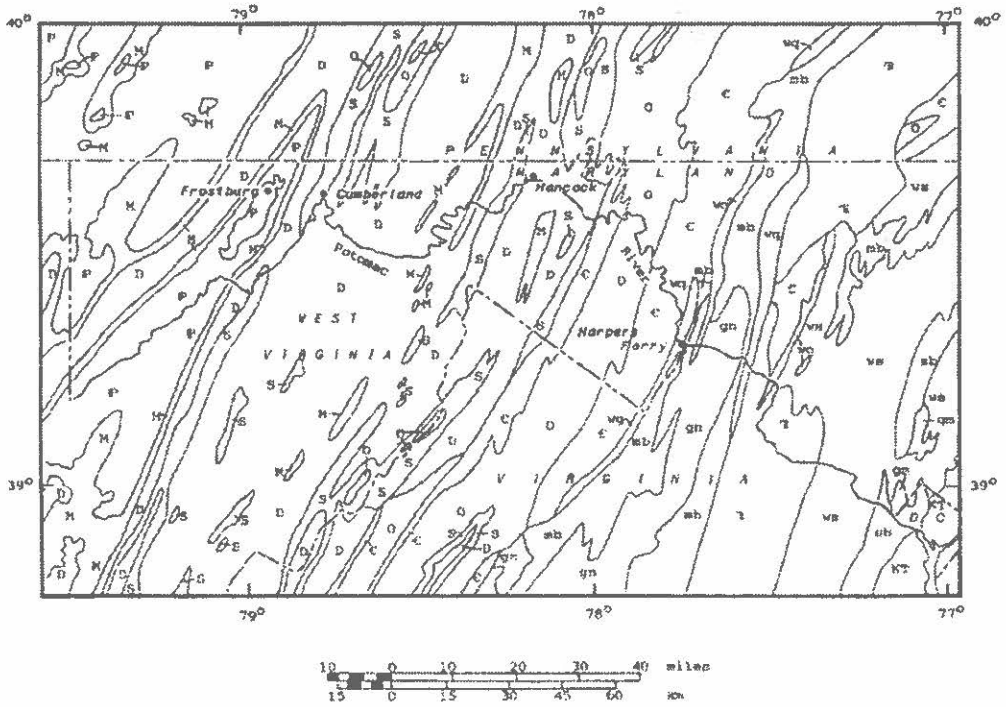


FIGURE 1 Geologic Map of the Potomac Appalachians. KT Cretaceous and Tertiary, T Triassic, P Permian, P Pennsylvanian, M Mississippian, D Devonian, S Silurian, O Ordovician, C Cambrian, wq Cambrian or Precambrian Weverton and Harpers Formations. Metamorphic and igneous rocks: gm Georgetown igneous complex, sb Skylesville Formation, ws Peters Creek (Wissahickon) Formation, mb Catoctin metabasalt, gn granite gneiss. Compiled from state geologic maps: Maryland 1:250,000 1968, West Virginia 1:250,000 1968, Pennsylvania 1:250,000 1980, Virginia 1:500,000 1963. For details on formations, see Table 1.

Potomac Valley history begins shortly after the founding of Jamestown, Virginia in 1609 when John Smith explored the river to Little Falls, 3 miles (4.8 km) west of the present site of Washington. By 1736, the Potomac River had been explored to its headspring at the Fairfax Stone, and by 1750 traders and a few settlers were scattered throughout most of the valley. Many had migrated via the Great Valley from Pennsylvania.

A fort was built at Cumberland in 1754-55 that was the base for General Braddock's ill-fated military venture against Fort Duquense (now Pittsburgh). Cumberland was organized as a town in 1786 following the establishment of Shepherdstown, Williamsport and Hancock. Early settlers were mainly Germans but construction of the railroad and canal brought in many Irish, Dutch, English and Welsh immigrants. Industry in the Potomac Valley was generally light except in Cumberland. In that city steel mills, synthetic fiber plants and tire factories grew, prospered and then closed. Coal mining at the head of the valley lasted a century and a half until the seams were mined out in the 1970s. Publishing, farming, cattle raising, fruit growing and recreation are now important segments of the economy. Close to Washington, the valley is the bedroom for many employees of the federal government and the private technical companies that support federal activities.

TABLE 1 General stratigraphic column for the Potomac Appalachians
(Thickness shown is the maximum for the area)

Triassic – Manassas (New Oxford) Formation, red sandstone and shale, limestone conglomerate; diabase sills and dikes, 4,500 ft (1,372 m).

Permian – Dunkard Group, shale, siltstone and sandstone, lenticular limestone, 200 ft (61 m).

Pennsylvanian – Monongahela Formation, claystone, sandstone and coal beds, 375 ft (114 m). Conemaugh Formation, claystone, shale, sandstone and thick coal beds, 900 ft (275 m). Allegheny Formation, claystone, siltstone, sandstone and coal beds, 325 ft (100 m). Pottsville Formation, conglomerate, sandstone, claystone, some coal beds, 60 ft (18 m).

Mississippian – Mauch Chunk Formation, red and green shale, and sandstone, 800 ft (244 m). Greenbrier Formation, argillaceous to arenaceous limestone, 300 ft (91 m). Purslane Sandstone, white, coarse-grained sandstone and conglomerate, 250 ft (76 m). Rockwell Formation, arkosic sandstone, shale, and thin coal beds 1,300 ft (396 m).

Devonian – Hampshire (Catskill) Formation, red shale, and sandstone, 3,800 ft (1,158 m). Chemung (Foreknobs Formation), sandstone, conglomerate with red beds, 1,900 ft (580 m). Brallier Formation, black, fine-grained sandstone and gray shale, 2,200 ft (660 m). Harrell Shale, dark gray to black shale, 278 ft (85 m). Mahantango Formation, thin-bedded, olive gray shale, some sandstone, 1,230 ft (375 m). Marcellus Formation, gray to black shale, 575 ft (175 m). Needmore Formation, black, carbonaceous shale, 490 ft (150 m). Ridgeley Sandstone, calcareous, quartzitic sandstone, 160 ft (49 m). Shriver Chert, dark gray to black chert and cherty shale, 14 ft (4 m).

Devonian/Silurian – Helderberg Formation, limestone, shale and chert, 200 ft (61 m). Keyser Limestone, dark gray, nodular limestone, 300 ft (91 m).

Silurian – Tonoloway Limestone, gray, laminated limestone, 600 ft (183 m).
Bloomsburg Formation – red siltstone, shale and argillaceous limestone, 35 ft (10 m). Rochester Shale, calcareous shale and argillaceous limestone, 250 ft.

Ordovician – Juniata Formation, red siltstone, shale and sandstone, 500 ft (152 m). Martinsburg Formation, dark gray to black siltstone and shale, 2,500 ft (762 M). Chambersberg Formation.

Ordovician/Cambrian – Conococheague Limestone, dark blue, argillaceous and siliceous limestone, 1,900 ft (580 m).

Cambrian – Elbrook Limestone, laminated, argillaceous limestone, 2000 ft (610 m)
Weverton and Loudon Formations, gray quartzite and conglomerate, 425 ft (130 m).

Cambrian/Precambrian – Harper's Ferry, siliceous siltstone, 2,000 ft (610 m). Weverton and Loudon Formations, gray quartzite and conglomerate, 425 ft (130 m).

Metamorphic and igneous rocks of the Piedmont:

Lower Paleozoic - Sykesville Formation, schist with blocks of Peters Creek Formation and other rocks. Georgetown igneous complex, gabbro, amphibolite, quartz diorite.

Precambrian – Catoctin metabasalt and metarhyolite, epidote rich, some tuffaceous phyllite. Swift Run Formation, sericitic quartzite and phyllite. Peters Creek Formation, phyllite, schist, mica gneiss, metagraywacke. Biotite granitic gneiss and grandioritic gneiss.

STRUCTURES OF THE CANAL

Most of the canal structures were made of stone or earth. As far as possible the canal was designed to permit excavation in soil and weak shale. The architecture of the canal represents unique uses of otherwise common structures. These include:

Prism – The water channel of the canal was generally 50 to 60 feet (15-18 m) wide at the top and 6 feet (2 m) deep. Embankments were made from materials excavated from the prism except in several areas from Hancock to Pawpaw where the material was obtained in West Virginia and transported across the river on temporary bridges.

Dams –Dams were used to raise the river to the water level of the canal so that water could be fed into the canal. Initially most of the dams were timber cribs filled with gravel and sheathed with planks. During and after the Civil War, Dam Nos. 4 and 5 were rebuilt as masonry structures. Dam No. 8, at Cumberland, was originally a masonry structure. Dam Nos. 1 and 2 were rubble, brush and other debris placed in the river. All dams had bedrock foundations. Dam No. 7, planned near Pawpaw, was not constructed.

Locks – The lift locks on the canal were ordinary Pound locks with 100 feet (30.5 m) long chambers for boats (Figure 2). The chambers were 15 feet (4.6 m) wide. Lift ranged from 3 to 10 feet (1 – 3 m). Locks were built of dressed stone or rubble backing with timber faces. Lock gates were of the swing type; head gates of several locks were converted to drop gates in the 1870s. In the early 1880s, 14 locks were lengthened to 200 feet (61 m) by timber extensions. Footings for the locks on soil foundations (Figure 3) consisted of 12-inch (30 cm) timbers, a foot (30 cm) apart, placed longitudinally along the walls of the structure. These were overlain by transverse timbers. The timbers were covered with 3-inch (7.5 cm) planks and stonework placed upon them. All the timbers were laid so as to be wet permanently.

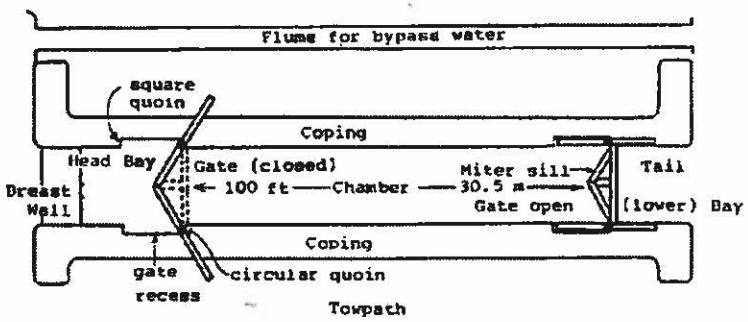


FIGURE 2 Plan of a Lock.

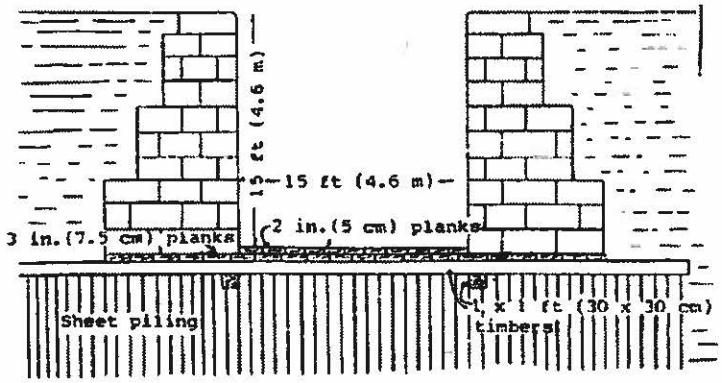


FIGURE 3 Cross Section of a Lock.

Culverts and Aqueducts – It was the practice of the canal engineers to keep streams from draining into the canal. The canal was carried across streams by single arch, masonry culverts. Aqueducts crossed larger streams. The arch in the barrel of most culverts was rubble bonded by cement. Faces of the culverts and aqueducts were dressed masonry. Earthen embankments bound the prism over the culverts. Footings for culverts and aqueducts were similar to those for locks. Stone for most structures was obtained locally except for a few locks and culverts in the Georgetown area where Aquia Creek freestone, quarried 35 miles (56 km) south of Washington, was used.

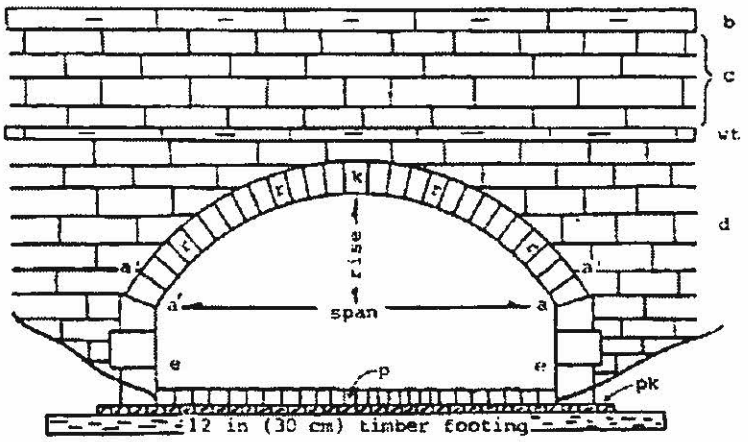


FIGURE 4 Profile of a Culvert or Aqueduct. A-a' skewback, b coping, c parapet, d spandrels, e abutment, k keystone, p pavement, pk 3 inch (7.5 cm) plans, r ringstones (archstones), wt water table or belt.

Wastes – These structures were used to control water levels in the prism. Surges of water from emptying of locks were discharged through the wastes. The wastes were used to maintain a current of 2 miles (3.2 km) per hour downstream to aid loaded boats going down from Cumberland. They also were used to empty the canal for repairs. Originally, the wastes were overfall spillways. These were replaced by standard, 3-gate weirs with insert boards and wicket gates.

Stop Gates, Stop Locks and Guard Locks - These structures were placed in the canal to divert floodwater and to cut off flow in the prism if a breach occurred in an embankment. Swing gates, drop gates and insert timbers were used in these structures.

Towing Path – The towing path was on the riverside of the canal except for a short stretch in Georgetown. The path was 12 feet (3.7 m) wide and had a natural surface until the 1870s when crushed stone was added. Canal terminology cited the embankment bounding the prism opposite the towing path as the berm.

Canal Boats were about 90 feet (27.5 m) long, 14.5 feet (4.4 m) wide and had a draught of less than 6 feet (1.8 m). The largest boats carried about 100 tons of cargo, mainly coal. The boats were privately owned until 1889. Each boat was operated as a family affair paying toll to the Canal Company and collecting freight charges from the shipper. After 1889, a contract was let by the Canal Company with one company to supply boats and operate them. Horses pulled the boats until an epidemic struck the teams. Afterwards teams of two mules supplied the motive power in relays with another team housed on board the boat. Locks required 10 minutes for passage. A trip from Cumberland to Washington took a week.

What lies along the canal? At present it is one of the few 19th century American canals that are nearly intact; only the last mile at Cumberland has been altered by flood control work. The canal is a geological laboratory extending 184.5 miles (294 km) across the Piedmont, Blue Ridge, Great Valley and the folded Valley and Ridge provinces. The canal is a display of early engineering. Its 182 culverts, 11 aqueducts, six dams and 74 locks are fine examples of 19th Century's engineering practices.

William E. Davies
15 July 1989

WASHINGTON BRANCH

Until the late 1870's the eastern terminus of the C & O Canal was its junction with the Washington City Canal at 17th St. and Constitution Ave.. The Washington City Canal connecting the Potomac and the Anacostia Rivers was constructed between 1791 and 1815. The canal was used very little and by the time of the Civil War it was a polluted, silt-filled ditch that was an eyesore along the Mall west of the Capitol. Between 1874 and 1886 it was roofed over to form part of the Tiber Creek Sewer west of the Capitol and filled in elsewhere.

The Washington Branch of the C & O Canal was 1.3 miles long and much of it was constructed on embankments on the tidal flats along the east bank of the Potomac River. The northern end of the branch canal connected with the main canal at the Rock Creek Basin.

West of 17th St., the Washington Branch trended slightly north of

Constitution Ave., skirting the base of the low hill west of 23rd St. in the area now occupied by the approaches to the Roosevelt Bridge. Curving to the north, it followed roughly along the route of the present Rock Creek Parkway, past the Kennedy Center, to a junction with the C & O Canal at the bend in the Rock Creek Basin, 100 feet from the dam and tidelock. The route is now usurped by Constitution Ave., the approaches to the Roosevelt Bridge, and the Kennedy Center.

add regrd 1909 I for Potomac Pk put this on new page

At the 17th St. terminus there was a lock (Lock B) connecting with the Washington City Canal and to tidewater. Bridges crossed the canal at 17th, 22nd, D, and G Streets and there were a stop lock at 27th St. and wharves at 17th and 27th Streets. A culvert passed beneath the canal at 21st St..

Construction on the branch started in 1832 as part of an agreement for subscription of $1,000,000 to the C & O Canal by the City of Washington. The branch was opened for service in 1834. The C & O Canal Company deferred maintenance on the branch and by 1849 the

prism of the canal was so silted that navigation was difficult; by 1860 the canal was filled with sediments 2 to 6 feet thick and operations ceased. Most of this came from freshets in Rock Creek, drainage from sewers and streets, and from coal tar refuse deposited by the gas works near the Rock Creek Basin. The towpath along the Washington Branch was leased in 1866 to Henry H. Dodge for use as a wagon road.

The lockhouse on the southwest corner of 17th St. and Constitution Ave., built in 1837, is the only structure associated with the branch that is intact. It is 1 1/2 stories high and is faced with matched rubble and some dressed stone, mainly light gray sandstone, garnet schist, and gabbro (dark igneous rock). The lentils over the doors and windows are cut Aquia Sandstone. The house is now used for public lavatories.

Map pg. size, draft at 2X.

Georgetown - early tobacco port., Rock Creek navigable (in colonial times) to P St.
Water St (K St.) : docking area.

GEORGETOWN TO SENECA

Distances are measured from the tidelock and are based on Chesapeake and Ohio Canal Company surveys of 1835, 1851, 1870, miscellaneous construction surveys, and B. F. Mackall, T. L. Patterson surveys 1896 - 1898. Distances based on mileposts erected by the National Park Service are shown in parenthesis where they differ more than 0.05 mile, from those of the canal company.

Why the difference?

MAP OF GEORGETOWN, Tidelock to Aqueduct Bridge; use Hopkins Atlas as a base with reduction; detail from p 7 Georgetown Waterfront and map of 1851.

✓ Anacostian indian village near mouth of Rock Cr. - may have been in Va.

insert text on Washington Branch

0.00 TIDELOCK 3.5 ft. lift, constructed 1828 - 1831. The Tidelock was built of Aquia freestone with granite backing but the chamber now consists of granite, garnet schist, some Seneca red sandstone rubble masonry with brick and concrete repairs. The lock is founded on piles with timbers bolted to the top of the piles and planking over the timber forming the footing for the masonry. A footbridge formerly

South side of dam: unloading pier, trestle & derricks

The head of the lock is now filled with earth.

Washington Gas Light Co. – chartered 8 July 1848.
Georgetown Gas Light Co., a subsidiary; construction began 1848.

crossed the tidelock. Ruins of an old gravity dam are on the south side of the tidelock. The first dam completed in 1831 was a low gravity dam with a waste weir (Waste no. 1). The present dam was built in 1869 after the Washington Branch Canal was abandoned. It was 100 ft. long consisting of a concrete wall on the north extending 25 feet to 6 timber frames with paddle gates. At the south end there was a gravity dam 50 ft. long but this was partially removed in the 1930's to increase flow in Rock Creek for the abatement of pollution from sewage.
All but 1/4 of north end of dam washed out.

The MOLE, built 1829 - 31, extends west from the tidelock 1080 ft. along the Potomac River. The lower end is occupied now by the Harry T. Thompson Boat Center and the western part is a lumber yard. When the canal was in operation, large timber cranes with horizontal booms extending over the river, occupied most of the mole and were used to unload coal barges for transshipment into schooners.

Washington Harbour - condominiums + offices 1983-86.

A BASIN along Rock Creek was built in 1831 as an unloading area for canal boats and some timber crib walls can be seen on the banks of log piling –

the creek. The West Station of the Washington Gas Light Company, erected 1858, dismantled 1949, was on the east side of the basin below K Street. Before the canal was constructed, K Street crossed Rock Creek on a 3-arched bridge, 135 ft. long, built in 1792 (Emery 1938). This was replaced by a timber bridge upon construction of canal. This bridge was raised and rebuilt in 1836 and was replaced by an iron truss in 1869. A steel through plate girder span was built in 1906-07 and was in service until 1940 when the present K Street bridge was built. This span was modified in 1948-49 and 1963-64 in connection with development of Whitehurst Freeway. A crossover bridge for the towing path was beneath the K Street bridge in the 1870's. To the east, between branches of freeway, are 4 old limekilns operated from 1833 to 1908 by Eli Wade and William H. Godney (Aetna Lime Kilns 1864-1908); limestone used in kilns was brought by canal from quarries in the Triassic limestone

conglomerate in the Monocacy area and from quarries in West Virginia near mouth of Antietam Creek.

Plan of basin, mole, tide lock and dam- 8"x10" drawing reduce to 3"x4" approximately.

0.37 LIFT LOCK 1 The canal proper begins 1800 ft. 2 paddles in each gate. Notch for stop gate at head of lock. = 5 in. wide x 4 in. deep + for drop boards north of the mouth of Rock Creek and Lock 1 is 150 ft. west of Rock Creek. The lock has a lift of 8 ft. It was constructed 1828-30 but it was taken down and rebuilt in 1830 after a defect was found in side wall. The chamber and coping are Aquia freestone with blocks of schist and bricks used in repairs; some light gray, coarse-grained granite is in the coping on north side at lower gate recess. The wing wall on the north side of the canal from Rock Creek to the lock contains Seneca red sandstone, Aquia freestone, schist and brick. The curving wall on the south is built of schist. Canal Company records indicate a contract for a lockhouse at Lock 1 was made in 1831, but there is no indication of its construction. Shanty on south side, head of lock

Towing path Lock 1 to 29th St + to Rock Creek's mouth.

Towpath, Lock 1 – Lock 3 brick.

Between the lock and Rock Creek, on the towing path, is a large boulder of schist on which has been placed the National Historical Marker for the canal. ~~The Washington Gas Light Company building, on north side of towing path, is faced with buff gray, medium-grained, pebbly Aquia Sandstone (freestone); quartz grains are subangular and rounded pebbles with diameters up to 2½ inches are conspicuous.~~ New brick building - Building removed & replaced by new building. Georgetown Plaza, 4 Seasons Hotel opened in 1979

The new building on the north side of the canal at Lock 1. is on the site of an early plant of Georgetown Gas Company, ~~and was built in 1928~~ then in 1887. A wall of rubble and mortar, topped with cut ~~stone~~ red sandstone on the north side of the canal from Lock 1 to Lock 2.

0.42 ✓ LIFT LOCK 2 8 ft. lift, constructed 1828-31, rebuilt 1886. The chamber and coping are mainly Aquia Sandstone; gabbro, schist and brick were used in repair. The Aquia Sandstone in the west wing wall is deeply weathered and worn and much of the Aquia stone in the east wall, south side, has been replaced by concrete. The 29th St. (Greene St.) bridge over the tail of the lock was originally a stone arch completed in 1831. It was rebuilt in 1866-67 as an iron span and the

29-30 St. NCFC complex

Upper wing, south side has concrete facing

CT bridges transferred from NPS to DC in 1941

Wings are Aquia ss., concrete on south; rubble wall on south; Locks 1&2 rubble on north with part mortar. Top of wall is cut red ss.

present reinforced concrete slab bridge was built in 1929. An old iron railing, with 1 x 42-inch round rod balusters and 1 3/8 x 42-inch round posts, is on the southwest wing. The towing path switched from the south to the north side of the canal at this point and the bridge was used to cross the canal. An incline from Lock 1 to the level of the bridge, used in the crossover, is on the south side of canal. The sloping wall on the north bank, east of the lock, is dressed Seneca red sandstone at the top and coursed rubble of gabbro and schist below. Canal Company records indicate that a lockhouse was built in 1831 between locks 2 and 3 but no evidence of such a house is now visible.

Wings of bridge at tail of Lock 3 are Aquia Ss. Lock 2 to 3 on south side, concrete and dry coursed rubble, brick wall; mortar on towpath side (north).

Between Locks 2-3 the wall on the south is concrete, dry coursed rubble & some brick. On the north the wall the wall is of similar material with mortar.

Bldg on north of L2: C.F.C. Square ca. 1979

Gas works formerly on north side of canal between Green & Washington Streets.

Towpath blacktop Lock 2 to 30th St

X 0.47 Stone culvert in berm (north wall) - removed where new building constructed.

0.49
0.47

LIFT LOCK 3 8 ft. lift, constructed 1828-31. The 2 paddles per gate.

chamber is coarse-grained granite and Aquia Sandstone with a few blocks of schist and gabbro in upper chamber; the granite is dominantly quartz and feldspar with few dark minerals; Aquia Sandstone is buff colored in the chamber and dirty gray in the coping.

check this

S. side Canal at 30th St Morrison House Hotel ca 1980

Towing path from Lock 3 to Lock 4 formerly cobble stones - replaced w brick

East end of Lock 3 - bust of Justice Douglas - dedication May 1971?

Towpath Lock 1 to Georgetown plaza: brick

The wing wall in the basin below the lock is Aquia Sandstone and the wall along the towing path in lower basin is schist and gabbro with a few blocks of Seneca red sandstone. The Each gate in the lock contains two paddle valves. berm wall is schist and concrete. The 30th St. (Washington St.) bridge, over the tail of lock, was built 1830-31 as a stone arch of Aquia Sandstone with a 40 ft. span. It was rebuilt 1866-67 as an iron bridge and present reinforced concrete span was constructed in 1929. An old railing, similar to that on the 29th St. bridge, is on the southwest wing of the bridge. The red Brick warehouse on the southwest corner of the canal at 30th St. was the former Duvall Foundry, now Foundry shops. constructed about 1856 by William T. Duvall, who operated it until about 1870. It was used as a veterinary hospital at end of 19th Century for C&O mules and from 1954 until the early 1970's it was Restored 1973-76 owned by the Washington Gas Light Company (USCFA,68).

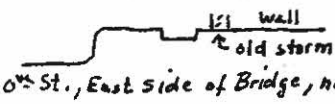
McGees Ferry foot of 30th St. John Francis Aubreys 1748 Geo. Mason --- (Foster 1938)

At the northeast side of the bridge is an old stone sewer in the north wall of the canal. The wings of the bridge are Aquia ss. X - remove for new building = C.F.C. Square

now a restaurant in an office, shopping complex,

The wings at the head of Lock 3 are built of Aquia sandstone, gneiss, red ss. and brick. The wall on the south, between Locks 3 and 4, is similar material, coursed and laid dry. The towing path wall is similar but with mortar (some).

0.53 LIFT LOCK 4 8 ft. lift, constructed 1829-31. The chamber is Seneca red sandstone with cut blocks of schist



X Removed by new building (1985 check).

South side of Lock 4 = mule feeding trough.

at the west end and granite blocks at lower gate recess.
Slots for stop planks at upper end of lock.
Blocks, 6 ft. long, 3 ft. wide, of Aquia pebbly sandstone
are in the coping and parts of the chamber. Prominent
Pool above Lock 4, revetment on south: coursed dry wall, rubble of schist, gneiss + gabbro; on towpath side wall of same material, some parts with mortar.
grooves, cut by tow ropes are in the coping at upper gate
recess. The wing wall at tail of lock is Seneca red sand-
The walls along the pool above Lock 4 are coursed, dry rubble of schist, gneiss and gabbro. The towing path wall contains some mortar.
stone and Aquia Sandstone. ~~and the revetment wall between~~
~~Locks 3 and 4 is coursed rubble of Seneca red sandstone,~~
~~schist and~~ gabbro. ~~]~~ In lieu of a flume or waste weir, excess
water is fed into and through the lock by a small slot
In addition to the slot gate, each lock gate has two paddle valves. A slot, 5 inches wide, for boards of a stop gate are at the head of the loch
waste gate at top of the upper berm lock gate. The Thomas
Jefferson St. bridge is at the tail of the lock; originally
a stone arch bridge built 1830-31 of Aquia sandstone, it
was replaced by an iron span in 1866-67. The present rein-
was
forced concrete slab bridge built in 1929. This bridge
has a railing similar to that on 29th and 30th St. bridges.
The towing path from Lock 4 west to 31st St. is paved with
rounded sandstone and quartzite cobbles, up to 6 inches in

Cobblestones replaced in 1981 with brick

Canal Square - SE corner, north side of canal - dedicated to Justice Douglas May 1971.

9 ✓

diameter, obtained from river terrace deposits.

0.60 ✓ 31ST. ST. (CONGRESS ST.) BRIDGE. This bridge was constructed 1830-31 as a stone arch bridge of Aquia sandstone and was replaced by 2 iron spans with an iron pier in in the center of the canal in 1866-67. The present 2 span steel girder and reinforced concrete bridge was built in 1929. The guard post on the northwest end of the bridge, 8 x 8 inches square, cut from schist, has prominent grooves near the base. The Towpath Apartments, on northeast side of bridge along side the towing path, were constructed of brick about 1830 by the Canal Company for use as storage building. They were later used as a tavern and then as a stable for horses or mules working the canal with quarters for the drivers on the second floor. Use as a stable continued until 1941 after the canal ceased operations and conversion to apartments was made in 1941 (USCFA,68). Canal Square along the towing path west of the bridge was reconstructed

1970 old warehouse started GT comments

from an old warehouse in 1969-70. Schist rubble facing is in the lower part of the building and brick above. 25 ft. west of the bridge, on the side of the towing path, are two large subrounded boulders, up to 3 ft. diameter, derived from river terraces. 25 ft. west of the 31st St. bridge, on the towing path, is a square concrete alcove which serves as a stall for mules waiting to be hitched to the touring ~~barge~~ canal boat when it [~~that now~~] operates on the lower part of the canal.

0.61 WATER INTAKE

0.67 WISCONSIN AVE. (HIGH ST.) BRIDGE. Constructed 1830-32, circular (segmental) stone arch, 54 ft. span, 11 ft. rise with 44 rusticated ringstones and keystone. The ringstones and coping are gray to buff colored, medium grained, pebbly Aquia sandstone with quartz pebbles are up to 1 inch in diameter. The ringstones are cut and edges rusticated but they are now deeply weathered. The inner spandrels and parapet are rough-dressed Aquia sandstone. The abutments, 6 tiers (6ft.) high, are made of cut, rusticated

Aquia sandstone, now deeply weathered to a dull powdery surface. A buttress on the southeast side is also Aquia Sandstone. The wings on the southeast side are coursed rubble of gabbro, schist and brick. Railings on the bridge have round iron balusters, spaced 6 inches, with 18 or 19 per section between round posts. The center post has 2 iron rods with curled tops rising 3 ft. 4 inches above railing; end and corner post are 22 inch square columns of Aquia sandstone with a 2 ft. square cap topped by a metal ball; the post on southeast has been replaced with concrete. The keystone on the east side is inscribed O.H. Dibble, Builder, 1831; the keystone on the west bears the date 1831. Small plaque on wall above keystone: "John Cox, mayor, James Dunlop, recorder" granodiorite in walls at bridge - some rusted garnets: gneiss?

Two stone plaques are on the east spandrels. They are rectangular, 3 ft. high x 4 ft. wide, enclosing an oval area of inscriptions; the plaque on north over towing path is dedicated to Andrew Jackson, President of the United

States, and Charles F. Mercer, President Chesapeake and Ohio Canal Company; other names are not legible. The plaque on the south is dedicated to Thomas F. Purcell, Superintending Engineer, F.(?).O. Williams, Assistant do.; Filbert Rodier, Michael Corcoran, ___ Mann, Clement Smith, Treasurer Ches. & Ohio C. Co. A rectangular stone 16 inches high by 3 ft. long, on west parapet between the keystone and the coping is inscribed to John Cox, Mayor of Georgetown, James Dunlop, Recorder.

A stone monument on the deck-level of the ~~on~~ Wisconsin Avenue, [~~on~~] northwest side, [~~of bridge,~~] was cut from Cockeysville marble quarried near Baltimore. The monument consists of a pedestal, and column surmounted with a pointed shaft and was originally erected in 1850 to commemorate completion of canal to Cumberland; the northeast face is inscribed with the names of the President and Directors of the company; the south-east face contains names of the Maryland agents the north-

west face has the name of Benjamin Wright, first Chief Engineer of the company and a citation on the start of the canal in 1828; the southwest face contains the name of Charles B. Fisk, Chief Engineer at time of completion of canal. The monument, dismantled in 1900, was stored and forgotten in the basement of the George Hill Paper Company but was found in 1927 when the District of Columbia Paper Company purchased the building. It was erected on the present site by executors of Hill's estate.

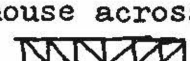
Walls along the towing path for 100 ft. on either side of the bridge are gabbro rubble containing prominent clusters of mica a quarter-inch in size and rusty red garnets. The wall is 25 ft. high on east and 15 ft. high on west.

The berm, on south side of canal from Wisconsin Ave. (High St.) to 34th St. (Frederick St.), was enlarged to 20

ft. width in 1831 to accomodate unloading of barges but later much of it was occupied by warehouses.

0.68 100 ft. west of Wisconsin Ave. bridge, is an out-crop of dark gray to black, coarse-grained boulder gneiss (Sykesville Formation) which forms low ledges on south side of canal; 2 sets of joints, N10°E vertical; N30°E dipping 45° to southeast are present.

0.69-0.75 The high wall along the towing path is skintled, coursed rubble and course ranged blocks of gabbro and gray schist. [Smooth face on back, Headers protrude 18 in. along canal -] The wall is 40 ft. high and 20 ft. above the towing path is a prominent line of headers spaced 10 ft. apart and protruding a foot [to 18½ in.]. The old brick ware-house of [Washington & Georgetown RR, later] Capital Traction is on top of wall [- stored feed & horses for Georgetown RR Power house in 1890] and there is a similar warehouse across canal. The warehouses are con-nected by a bridge of skeletal Pratt trusses and another enclosed iron truss. Parts of the building on the north

now bridge is  at 2d story level, steel truss, midway along old transit buildings; bridge 150 ft. west of Wisconsin Ave. connects buildings at 1st Story level, = steel girder. [100' from west end high wall.]

Entrance to ~~stores~~ ~~at tow~~path level - arch ~~[illegible]~~rance is segmental. 2 skewbacks, 19 ~~ringstones~~, 16' span, ~~[illegible]~~ 10 ft. abutment, ~~gneiss~~ & schist stones.

Outcrop on south side of canal opposite high wall: 100 ft. long, 5-8 ft. high (above water) beneath beam bridge.

Canal House on south side of high wall; 1873 - stored horses & feed for Georgetown RR.; power house in 1890.

Georgetown Park: ~~1981~~ 1979-1981

Building on S. side: Canal House Now Converted to Georgetown Park. Old bridges removed. New bridge just west of Wisc. Ave connects shopping centers.

Georgetown Park built 1980 -

Bridge: 200 ft. W. of Wisconsin Ave.: Steel beam deck Br.

Old cable bridge replaced with Steel through truss.

side date back to 1823 when it was used as a tobacco warehouse. In 1854 it was a stable for a horse drawn omnibus line. Later it was enlarged for use as a street car repair shop and was used as such until 1963 (USCFA.68). A 14-inch iron pipe intake for utilizing canal water for power is near the east end of the building on the berm (south side).

remain as part of Georgetown Square.
Entrance to Georgetown Park shops and Wisconsin Ave., east end of high wall, 75 ft. west of Wisconsin Ave., opening from towpath; 20' high, mitched rubble wall extends from entrance to Wisc. Ave. Br.
Outcrop on south side of canal, 100 ft. long 5-8 ft. high (above water), beneath beam (girder) bridge. Entrance arch is segmental, shewbacks + 19 ring stones, 16 ft. span / 4 ft. rise, 10 ft. abutment; stones: gneiss + schist; opening cut in high wall.

0.78 A deposit of terrace gravel, 4 ft. thick, overlain by man-made fill can be seen beneath the floor of building supported on concrete columns adjacent to the towing path. The gravel contains water-worn cobbles of sandstone and quartzite up to 4 inches in diameter; thin silt and gravel beds lie below the upper gravel bed.

✓ Washington Market - once a flour mart / 1984 variety foods - closed.

0.79 POTOMAC STREET FOOTBRIDGE, a Pratt pony (open) truss, crosses the canal to the Wilkin Rogers Milling Co. built about 1877 at Grace St.. A water intake, with iron slat guards, is on berm at the west side of bridge; another intake 40 ft. to

west, has a concrete frame and formerly fed water to the flour mill which was built about 1832 by Col. George Bromford. It was destroyed by fire, September 1844 and a cotton mill was erected on the site 1845-47. This was converted to a flour mill in 1866, rebuilt 1883 and continued operations until 1913. It was altered in 1922 by the Wilkin-Rogers Milling Co. for use as offices. Culvert A, built 1830, a wooden conduit, 2½ ft. diameter, 122 ft. long, passes under the canal just west of bridge. It formerly connected with sewers draining areas in vicinity of 36th and N. Sts. and Wisconsin Ave.

Converted to a office-apartment complex

1979-80 : Flour Mill Condominiums, new brick building to west.

Star-bolts (9) prominent in building

Rubble wall for 50 ft. to Market House, primarily schistose "gabbro" - matched - along prism side of towpath.

OLD MARKET HOUSE Between Potomac St. and Cedar Alley over a basement. ✓

The first market was built in 1795 but construction of the canal cut the market site in two and bridges were constructed to link the two parts. The present Market House building was built in 1865 and now is used for other commercial purposes. The dry wall along the towing path extending to

Used as a mall & variety shops - closed early 1980's - 1984 - restored 1979-80

33rd St. bridge is built of Seneca red sandstone, Aquia sandstone and gabbro. It formerly supported the market building. Waste no. 2, a 2-gate overfall built 1833 was formerly in this area and discharged under a warehouse to a ravine connecting with the river.

0.86 (0.86) 33rd. St. (MARKET ST., DUCK LANE) BRIDGE

This curved chord Parker open (pony) truss was built about 1900. The first bridge at this point was a timber truss built in 1831, the completion of which was delayed because of abutment troubles. An iron and timber truss replaced the timber bridge in 1866-67. The dry wall west of the bridge is mainly gabbro and some schist cut in blocks up to 4 ft. on a side. A concrete and brick water intake was on the berm at the PEPCO substation, 100 ft. west of the bridge.

0.91 (0.91) A low ledge of dark gray, course grained gabbro with prominent flakes of biotite (mica), dull black

hornblende is on the side of the towing path. Prominent joint planes strike N10°E, dipping 65°ESE; N32°E dipping 80°SE; and N74°W dipping 80°SSW. Blasting in this area during construction of the canal hurled boulders weighing up to a half a ton into Georgetown, smashing parts of a house and killing a horse. A turning and docking basin, now filled, was formerly on the south side of canal, east of 34th St. Rebuilt well in 1950's conc brown slabs of 7-Lock stone.

North side of canal for 200 ft. east of Frederick St. Bridge stone wall of mortared rubble 15-20 ft. high above which is a brick wall 10-15 ft. high. Greenschist, gneiss + gabbro. + coal trestles

bridge. 4 ft. high outcrop at base of rubble wall; dark gray to black, fine-grained gabbro; biotite visible, small quartz pebbles present. Rubble wall in vicinity of Frederick St. Bridge contains some 7-Locks quarry stone; also in wall for 200 ft. east of bridge.

0.95 (0.95) 34th ST. (FREDERICK ST.) FOOTBRIDGE and TOWING PATH CROSSOVER A timber bridge was built across the canal here in 1830 and was replaced by a timber and iron bridge in 1866-67. The towing path until 1856 was on the south side of the canal from Greene St. to Frederick St.. In order to facilitate unloading from barges to river boats by way of coal trestles, of which there were 7 or more in use between Aqueduct Bridge and 33rd St. from 1857 to 1887, the towing path was shifted to the north side of the canal

in 1856 and a timber crossover bridge built opposite 37th St.. The bridge was reached by a short incline from the towing path west of the site of the old Aqueduct Bridge. The incline still exists connecting with M St. and it was used in conjunction with the crossover bridge at 37th St. The crossover bridge was used for only a few years and removed about 1861. After 1858 the towing path followed the incline to Canal Rd. and west along Canal Rd. for 0.58 miles to Foundry Branch culvert, which was used to cross under the canal to an incline on the southeast side of the culvert. The incline gave access to the towing path on the south bank of the canal. This method of operation continued until the closing of the canal in 1924 and was used from the restoration of the canal in 1939 until September, 1954 when the 34th St. crossover bridge was restored. After 1858, the south bank of the canal from the culvert east was used as a holding basin for boats leaving or

arriving at Georgetown. The present bridge at 34th St. is a Pratt bowstring open (pony) steel truss. The parts forming the superstructure originally were in the bridge that spanned the canal at 36th St. but were removed when the Whitehurst Freeway was constructed in 1948-49. From 34th St. west to Cumberland, the towing path is on the river side of the canal. The coursed rubble wall along the towing path at ~~gneiss red sand gabbro~~ 34th St. is gray schist, containing quartz lenses up to a half inch thick, gabbro with salt and pepper texture, some Seneca red sandstone, and several rounded, worn blocks of Aquia sandstone.

an outcrop 4 ft. high is at base of wall = dark gray to black, fine grained gabbro, brown mottle, quartz pebbles present.

Formerly old basin on towing path side to east of 34th St. Bridge.

Wall of schist, gneiss, dark gray to black; some gabbro & Aquia SS., wall relaid 1978. For 200 ft. east of bridge wall is same. This part of wall apparently relaid in 1938; wall material, some sections slant. 2 areas between Frederick St. & Wisconsin Ave. Rear slumped.

1.00 ~~KEY BRIDGE~~ Constructed 1920-23 by the Corps of Engineers, U.S. Army, cost $2,500,000, opened January 17, 1923. The bridge originally consisted of 7 reinforced, ribbed archs with open spandrels containing 68,000 cubic yards of concrete. It was 1,791 feet long and up to 72 ft. high above river level. The center span is 208 ft. long

plaque says 1917.

with two flanking spans on each side of the center span, each 204 ft. long. These spans are flanked by spans 187 ft. long and on the north a span over K St. is 152 ft. long. The approach span over the canal is 85 ft. long and the span near the Virginia shore is 152 ft. long. An eighth span on the Virginia approach was added in 1939. The bridge deck was rebuilt and widened to six lanes in 1957.

8 arches on Key Bridge

2 1
A gate, concrete culvert under the towing path, on the east side of the bridge, formerly served as a waste weir.

Boulder of dark gray gabbro with grayish feldspar, black mica + hornblende(?) along towing path – overgrown by tree. Between Key Bridge + old power house

Stone revetment for 100 ft. west of Key Bridge along towpath, then 100 ft. of brickwall on riverside of towpath

1.04 CULVERT under the towing path, formerly carried water to a small electric generator (turbine and) housed in the brick building on the river side of the canal.

Coursed rubble wall on berm of schist and gabbro between Key Bridge + Whitehurst Bridge

Built by ice company; sold to Washington Flour Co., built in early 20th century.

1.05 WHITEHURST FREEWAY BRIDGES Two bridges, deck girders encased in concrete, were constructed 1948-49.

1959??

Stairs to K St between Whitehurst bridge and Aqueduct bridge
Small park with benches at end of Aqueduct Br.
Stairs to M St between Whitehurst bridges.
Key Bridge

1.06 AQUEDUCT BRIDGE Constructed 1833-43, opened July 4, 1843. This structure carried the Alexandria Canal (chartered 1830) across the Potomac River. The original superstructure of the aqueduct was 9 timber queen-post spans with diagonal supports below the spans at each pier. Each span was 114 ft. long, 28 ft. wide, containing a canal trunk 17 ft. wide and 9 ft. deep with a towing path 5 ft. wide. The aqueduct was 1,100 ft. long and had a narrow carriage-way above the canal trunk. The aqueduct cost $575,381 of which $50,000 was for the wooden superstructure and the remainder for piers and approaches. It was opened to traffic July 4, 1843. The 8 piers, constructed 1833-41, were gneiss quarried from the banks of the Potomac upstream from the aqueduct. The icebreakers on the upstream side of the piers were granite from Sandy Bay, Massachusetts. The piers extended to bedrock 20 to 35 ft. below the water and rose 30 ft. above the water. The original plan of the aqueduct called for 12 stone archs,

each with 100 ft. span and 25 ft. rise. 3 spans were later eliminated by a 350 ft. causeway on the Virginia side. Shorter timber spans, however, were used in order to cut costs and speed construction. The northern abutment, on the D.C. side of the river was constructed in 1839-1841 and owned by the C & O Canal. It consists of 2 stone archs with ringstones, spandrels, parapets and coping of cut granite, now deeply weathered and rounded. The south arch is elliptical with a 40 ft. span, 10 ft. rise, 24 ringstones and a keystone. The north arch was rebuilt by the Washington and Western Maryland RR (B&O) in 1906-07 to obtain greater clearance and is segmental with a 40 ft. span and 16 ft. rise. The inner part of the arch is concrete with a facing of 34 ring-stones of cut granite. Spandrels and parapet are rusticated, scabbled and course rubble of gabbro and gneiss quarried near Foundry Branch. The wings are gabbro and schist coursed rubble.

Until 1856 bridge over entrance to Potomac Aqueduct to carry C+O towpath.

During the Civil War, the Aqueduct was commandeered by the U.S. government, May 23, 1861, drained and the bed converted for use as a roadway. A timber bridge was built over the C & O Canal to connect with 36th St.. Control of the Aqueduct was returned to the Alexandria Canal Company in 1866 and it was leased on May 16, 1866 to the Alexandria Canal, Railroad and Bridge Company (incorporated October 13, 1867). A new superstructure, 9 timber trusses of the Howe type later reinforced by laminated timber archs, was built on the piers. The lower chords of the truss supported a canal trunk 17 ft. wide and a towing path; a 20 ft. roadway and 4 ft. walkway were on the upper chord. The roadway was carried across the C & O Canal on a timber Howe Truss, 107 ft. long. A timber trestle 173 ft. long carried the roadway above the northern abutment. The bridge was condemned as unsafe in 1886 by the D. C. Commissioners and was purchased by the U.S. government December 31, 1886. The

Alexandria Canal ceased operations in 1888. The superstructure was replaced with 2 iron Pratt through trusses, side by side, 164 ft. long, over the C & O Canal, a 127 ft. iron trestle on the north abutment and 9 iron Pratt deck trusses, each 114 ft. long over the river. The total length of this bridge was 1,313 ft. It had a roadway 24 ft. wide with two 6 ft. sidewalks and the deck was 66 ft. above the river. The bridge was opened April 11, 1888.

Electric railway tracks were placed on the west side of the bridge in 1902. The bridge was closed on January 17, 1924 with the opening of Key Bridge but the iron superstructure and upper parts of the piers were not removed until the winter of 1933-34. The remainders of all but the southern-most pier were removed in 1962 and the rubble placed in Anacostia Park for foundations of a sea wall.

The iron railing remaining on the northern abutment is of two types: heavy, gothic lancet, fastened to the edge of

the stonework is from the pre-1866 aqueduct; riveted curving straps of iron are from the 1888 bridge.

Sketch of Aqueduct bridge - 3 profiles on 8 x 14-
1843, 1867, 1888-
source Gtn. Waterfront and Rec. Col. H. Soc. + Congr. Doc.

Sketch of railing types - draft at 4" x 8" for reproduction at 2" x 4".

Before construction of the Aqueduct Bridge, transportation across the river at Georgetown was by Mason's Ferry operating from near the foot of 34th St. to Analostan (Roosevelt) Island. The island was connected by a causeway to the Virginia shore. The ferry began operations about 1720 and continued until 1867 (Spratt 1967).

From 1934 to 1948 an iron pony (open) Warren truss crossed the C & O Canal from Canal Road at 36th St. connecting with the northern abutment of the Aqueduct Bridge. This truss was removed when the Whitehurst Freeway was built and used in rebuilding the crossover bridge at 34th St.. A

concrete slab for the base of the abutment remains on tow-
path. opposite the end of the Aqueduct Bridge.

1.04 CULVERT B COLLEGE RUN Constructed 1830-31. This was a cylindrical brick culvert, 3 ft. in diameter, replaced by a 36-inch cast iron pipe which is part of a storm sewer. The pipe is exposed on the river side of the towing path.

1.10 CROSS-OVER BRIDGE From 1856 to 1865 a cross-over bridge carrying the towing path from the north side of the canal to the south was on the site of the College Run Culvert. It was a double intersection timber truss about 80 ft. long. The abutment on the north side was part of the wall along the canal and can be distinguished from the arrangement of the stone in the wall. The south abutment was on the towing path and was a stone tower with a ramp sloping to the east. No evidence of this is now present.

The bridge was removed during the Civil War after the Alexandria Aqueduct was converted to a roadway. After this the crossover was at the Foundry Branch Culvert.

Boulders of gabbro on towing path.

1.25 OUTCROP ON BERM Dark gray gabbro, cut by 4 distinct joint planes, is exposed at the base of the concrete wall on the berm. Blasting with black powder for excavation of the canal in this area in 1828-30 caused considerable damage to surrounding structures and large rocks were blown into the foundry adjacent to the canal. The wall on the berm was constructed as a dry wall in 1830-40 by the canal company. It was transferred, along with part of the adjacent street, to the District of Columbia in 1897. The wall was rebuilt in 1916. Outcrop of gray gabbro at base of wall and on ledge along Canal Road. Prominent joint face parallel to canal and sloping down towards canal.

1.50 CULVERT C FOUNDRY BRANCH (formerly Deep Branch, Mill Branch) Constructed 1829-30. The culvert has a semi-circular arch with a span of 22 ft. and a rise of 10 ft.

Coal trestle East end of foundry area during unloading

There are 30 ringstones and a keystone of cut Aquia sandstone. The arch has been repaired with brick and has a concrete facing on the north side. The abutments, which are 4 ft. high, and the wing walls and spandrels are coursed schist and gabbro rubble. Iron pipes, 2 ft. in diameter, 20 and 100 ft. east of the culvert, formerly fed water from an impoundment ¼ mile north on Foundry Branch to the old Columbian (Foxhall) Foundry.

Foundations for the old foundry buildings on the river side of the canal for 200 ft. east of the culvert are mainly gabbro, schist and some Seneca red sandstone. The foundry consisted of 4 stone buildings housing the molding, casting, boring, and finishing shops. A large 4-story stone building and several shops and houses were on the north side of the canal. Buildings on the south side of the canal were still standing in the early 20th Century, and were used as a distillery and for other purposes after the foundry closed.

A large wooden ice house of the Independent Ice Company was erected at the foundry in the late 19th Century (Davis 1908).

The foundry was built in 1801 by Henry Foxhall and was one of four foundries in the U. S. supplying ordnance to the Federal government. It was sold in 1815 to General John Mason who had continuous litigation with the canal company during the early construction of the canal because of damage from blasting. The foundry closed about 1856, 7 years after Mason's death. Consisted of boring mill, cupola house & casting house

"Columbian Foundry

1.52 (1.52) WASTE NO.3 The original waste was constructed in 1833 as 3 square drains (2 ft. wide x 3 ft. high) built of schist, rubble and Seneca red sandstone rubble and (the remains are) situated under the towingpath between the present overfall and waste weir. The present overfall is a concrete apron, 50 ft. wide with six openings under the towingpath bridge. The waste weir, 40 ft. west, is a concrete frame with 3 screw gates. On the

river side of the towingpath are curving, concrete wing walls which join at railroad; a Concrete culvert carries the waste water under the railroad. Dark gray to black gabbro crops out at base of the spillway and along the railroad; 3 joint planes are present, N60°E dip 80°SE, N30°W dip 60°SW, N-S dip 45°W.

1.74 (1.74) CULVERT A brick, circular arch culvert, 5 ft. span, 2 ft. rise; abutment 2 ft. high, under Canal Road empties into the canal.

1.75 (1.75) OLD FOUNDATIONS Schist and gabbro rubble walls on the riverside of the towingpath are probably the remains of an old coal transfer trestle. *Not seen in 1975.*

1.80-1.90 (1.80-1.90) OUTCROP ON CANAL ROAD Quartz-garnet-mica gneiss with schistose fragments, Wissahickon (boulder gneiss) Formation forms a low ledge; two prominent joints, N60°E and N20°W, both vertical, are present.

2.01 (2.01) CULVERT A brick and rubble arch culvert, 5 ft. span, 2½ ft. rise, is on the berm under Canal Road. Flat slab concrete above culvert ~~across~~ along canal.

2.12 (2.12) OUTCROP ON CANAL ROAD Quartz-garnet-mica gneiss with schistose fragments, Wissahickon (boulder gneiss) Formation forms a ledge; two joint planes N62°E, N23°W, both nearly vertical, are present.

2.20 (2.20) SITE OF INCLINED PLANE The rectangular basin, oriented southeast on the river bank and the stone wall of gabbro blocks at the side of the towing path are remnants of a former inclined plane (outlet lock). Plans for outlet locks above Georgetown were considered in 1844 and an inclined plane proposed in 1864. The Inclined Plane was constructed by the Potomac Lock and Dock Co. in 1875-76, at a cost of $146,556. It was opened on June 29, 1876 and was leased to C & O Canal Co. January 11, 1877 for $15,000 per year. The incline was 600 ft. long with a drop of 40 ft. on

grade of 1 on 12 for the caisson and 1 on 8 for counter-e-
weights on a plane 300 ft. long. The horizontal caisson
on the incline carried canal boats afloat in its chamber
from the canal to the river. The boats locked from the canal
into the caisson at top of incline by way of a drop gate
and into the river from caisson at bottom. The caisson
was 112 ft. long, 16 ft. 9 inches wide, 7 ft. 10 inches
high and weighed 802,000 pounds (401 tons) when loaded.
It was counter balanced by stone weights of 572,000 pounds
(286 tons). The caisson and counterweights ran on sets
of rails; moved by wire ropes fed through pulleys anchored
in dressed blocks of gabbro and gneiss at canal level. Power was
supplied by a turbine with water from the canal and an
auxiliary steam engine. In May 1877 the pulley anchors
failed, plunging a loaded caisson and counterweights to the
bottom of the plane. 3 men were killed. Afterwards the
caisson was operated empty? to reduce the stress on the system.

Use of the incline was greatly reduced by a decline in traffic after 1877 and was used only occasionally after 1879. It was damaged in the flood of 1889 and was not restored for operation. It was in place in 1893 but was dismantled in 1908 to provide the right of way for the Washington and Western Maryland RR.

Large gabbro boulders along towing path on west side of incline; dull gray feldspar + dark minerals.

2.28 Stop Lock ?

3.08 (3.08) CULVERT A brick arch culvert, 5 ft. span, 2½ ft. rise, is under Canal Road on the berm. 10 ft. rubble parapet and coping above.

3.20-3.76 (3.20-3.76) BALTIMORE AND OHIO RR. The Georgetown Branch of the B.&O. R.R. is on the riverside of the towingpath. It was constructed between 1906 and 1909 as the Washington and Western Maryland R.R,,a B.&O. subsidiary. It was opened June 25,1909 and extends from Georgetown to Chevy Chase. From Chevy Chase to the B.&O. main line (Metropolitan subdivision) at Linden near Forest Glen, the branch was built as the Metropolitan Southern

Wall on berm - supporting Canal Rd., Foundry Branch, west
: rubble schist & granodiorite.

R.R. in 1892.

3.26 (3.26) SITE OF WASTE 4 An overfall, constructed in 1833, was formerly 200 to 300 ft. east of the old Potomac Co. locks at Fletchers Boathouse.

3.28-4.30 (3.28-4.30) OUTCROP ON BERM Extensive ledges quartz-garnet-mica gneiss with fragments of schist, Wissahickon (Boulder gneiss) Formation along Canal Road. Cleavage dips 30°W; joints strike N60°E dipping 40°SE, N32°W nearly vertical. Wall of slabs of schist and gneiss rubble along Canal Road.

3.28 (3.28) CULVERT H and VIADUCT, FLETCHERS BOATHOUSE

Fletchers: 358.4.

The culvert and viaduct were constructed in 1829-30. The stream culvert (Maddox Branch) has a 6 ft. span, 3ft. rise, with 10 ringstones and keystone of cut granite. The rest of the culvert is schist rubble; on the towing path side the face of the culvert and the section under the railroad are concrete with an arch of the same dimension as the berm.

The abutments are 7 ft. high. The stream culvert under C.A. Canal Road is a segmental skew (oblique) brick arch with 10 ft. span, 8 ft. rise, built of 3 tiers of brick in the arch.

The road culvert (viaduct) is 100 ft. to the west of the stream culvert. The berm arch has a 14 ft. span, 7 ft. rise, 2 ft. abutment with 20 ringstones and keystone of cut granite. The spandrils, wings, etc. are dressed gabbro; inner arch is schist rubble. The arch on the towingpath side under the railroad is concrete.

The lower end of the Potomac Canal around Little Falls was 100 ft. above the road culvert. 3 continuous locks with common gates were constructed of wood in 1793-95; each lock was 100 ft. long, 18 ft. wide, with 11 ft. lift; These locks collapsed in 1815 and were replaced in 1820 with 3 new locks, each 80 ft. long, 12 ft. wide, built of

Seneca red sandstone. The locks extended from the head of the embayment on the river, known as Lock Cove, to near the present waste weir. Along the spillway, which follows the line of the old locks; some stone walls from the old locks remain. The canal at the head of the locks extended 2 miles west to Dam no. 1. It was 4 ft. deep, 25 ft. wide at the top, 20 ft. wide at the bottom and is now covered by the railroad grade along the lower part. The C & O canal bed is along the line of the Potomac Canal to Lock 5. Ruins of the Cloud-Edes Mill, 200 ft. west of the old locks and 50 ft. on the riverside of the canal, was built in ~~the latter part of the 18th Century~~ 1801. and operated for about 100 years. Only the foundation of coursed rubble schist and boulder gneiss remains at the head of the old mill race. The millers house on the berm opposite Fletchers Boathouse is roughly coursed schist rubble (Clark 1930).

out of operation in 1889.

Peabody Mills 1894

Lock Mill

Guano factory near river at Edes Mill 1870's.
Pacifica Ordnance mill on site of Edes Mill ~~1880's~~ 1880's.

An outcrop of gray schist (Wissahickon Formation,

Boulder Gneiss) is at the northwest corner of the parking lot on the berm; schistocity strikes N50°E, dips 30°NW. Ledges and low scarps formed of schist and gneiss are exposed along Canal Road west to mile 4.30, schistocity strikes N45°E, dips 30°NW. A prominent joint dips 40° to the east; a second set of joints is parallel to Canal Road.

Place diagram of area around Fletchers showing old locks etc. in relation to present features. Original draft 8"x10", reduce to 3"^{w}x2"^{h}.

3.31 (3.31) WASTE No 5 This waste weir is a concrete 358.43 frame, with 3 gates and insert boards. 2 of the gates have paddle valves at the base. West of here to above Chain Bridge the canal has a liner of plastic sheets to prevent leakage in the area where a trunk sewer was placed in the bed of the canal in 1967.

3.38-4.01 (3.38-4.01) SECTION F The contractor, Jesse Leach & Co., was awarded a silver medal on January 1, 1830 for the first section completed under letting of December

1829.

3.55 (3.55) CULVERT A brick arch culvert with coursed schist rubble spandrels, etc., is under Canal Road. *Not visible in summer*

3.65 (3.65) BOULDER A large boulder on the river side of the towing path, 600 ft. downstream from the B & O R.R. bridge is dark gray schist (Wissachickon Formation, Boulder Gneiss), with quartz, feldspar (plagioclase) and mica (muscovite) well developed; pyrite cubes and garnets up to 1/8 inch size are common; foliation is prominent. The wall between the canal and Canal Road is built of coursed rubble slabs of schist.

3.76 (3.76) B & O R.R. GEORGETOWN BRANCH, BRIDGE No. 18 358.88

This bridge was built in 1909 as part of the Washington and Western Maryland R.R. It is a single span, steel, through whipple truss over the canal and a single, skew span, steel, through Pratt truss over Canal Road.

3.77 (3.77) Culvert I. The original culvert was constructed in 1830 and was replaced in 1967 by a 5 ft. concrete pipe. The cut in the stream channel on the river side of the towing path exposes dark gray schist (Wissahickon Formation, Boulder Gneiss) with veins of white quartz; muscovite and chlorite grains are included in the quartz vein. Prominent joints are at N40°E, dip 40°NW; N55°E, vertical; N85°W, dip 60°S; N75°W, vertical; the latter joint has slickensided surfaces. Schistocity strikes N40°E, dips 20°NW.

3.88 (3.88) WASTE (OVERFALL). Originally constructed in 1830, rebuilt 1845, the present overfall, is a concrete apron 300 ft. long. The wall of coursed rubble schist on river side of towing path beneath the concrete apron is a remnant of the original waste. Reconstructed 1974; 139 paces long, 10 ft. wide at top 4:00 MP 359.18 359.1-359.15

4.22 (4.22) CHAIN BRIDGE. The original timber bridge; 359.4

Quarry along north side of Canal Rd., 300-400 ft. east of Chain Bridge

W^m B Davis Jr. 1937 The History and construction of Chain Bridge: Initiation paper Univ Md. Beta Chapter, Tau Beta Pi, (ms) ~~mimeo~~ 14 + 3p.

framing New England white pine brought to site by water

built in 1797 by Georgetown Bridge Company was the first bridge across the Potomac River, replacing a ferry that had operated nearby since 1738. The bridge was a single span, 120 ft. long, across the river channel only. It collapsed in 1804, was rebuilt but burned 6 months later.

abutment, massive stones held together by iron pins + melted lead. Stones from rock ledge below mouth of Rimmit Run.

outcrop removed in quarrying.

In 1808 a timber span, 136 ft. long with iron chain suspension, was built. It was carried away in the flood of 1810.

designed by James Finley

128 ft. between stone towers

Va. end. - warehouse built by Thos. Lee : official tobacco inspection warehouse

Other bridges using chain suspensions were built between 1810 and 1840, but were carried away by floods. The bridge company was purchased by Georgetown City in 1833 and in 1840 a timber truss was constructed on stone piers spanning the river channel. It was severely damaged by the flood of 1852. A sixth bridge built by U.S. government in 1853, a single span over the river channel only. This was replaced ~~by~~ just before the Civil War by an 8 ft. span, through, timber Howe truss with a heavy laminated timber arch enclosed in the truss frame, similar to

1794-1815 - gristmill, brewery, distillery, cooper + blacksmith shops at Va. end of bridge.

Aqueduct Bridge of 1868. It was 1351 ft. long and 46 ft. above river level on stone piers and built of schistose gneiss from the bottom land adjacent to the bridge. This was replaced in 1874 by a bridge built by Phoenix Bridge Co., with 6 through iron Whipple trusses each 172 ft. long and 2 each 160 ft. long on the stone piers of the 1853 bridge. By 1910 the Virginia abutment was undermined but repairs were not made until 1928 when the abutment was rebuilt. The bridge was weakened by the 1936 flood and taken down in 1937. The present bridge was opened June 17, 1938. It is an 8-span, continuous deck, haunched plate girder placed on the old stone piers and was built by the Tuller Construction Co. The bridge carries water mains to Virginia below the deck.

The George Washington Memorial Parkway on the berm of the canal extends from Chain Bridge to west of Carderock. It was built in 1962 from Carderock to Glen Echo, and from

Glen Echo to east of Lock 5, in 1966. The short section near Chain Bridge was opened in 1970. 500 ft. west of Chain Bridge, on the berm side of the canal there were carpenter shop and company houses; these were removed for construction of the parkway.

4.25 (0.03 mi. above Chain Bridge) modern culvert, concrete box 8 ft. span (Prentice) Reinforced, 6 ft. high.

4.31 (4.31) OUTCROP ON BERM Greenish Gray schist of boulder gneiss phase of Wissahickon Formation forms low ledges along the Parkway. Some parts of the outcrop are highly contorted; quartz and feldspar bands 1-inch thick are prominent and expanded to 2-inch thickness in contorted areas; garnets and pyrite are present Schistocity is N40°E, dip 30°NW; prominent joints are N70°E, vertical; N40°E, dip 70°SE; N65°W, vertical; N50°W, dip 60°NE. 100 ft. west joints are N35°E, dip 45°SE; N35°E, dip 45°NW (plumose surfaces); N10°W, dip 80°s. ✓ Not visible in summer.

4.55 359.74 CULVERT A 5 ft. concrete pipe, carries drainage from the Dalecarlia Filtration plant under the

canal. The cut on the river side of the culvert is in gray schist of the boulder gneiss phase of the Wissahickon Formation. Schistocity is N15°E, dip 45°NW; joints are N10°W, vertical; N35°E, dip 35°SE; N15°E, dip45°NNW. Schist boulders along the towing path contain prominent quartz blebs up to 4 inches on a side. The low escarpment on side of the parkway to the west exposes schistose boulder gneiss, Wissahickon Formation with prominent joints. Hydro plant

4.78 ✓ 359.94 CULVERT K LITTLE FALLS BRANCH The original culvert was built in 1830-31. The present culvert, built in 1962, is a 20 ft. flat, concrete coursed rubble span, 6 ft. high. The wings are quartz-mica schist. Numerous schist boulders are in the stream below the culvert.

5.00 MP (360.18)

5.04 (360.10) LOCK 5 Constructed 1830. The lower part of the chamber was originally gneiss and the upper part Aquia sandstone. The lock was rebuilt in 1868 and altered in

Swing gates in head of lock. RG79, map #66.

1876 for a drop gate at upper end. The swing gates were apparently substituted for the drop gate in the 1939 restoration. It was seriously damaged in flood of 1877. It was rebuilt in 1878. In rebuilding in 1868 and 1876 granite and gneiss were used in chamber to replace some of Aquia sandstone. Seneca red sandstone was used in circular quoins and lower recess. The coping is now Aquia sandstone and Seneca red sandstone except in the area of the upper gate which is concrete. The breast wall, formerly at lower end of the upper recess was removed for installation of the drop gate. The wall between the lower end of Lock 5 and the Guard Lock to the south is rubble schist and gneiss. The concrete apron on the face of the guard wall between the head of Lock 5 and the guard lock was apparently constructed as part of 1939 restoration. It rises 6 ft. above the former level of the coping. The by-pass for the lock flume is in a culvert on the berm side. A concrete overfall

10 ft. long, 2 ft. high is beneath the towing path, 15 ft. upstream from lock.

The feeder, 150 ft. south of Lock 5 is the former Potomac Co. canal extending downstream from Dam no. 1. It is up to 80 ft. wide and 6 ft. deep with a single set of control gates. Boats using the feeder could pass from the river to the canal but not from the canal to the river because of current in feeder. The gate walls are black schist and gneiss (Wissahickon , boulder gneiss). The stop gate, 600 ft. west of the inlet gates has walls of schist and gneiss. An overfall of rubble capped with concrete is 600 ft. west of the stop gate. Lockhouse formerly on berm at head of lock; removed in construction of Geo. Washington Parkway

As originally planned the eastern terminus of C & O Canal was to be at Lock 5. Ground breaking 4 July 1828 The decision to extend the canal to Georgetown on August 9, 1828, was based on requirements imposed by subscription to stock by Georgetown and other

The extension was opened late in 1831.

From 1831 to about 1853 the roadway to the Little Falls Bridge (Chain Bridge) crossed the canal on a timber bridge just below Lock 5. The original Lockhouse no. 3 serving Lock 5, was destroyed in the flood of 1852. It was rebuilt as a timber frame house on a masonry foundation at the base of the hill on the berm. It was removed for construction of the parkway. The retaining wall on the parkway is coursed rubble of quartz-mica schist.

5.08 (5.08) BOULDER ON BERM 200 ft. west of Lock 5 is a large boulder of dark gray to black schist (Wissahickon boulder gneiss) with mica pods ¼ to 2 inches long; quartz is in layers up to ½-inch thick; pyrite cubes are up to 1/8-inch on a side. Outlines of elliptical white quartz nodules are prominent on the smooth face of the boulder.

5.40 ~~(5.40)~~ LOCK 6 Constructed 1829-31. The chamber is

33.68
360.60

Had drop gate RG 79 #66 (map)

Locks 7-19 - all swing gates RG 79 #66. (map)

mainly Seneca red sandstone with some cross-bedded, pebbly Aquia sandstone, granite and gneiss. The upper recess was altered and a drop gate installed in 1876. This was replaced by a swing gate in the restoration of the canal in 1939-40. Lockhouse no. 4 for Lock 6 is on the berm; built in 1831 it was washed away in the freshet of October, 1847. It was rebuilt and is now white-washed rubble schist, 1½ stories high. The flume passes north of lockhouse and has a fixed overfall and concrete bridge at its head. Large boulders of Wissahickon Boulder Gneiss, mica schist phase are on the berm; above the lock pods of mica 1/16 to 1/8 inch in size, veins of quartz and feldspars with quartz pods up to ¼ inch in diameter are prominent. 4 smooth joint faces are on one boulder, other boulders have 3 joint planes at oblique angles; schistocity planes are distinct.

Flume - rubble wall of ss, gneiss (boulder) + schist.

5.59 SIDE TRAIL Large boulders of gray schist (Wissahickon Boulder Gneiss) with garnets up to 1/8 inch

size; biotite (mica), chlorite, and hornblende of similar size; glassy quartz pods up to 1 inch size are at the end of a short trail leading from the river side of the towing path to the feeder. 3 oblique joint planes are in the schist. Large rounded boulders of white quartzitic gneiss are also present and were derived from river terrace gravel. Feeder entry = old Potomac Canal, revetted with gray schist + boulder gneiss.

5.65 Boundary Stone of D.C. #3.

5.68 CULVERT 2 Constructed 1829. This culvert is 200 ft. east of the Little Falls pumping station. Spandrels and parapet are built of dark gray quartzitic, garnetiferous gneiss rubble; the parapet is 10 ft. high. The culvert is filled to the arch.

wings

5.60 (5.72) DAM No 1 Constructed 1828-30, original cost $40,704. The dam was 1,750 ft. long, 5 ft. high but now it is a crude pile of stone downstream from the concrete dam. The Potomac Company had a small wing dam to divert water to

its canal at this point before 1828 and in 1830 this was extended to an island 855 ft. from Maryland shore, the gap to Virigina shore being filled with brush, stone, and gravel. Later the dam was covered with stone laid in the form of an arch capping the rubble and gravel. The dam was designed to form a pool 6 ft. deep and 2,500 ft. long. The dam was breached by ice in November, 1832 and by flood June, 1836. It was rebuilt in 1870 after serious damage from a flood in 1868. The 1870 dam was 10 ft. high with a sloping stone front and a back slope filled with gravel and earth. Much of the dam was carried away by ice in 1873 and was rebuilt again. It needed continuous maintenance and leaked so badly that supply of water for Georgetown level was marginal. After the canal was taken over by the National Park Service the dam was damaged by the flood of 1942. It was repaired and grouted with concrete in 1942-1943 and capped with concrete in 1949. The new concrete dam and water intake was built by the

Army Corps of Engineers as an auxiliary water supply for the District of Columbia in 1956-58 at a cost of $835,013. This bridge over the canal at the pumping station is a deck haunched concrete girder span with concrete slabs between the girders.

Ground-breaking ceremonies for the canal were held at this point on July 4, 1828.

5.75 informal spillway - shown on Mackall map; covered in constructing pumping plant ✓

5.61-5.88 (5.73-6.00) OUTCROP Large boulders of Kensington Gneiss and schist from the Sykesville Formation are on the river side of the towing path, 200 ft. west of the pumping station; quartz, feldspar and weathered biotite are prominent. Numerous gray schist boulders are on the berm. At (6.00) there is an outcrop on the berm of gray schistose gneiss (Kensington Boulder Gneiss) with prominent joints at N75°E, dip 62°SE; two other sets of joints at right angles; joints along with fracture cleavage cause rock to break

Hidden in summer.

into cubic blocks.

6.00 Canal quarry

6.08 (6.18) OVERFALL A steel grated spillway feeds through a culvert under the towing path. 12 ft. long x 3 ft. deep Pipe under canal, 3 ft. diamtr.

6.14 (6.23) OUTCROP ON BERM Dark gray granite gneiss (Kensington) crops out on the berm. This is the site of the canal company's quarry which was in use up to 1870's. Covered in summer

6.24 (6.31) OUTCROP ON BERM Dark gray schistose gneiss (Kensington) has 3 joint planes, N55°W, dip 45°NE; N25°W, dip 60°SE; N80°W, dip 55°S. The gneiss is weathered to a depth of 5 ft. with a cover of yellow brown sandy silt soil. Covered in summer

6.32 (6.38) FOOTBRIDGE This is a steel, through Warren truss with the towing path pier on a steel tower. ca. 1910

6.41-6.54 (6A5-6.55) OUTCROP ON BERM 150 ft. west of footbridge dark gray schist and gneiss (Kensington) are exposed on the berm; schistocity is N15°E, dip 70°NW;

prominent joints are N60°E, dip 70°SE; N65°W, dip 65°NE. visible in summer
Irregular nearly horizontal fractures trend N30°E with a slight dip northeast near the west end of the outcrop (6.50); large boulders of gneiss are on berm to west. Schistocity at west end of outcrop (6.55) strikes E-W and dips 45°S. ✓
Creek enters canal west of outcrop.

6.90 OUTCROP ALONG PARKWAY Coarse grained ✓ Not visible in summer
Kensington granite gneiss with prominent 3 joint planes crops out in low ledges. Boulders of similar rock are in the field south of the towing path.

7.00 ORIGINAL MILE STONE 7 This milestone is ✓ made of cut, white Aquia sandstone.

7.02 LOCK 7 Constructed 1829-1830. Mainly ✓ granite gneiss (Kensington) obtained from French's quarry on the berm about 1/8 mile east of the lock. There are some dressed blocks of schistose gneiss and gray and bluish gray granite gneiss in the lock; blocks of Seneca red sand-

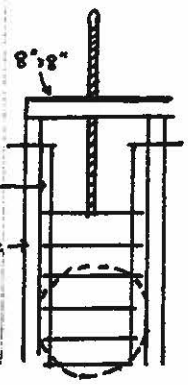
4 slabs of cut stone from lock on edge of towpath, 3 Seneca red ss, 1 gray gneiss with hornblende, gray feldspar and a little clear quartz.

stone are in the upper recess. The original coping was white Aquia sandstone. The lock was extended and a drop gate placed in the upper recess in 1877. Lockhouse no. 5, on berm ~~50~~ 40 ft. north of lock, 1½ stories high, is made of white-washed schist and gneiss rubble. A graded flume is behind the lockhouse. lined with coursed gray gneiss rubble, some gray quartzitic schist., 8 ft. wide × 4 ft. drop.

7.00-7.20 ✓
339.35

GLENECHO The wooden structures on ✓ the bluff to the north of the canal were formerly the Glen Echo amusement park. This park was started in 1889 as a community development and converted to a Chataugua in 1891; from 1893 to 1897 it was a vaudeville park. In 1903 it was purchased by Washington Railway and Electric Co., later Capital Traction Co., for use as an amusement park. It closed in 1968 ( ) and is now being developed by the National Park Service as a recreation and visitors center.

339.42 Single gate screw wash - wing wall 10 ft. long, at right angles; 5 - 12" boards; L iron in each side for frame; 4 ft. diameter iron pipe under canal. 5 ft cement above pipe to 8×8's.



7.13 339.42 WASTE WEIR This waste has a concrete frame and a single screw gate.

7.14 CULVERT 5 MINNEHAHA (NAILORS) BRANCH

Original culvert constructed 1829. This was replaced in 1960's with a concrete arch faced with quartzitic schist; 12 ft. span, 1½ ft. rise, 14 ringstones and keystone in the facing. The parapet rises 2 ft. above keystone.
7,34 Informal spillway, 132 ft. long, shown on Mackall map

7.57 CULVERT 8 CABIN JOHN CREEK The original culvert was constructed with a segmental arch in 1829-30. It had a span of 22 ft. and a rise of 5 ft. It was rebuilt 1848 and in the 1960's it was replaced by a concrete flat, wings straight. span faced with dark gray schist. The revetment along the towing path is dark gray, fine to medium grained gneiss (Wissahickon Boulder Gneiss). Cabin John Island between the canal and river is formed of brown silt and sand exposed in 15-foot bluffs along Cabin John Creek. A "granite"

quarry formerly near the mouth of Cabin John Creek was opened in 1830. Schistose gneiss of the Wissahickon Boulder Gneiss was quarried and shipped via canal until the late 1850's (Mathews, 1898).

Cabin John Bridge, 1,000 feet north of canal was built in 1857-63 and its arch was keyed on December 4, 1858. The span is 220 ft., with a rise of 57.26 ft. It was the second longest arch in the world when built. The coping is 100 ft. above the valley floor. Ringstones and the keystone are cut granite from Quincy, Massachusetts. Spandrels are Seneca red sandstone and gneiss from Montgomery County, Md.; the parapet is also Seneca red sandstone. A conduit, 9 ft. in diameter, is on top of bridge and carries water for the District of Columbia (Curtis, 1899).

Insert 7.76

8.00 OUTCROP ON BERM Dark gray gneiss (Wissahickon Boulder Gneiss) with white quartz veins 1 to 4 ft.

Visible in summer

Insert p. 56
near bottom

7.76

OUTCROP ON BERM Dark gray, fine grained gneiss (Wissahickon Boulder Gneiss) is exposed in a low bluff. Quartz veins up to 4 inches wide cut the gneiss. Schistosity strikes N50E and dips 80 NW. Four joint planes, N50E, dip 60SE; N10W, dip 85W; N30W, dip 45NE; N65W, dip 45SW, are present. 10 ft. south of the towing path is a large boulder of dark gray, Wissahickon Boulder Gneiss composed mainly of feldspar, and muscovite-biotite (micas) with large dark gray, fine grained schist inclusions in the gneiss.

wide occurs in low ledges. Schistocity strikes N35°E and dips 70°-80°NW. A joint cuts the rock at N55°E, dip 60°NW.

8.01 (8.04) 366.34 OUTCROP ON BERM Dark gray gneiss with quartz veins (Wissahickon Boulder Gneiss)forms low ledges. visible in summer Joints at N55°E, dipping vertical; N60°W, vertical; and N60°W, dip 45°SW are present.

MP 8 366.35 Wall ends at curve to north at 366.34

8.13 (8.19) OUTCROP ON RIVERSIDE OF TOWING PATH 1,000 ft. east of Lock 8 there ledges and boulders of gray gneiss with dark gray, fine grained schist inclusions (Wissahickon Boulder Gneiss); these ledges are also extensive in the river. A revetment formed of gray granite gneiss blocks is along the towing path; quartz, feldspar and biotite (mica) grains up to ¼ inch size are in the gneiss.

366.57 outcrop on berm, gray gneiss - dip 60° upstream.
River channel along canal; wall on riverside of towpath 10-15 ft. high
366.13 Ledge in river

8.34 (8.35) 365.95 Lock 8 Constructed 1829-30. The lift? The lock is mainly Seneca red sandstone and some gneiss blocks; brick repairs are in the chamber. A graded flume is on the berm

behind the lockhouse. Lockhouse no. 6, on the berm is 1½ swing gates.
stories high and built of whitewashed coursed schist rubble.
366.70 Cabin John footbridge

8.42 (8.47) CULVERT 9 200 ft. west of Lock 8, construct-
365.85
Rebuilt 1971 · concrete cap on rubble arch.
ed 1829-30. The culvert has a segmented arch with a 4 ft.
span, 2 ft. and a rise of 8 ringstones and a keystone are
in the arch. The abutment is 2 ft. high and the parapet is
6 ft. high. Spandrels and the parapet are coarsed schist
rubble. Curved wings 12 ft. long

8.56 (8.59) OUTCROP ON BERM Blocky gray gneiss cut by
small quartz veins (Wissahickon Boulder Gneiss) forms low
ledges. Schistocity strikes N50°E, and dips 70°NW. Joints
are at N10°W, vertical; N20°W, dip 45°NE; N70°E, dip 80°SE;
N80°E, dip 65°SE; N30°W, dip 10°NE; N55°W, dip 30°SW.

8.72 (8.72) CULVERT 10 250 ft. east of Lock 9, construct-
365.65
Prentice says 6 ft. span
ed 1829-30. The circular arch of this culvert has an 8 ft.
span and a 4 ft. rise. 10 ringstones and a keystone of cu t
No wings

granite form the arch with a springing line at water level. The parapet is 7 ft. high and spandrels, parapet and wings are coursed schist rubble.

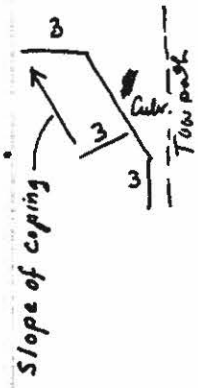
8.70 365.58 LOCK 9 Constructed 1829-31. The lock is mainly gneiss from French's quarry just east of Lock 7. Some Seneca red sandstone and Aquia gray sandstone with pebbles up to 2-inch diameter are mainly in the coping. Patches of concrete repairs are also in the coping. The upper recess was extended and a drop gate installed in 1877. A pivot foot bridge formerly crossed the lock. Masons' marks are on the berm side of the chamber, 15 ft. east of upper recess- B ; a similar but inverted mark is on the berm side of the chamber 15 ft. west of the lower gate.

Flume on berm 25 ft. from lock; graded

Lockhouse no. 7, on berm between Locks 9 and 10, is 1½ stories high and is built of coursed schist and gneiss rubble.

8.77 (8.77) LOCK 10 Constructed 1829-31. The lock is
365.5
Locks 5-10 repaired in 1975
mainly granite gneiss with some Seneca red sandstone in the chamber; grains of biotite, feldspar and quartz up to ¼ inch in size are distinct in the granite, especially in areas polished by rope drag. The upper recess were extended and drop gate installed in 1877. A graded flume is on the berm. Embankment on berm Lock 10 to Lock 13; masonry weir near lower End, 6 ft. opening.

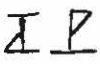
8.95 CULVERT 12 ROCK RUN Constructed 1829-31.
365.40
The semi-circular, skew arch has a 12 ft. span and 6 ft. rise. The face contains 12 ringstones and a keystone of cut granite. The abutment, 6 ft. high, is also cut granite. The parapet which is 7 ft. high, spandrels and wings are coursed schist rubble. This culvert collapsed in February, Coping 20 ft. above stream 1847, and was rebuilt, lengthened, and buttresses added in 1848. Most of the flow of Rock Run was diverted to the west in construction of the beltway (I-495) in 1962 and now passes beneath the canal in a new culvert at mile 9.54.



9.00 (9.00) 365.32 **LOCK 11** Constructed 1829-30. The masonry is mainly Seneca red sandstone with some coarse-grained, schistose gneiss in the chamber. Brick and schist blocks have replaced some of the original stone where repairs have been made. Very coarse-grained granite, with distinct pods of biotite and feldspar up to ½ inch size, is at the lower end of the lock below the coping. A graded flume on berm is lined with red sandstone, gneiss and schist rubble. The lockhouse is along the towing path and is built of coursed red sandstone, gneiss and schist rubble. The 9-mile marker on towing path at the lock is cut white Aquia sandstone.

Paddle gate for berm inlet culvert of lock 2x3 ft
Into the inlet culvert opening 4 ft. wide x 3 ft. high, connected up.
3 ft. deep - 8 ft. wide
13 ft. from canal
slot for drop boards at head.

Masons' marks are on the chamber and recess walls.

 symbols are on the coping on the bermside near the center of the chamber;  are 2 to 6 tiers below the coping on the berm side near the center of the chamber;  is on the towing path side on the coping at the lower end of the lock;  is 2 tiers below the coping

on the towing path side near the center of the chamber.

 occurs on the third tier below the coping and  is on the 4th tier below the coping, 10 ft. east of the lower recess.

A quarry in the bluff along MacArthur Blvd. formerly was worked by the canal company for "granite" (Wissahickon Boulder Gneiss).

MP 9 - stone outlook

9.00-9.28 OUTCROP ON RIVERSIDE OF TOWING PATH

Four ledges, 20 ft. high and 200 ft. long are composed of Wissahickon B oulder Gneiss, schistocity strikes N15°E and dips 60°NW. A large boulder of gneiss is on the towing path. Another ledge of gneiss is on the berm at the lower end of Lock 12 with schistocity dipping 30° to 60° west.

9.28 LOCK 12 Constructed 1829-30. The lock is mainly granite gneiss from French's quarry east of Lock 7; some Seneca red sandstone is in the coping. This is an old

type lock in which water entered the chamber from a culvert in the berm wall. The culvert openings are still intact although the upper recess was rebuilt and a drop gate installed in 1877. The Lockhouse was formerly on the berm, ~~40~~ 36 ft. north of middle of lock. It was a 2-story, frame building which was removed in construction of the parkway. Only part of the stone footings remain. A graded flume is 50 ft. from the lock on the berm. 3 ft. deep x 6 ft. wide

9.36 / 364.92 LOCK 13 Constructed 1829-30. The masonry is mainly granite gneiss from French's quarry east of Lock 7. Some Seneca red sandstone is in the circular quoins at the upper and lower recesses. The original breast wall removed in 1877 preparatory to rebuilding the upper recess for a drop gate. The breast wall was later rebuilt at the head of the recess and a long gate was installed. A graded flume 3 ft. deep x ?-wide is 15 ft. from the lock on the berm. The lock gates and an old pivot bridge over the lock were burnt on June 27, 1863

by Col. J.E.B. Stuart. The flood of 1889 damaged the lock and carried the pivot bridge away. Lockhouse no. 9 was formerl y on the berm, 40 ft. north of the middle of the lock. It was a 1½-story stone rubble building which was removed in construction of the beltway. Two girder, concrete deck bridges over the east end of the lock carry the Capital Beltway (I 495, American Legion Memorial Bridge) over the canal. The bridges were constructed 1960-62 and opened December 31, 1962.

9.45 ✓ 364.85 LOCK 14 Constructed 1829-30. The lock is ✓ built mainly of gray granite gneiss with some Seneca red sandstone at the west end, berm side. Slots for stop planks are in the wall at the breast. Rods for control of the flow to the culverts in the lock walls are at the center of the upper recess on both the towing path and berm sides. A single screw gate, concrete frame and culvert waste weir are on berm side at head of lock feeding to a graded flume, 9 to 25

Berm on low embankment west to 200 ft. west of Culvert 15

ft. from the lock on the berm. The lockhouse formerly was on towing path side at the middle of the lock. It was a 2 story, frame house; part of rubble foundation remains. The Log wall level, named for extensive log revetments along this section of canal, extends west 3.9 miles from Lock 14 to Lock 15.

364.25 - Embankment 25 ft. abm coping.

9.54 CULVERT Constructed early 1960's. The drainage of Rock Run was diverted to this culvert when the beltway was constructed. The culvert has 2 gallery, rectangular concrete conduits, each 10 ft. wide and 10 ft. high. The facing is brown quartzitic schist with white granite coping on the wings. Wissahickon gray schist crops out in the stream bed below the culvert; schistocity is N10°W, dip 80°W; joints are at N85°E., vertical; N45°W, dip 10°NE. The David Taylor Model Basin is on berm. Construction was started by the Navy on this installation in 1933.

9.65 364.65 **WASTE WEIR** Originally this waste weir was a concrete frame with 3 gates. Formerly two of the gates had paddles but now all the gates are board inserts.

9.66 pipe culvert (Prentice)

MP/10 364.28

9.90 364.40 **SWING BRIDGE** This bridge was constructed in 1941 by the CCC to give access to the picnic area adjacent to the towing path. Only the circular center pier and abutments remain. The pier is built of blocks of quartzitic schist rubble. A circular rail on the pier formerly supported the swing bridge. The abutments are quartzitic schist.

9.94 ✓ **SITE OF OLD OVERFALL** Originally there was an overfall waste here that drained south via narrow ravine.

9.97 Informal overflow 144 ft. long (Prentice)

10.4 **CULVERT 14** Constructed 1840. The arch is semicircular with a 5 ft. span and a 2½ ft. rise. 8 ringstones and keystone of cut Seneca red sandstone are in the face of the arch. The parapet is 3 ft. high; abutments are

10.22 turning basin

4 ft. high. The spandrels, parapet and wing walls are coursed schist rubble. curved wings, 10 ft. long. An outcrop of Wissahickon gray schist is in the stream, on the south side of the culvert; schistocity is N10°E, dip 70°W; joints are at N70°E, dip 30°S; N70°W, vertical.

364.09 Inlet on berm 100 ft. long and extending 80 feet back into berm.

10.45 CULVERT 15 AND VIADUCT Originally constructed 1829-30, the viaduct was rebuilt in 1960's. The culvert has a semicircular arch, with a 14 ft. 11 ft. 9 in. span and a 7 ft. rise. Curved wings 20 ft. long. 20 ringstones and a keystone of cut granite are in the face of the arch. The abutment is 6 ft. high. The face of the culvert is battered 1 on 10. The spandrels, abutment, and wingwalls are coursed schist rubble. The pavement in the culvert and ~~and~~ for 15 ft. south of the culvert is dense blue gray to black migmatitic gneiss slabs laid on end. This rock is also used in the revetment south of the culvert.

363.85 - viaduct

The viaduct over the road to the east of the culvert is a flat concrete span faced with brown quartzitic schist. It was constructed in the 1960's.

363.66 - start old bricks on berm for 200 ?, old dock ?, berm juts out 6 ft. / Basin on berm 400 ft. long to west of bricks; 30 ft. wide

10.54 OUTCROP ON BERM Wissahickon gray green schist, schistocity N5°E, dip 68°W, forms low ledges in the canal prism which are visible during low water.

10.63- 10.65 OUTCROP IN BED OF CANAL Wissahickon gray schist, schistocity N10°E, dip 55°W, with joints at N10°E, vertical; E-W, dip 20°S.; N45°E, dip 30°SE; and N80°W, vertical is visible in the canal prism during low water.

10.67 (10.87) prentice - Informal overflow 132 ft. long, low point 1 ft. down / same

10.76 SITE OF OLD OVERFALL In the early days of the canal an overfall drained south along the narrow, shallow ravine across the Carderock Recreation Area.

370.66 Access, upper end Carderock - parking.

10.98 OUTCROP ON BERM Wissahickon gray schist with small rounded quartz pods up to 2-inch size forms low

visible in summer

End hike towpath 370.00

ledges. It is tightly folded with schistocity striking on berm

N12°E and dipping 57° to 70°W; joints are N20°E, dip 42°E; visible in summer

N25°W, dip 20°NE; N75°W, vertical (forms face of canal cut).

4 ft. of dark gray to black silty clay over granular yellow

to brown and red clay silt lies above the rock.

MP 11 370/80

11.00-11.30 HIGHWALLS This section of

canal is known as The Highwalls because of the high revet-

Begin 100 ft. east of curve

ments needed to retain the towing path where the river cut

into high rocky ledges. A night watch was kept on the

Highwalls in the early 1830's because security of the re-

vetment was questionable. Similar highwalls are from mile

12.40 to 12.60. Coursed rubble dry wall; 10 - 60 ft. high; mainly schistose gneiss + some metagraywacke; 3 to 5 ft. thick

retaining wall

11.04 OUTCROP Wissahickon mica schist is exposed

in prominent cliffs along the east bank of the river channel

visible in summer.

east of Vaso Island. Cleavage is N5°W, dip 55° to 70°W;

prominent joints form cliff faces parallel to the channel

at N40°W, dip 70°SW.

11.22 370.95 - 371.00 OUTCROP ON BERM A ledge of Wissahickon mica schist with cleavage N5°E to N15°E, dip 65°W is on the berm. Prominent joints are N70°W, dip 80°S; N15°E, dip 18°E, N70°W, dip 45°N; N5°W, vertical; N77°E, dip 55°N and N75°W, dip 45°S. Canal straight for 200 ft. across outcrop and then curves more to south. End of outcrop, stream enters 371.00 Short straight stretch to long curve to north.

11.36 OUTCROP ON RIVER SIDE OF TOWING PATH

371.25 Marsden Tract, permit camping #2,3,4.

Wissahickon mica schist with a vein of milky quartz 100 ft. wide forms a broad low ledge. The vein trends N15°E and the quartz contains inclusions of mica schist engulfed at the time tne quartz intruded the schist. Some of quartz is pink in color. Cleavage in the schist trends N40°E and dips 57°W. Joints are N20°E, dip 47°ESE; and N70°W, vertical. A broad, flat bench cut into the rock south of the outcrop, is covered with river terrace gravel containing numerous well rounded cobbles and boulders of sandstone

Not visible in summer.

371.30 footbridge over canal - Marsden Tract #1 (100 ft. west of footbridge) Along land to 371.30 canal widens out on berm to width of 120 ft.

and quartzite. The bench is 50 ft. above present river level.

11.18 SITE OF CULVERT ??

11.52 Nonhistoric footbridge, Marsden Tract.

11.63 371.4 BOULDER ON SIDE OF TOWING PATH The boulder is schistose gneiss (Wissahickon Boulder Gneiss) in which blocky, black hornblende is dominant; coarse-grained quartz and feldspar are also present. The rock is banded and contains fine-grained black schist lenses up to 3/4-inch thick. The outlines of angular "boulders" inclusions , up to 6 inches on a side are accentuated by their light gray weathered surfaces. Quartz veins up to 2 inches wide cut the gneiss.

371.4 Low ledges of coarse grained gneiss crops are on the berm with schistocity striking N20°E, dipping 66°NW. Prominent joints strike N60°W, vertical; N80°E, dip 55°S; N30°W, dip 65°SW, and N50°W, dip 45°N. Low ledge outcrop 50 ft. wide on top. Outcrop to west separated by low ground 100 ft. wide. Outcrop also along towpath.

11.75 SITE OF POTOMAC GRANITE MILL A stone mill and wharf were on the berm in early 1900's. The mill was a large 2 story timber building. Granite was quarried in Wissahickon Boulder Gneiss on the berm west of the mill. The towing path is cut in the mica schist phase of the Wissahickon Boulder Gneiss; cleavage and schistocity strike N10°E, dip 85°W; joints strike N80°W, dip 55°SW; and N50°E, vertical. The berm bank is cut along a joint plane trending N80°W.

371.60 - 371.72 curve to north, canal 150 ft. wide.

11.76 ?? CULVERT 17 Constructed 1828-30. The .5 from Culvert 18 circular arch of cut, green-gray granite gneiss has a span of ~~10~~ 8 ft.; and a rise of 4 ft. 14 ringstones and keystone are in the face of the arch. The parapet is 1 ft. high and the springing line is at the foot of the abutment. The spandrels, parapet and coping are coursed schist rubble. Curved wings; 16 ft. embankment above coping.

11.8 overflow (Baron) ??

11.95 OUTCROP 20 FT. SOUTH OF TOWING PATH

Wissahickon quartzitic schist with schistocity striking N10°E and vertical forms a low ledge. Similar rock crops out 100 ft. west, 40 ft. south of towing path.

Not visible in summer

MP 12 = 371.78 Entry on berm to basin which continues to 371.85; curve starts to west.

12.26/ Culvert 18 8 ft. span (Prentiss)?

12.38 (12.42) CULVERT 18 Constructed 1830. This culvert was blocked off in the 1900's and is now faced by a stone wall on the towing path side and concrete on the berm.

372.05

? 10 ringstones, 2 abutments + keystone, 1 ft. abutment ?

372.14 Concrete wall on berm + concrete abutment rising 12 ft. on berm.

✓ /

12.40-12.60 (12.40-12.60) HIGHWALL SECTION The canal was rebuilt and widened in this section in 1839 by blasting out spurs of rock that protruded into the prism. Originally the canal alinement here was sinuous because of the spurs.

372.16

✓ /

12.40 (12.44) OUTCROP ON BERM Wissahickon quartzitic schist forms a ledge on the berm; vertical joints trending N-S cut the schist.

372.20 center of 1972 break in towpath embankment

✓

12.46 (12.52) OUTCROP ON TOWING PATH Wissahickon quartzitic schist cut by quartz veins ½ to 3/4 inch wide crops out in an anticline. Schistocity is N-S, dip 45°E and 30°W.

372.25

Culvert 18 (12.26) 14 ringstones, parapet 4 tiers = 3 ft., coping 1 ft. Upstream wing slightly flared. downstream wing straight. Cut stone arch, parapet + coping rubble - granite ringstones, mostly quartz, [illegible]

The outcrop is in a bluff on the river side of the towing path and is flanked by high revetment walls of coursed schist rubble on the side of the towing path.

occasional outcrops to 12.5 (Berm) - culvert, apparently same as Culvert 18.

12.55 (12.62) 372.35 OUTCROP ON BERM An anticline in well-bedded Wissahickon quartzitic schist and quartzite cut by granodiorite dikes forms a low ledge on the berm. Schist and

Diagram. Draft 6" x 12" for 2"h x 4"w reproduction
Use field sketch, add data from Cloos Guide to Bear Island

quartzite beds are 2 inches to a foot thick with schistocity parallel to the bedding. The schist is crenulated and fractured.

12.60 (12.68) 372.38 OUTCROP ON BERM An anticline in Wissahickon quartzitic schist and quartzite is on the berm at the east

Diagram- Draft 6" x 12" for 2"h x 4"w reproduction
Use field sketch, add data from Cloos Guide to Bear Island.

end of Widewater. West of here the canal occupies an old high river channel on the north side of Bear Island for

12.61 - overflow, beginning of widewater 372.38

3,000 yards. The old river channel is blocked off by high walls at the east and northwest ends of island. Water in the canal is up to 65 ft. deep in Widewater. The area north of Widewater and extending along the canal as far as Cool Spring (15.25) above Great Falls has numerous quartz veins cutting the Wissahickon schist and gneiss. Gold is present in some of the veins and was formerly mined. Maryland Mine, at the junction of Falls Road and MacArthur Blvd., was operated intermittently from 1867 to 1940 (Reed and Reed 1969; Ingalls 1960) but is now in ruins. Two other mines were also operated in the area. Most quartz veins are low grade or barren of ore but some of the veins contain occasional pockets rich in coarse sheet and wire gold. The yield from all the mines was small and totalled about 5,000 ounces. The Wissahickon Formation is extensively exposed along towing path at Widewater. It is primarily a micaschist with quartzite and granitized schist

Lens shaped bodies of amphibolite are extensive in schist. An excellent display of the complex relations of metamorphic rocks are along the trails to the south on Bear Island (Cloos and Anderson 1950; Fisher, 1971). Caution- the side trails are rugged and care should be exercised on the smooth, bare rock surface.

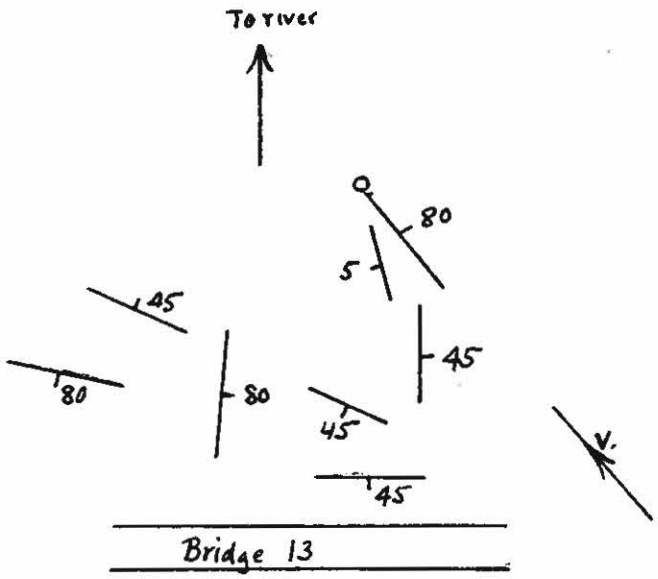
372.40 - concrete control tower, 20 ft. tall, 5 ft x 5 ft.
372.45 - 372.48 Breach formed in trough embankment 1972. Billy goat trail here at west end of breach

12.80 (12.89) WASTE WEIR This is the site of a former large overfall spillway. A concrete comb and apron 20 ft. wide, 200 ft. long is now buried 15 ft. beneath the towing path. The weir formerly had insert board waste. on Macelli's map

372.48 begin wall along trough; stone-coursed rubble gneiss, granite, with graywacke & schist.

12.84 (12.93) OUTCROP ON TOWING PATH Wissahickon metagray wacke, with interlayered quartzitic and mica schists forms low ledges along the towing path. Bedding is from an inch to tens of feet thick. 3 small anticlines and synclines occur within a 5 ft. section of the outcrop.

12.90 (13.00) CONCRETE BRIDGE The present steel I-beam 372.61
5 concrete piers, 18 ft. apart. Structure 100 ft. long.
MP13 = 372.61


To river
80
5
45
45
80
80
45
45
V.
Bridge 13

13.02 + Logwall (Prentice)

bridge was built in 1939 and replaced an older timber structure. The bridge carries the towing path across a channel leading to 2 waste weir. The abutments are coursed schist rubble capped by dressed, coarse-grained granite on concrete sills. Waste weir is 150 from towpath. gneiss with mica in bands 1/8 to 1/4 inch apart. Ledges in the vicinity of the bridge contain highly distorted schist with closely-spaced veins of feldspar and quartzose material. Small amphibolite lenticular masses extend south of the waste weir. Schistosity is vertical and at right angle to towpath bridge to 80°W.

12.94 (13.04) OUTCROP ON TOWING PATH Granitized, tightly folded interbedded, thin-bedded quartzite and quartzitic schist, Wissahickon Formation, forms ledges along the towing path. It is cut by small quartz veins. Schistocity strikes N15°E, dips 50°E; joints strike N20°E, dip 40°ESE; N50°W, dip 50°NE; N5°E, vertical.

13.00-13.05 (13.10-13.15) OUTCROP ON TOWING PATH Wissahickon muscovite-biotite schist with interlayer quartzite

13.1 - Overflow (Barron)

in beds from an inch to tens of feet thick are in ledges along the towing path. Small masses of foliated amphibolite are included in the schist. A flat joint surface sloping 10° to the ENE is along the towing path; other joints strike N60°W and dip 60°NNE. Extensive outcrops in low ledges along the berm side of Widewater, continuing west to Lock 15 are formed of Wissahickon muscovite-biotite schist. Joints strike N60°W, dip 70°WNW; N10°W, dip 50°W; and N50°W, dip 30°SW.

372.9 - potholes, 6 ft. diameter on towpath (half cut). 2 large potholes on berm beneath water.

373.1 - Causeway across channel

13.02 - Logwall - washed out in 1924 flood.

13.05-1328° (13.15-13.38) OUTCROP ON TOWING PATH Wissahickon granitized mica schist, medium grained and highly foliated crop out in low ledges. The schist is composed mainly of muscovite, biotite, quartz and feldspar and is cut by veins and thin seams of light colored quartz and feldspar along the foliation. Prominent horizontal fractures are in the schist along the towing path at (13.25). Schistocity strikes N20°E, dips 60°Se; joints strike N-S,

dip 60°E, and N70°E, vertical. Granite dikes up to 6 inches wide intrude the schist at (13.30). They are light colored, fine grained and contain mainly quartz, feldspar, and some muscovite (mica).

13.28 (13.38) OUTCROP ON TOWING PATH Low ledges of metagraywacke crop out at the southeast and of the causeway. The metagraywacke is black, banded and highly micaceous. Cleavage and schistocity strike N40°E, dip 60°SE; joints strike N80°W, vertical; N80°W, dip 60°N; and N40°W, dip 70°Sw; additional joints at the southeast end of the outcrop strike N50°E, dip 32°SE; N20°E, dip 57°SE; and N10°W, dip 35°W.

13.38 (13.48) CAUSEWAY AND GUARDWALL These structures were constructed about 1850 as part of a large scale improvement program. The towing path crosses a former river channel on a rock causeway; the water in the canal is

29 June 1974 odometer
Dart 6083, 96,648

25 feet deep at this point. 100 feet southwest of the towing path is a stone guard wall, 15 ft. high, 100 ft. long that blocks off an old channel and protects the canal from flood water. It is built of metagraywacke and schist blocks.

13.40 (13.50) OUTCROP ON TOWING PATH Ledges 250 ft. south of Lock 15 are formed of metagraywacke with quartzite and schist (Wissahickon Formation). Schistocity strikes N15°E; dips 85°SE to vertical. Crenulated quartz veins cut the schist. Joints strike N30°E, dip 25°SE; N60°W, dip 45°NE; N75°W, dip 60°N; N30°W, dip 75°NE; N80°W, vertical; and N65°W, dip 54°N.

13.45 (13.55) LOCK 15 Lift 8 ft., constructed 1829-31. The locks are built of Seneca red sandstone with some concrete in upper recess. The upper recess, berm side has a subrecess with a culvert opening 4 fr. wide, 6 ft. high

Causeway downstream Lock 15 - partial.
Beyond lock 15 canal excavated in rock cut.

that formerly conveyed water to the chambers. A timber facing of concrete 15 ft. high; cribbing filled with schist boulders.
crib dam and concrete spillway, on berm at lower end of Spillway 16 ft. wide. Dam = 60 ft along spillway
lock is 70 ft. long, 15 ft. high and forms a pool on the
Cap of concrete on breast wall top at upper + lower recesses
berm side of the lock. The lockhouse was opposite the Concrete reinforced by brace mesh.
Concrete in berm recess wall + abm at head of lock. Inlet gate on berm, upper recess for recharge culvert.
center of lock along the towing path. None on towpath side It was constructed
Wingwall on towpath, lower side = schist rubble.
of rubble schist in 1830-31 and was demolished in the
flood of 1889. A frame lockhouse was built in 1899 just
west of the lock. It burned in the early 1900's and only
Rubble wall on towpath, schist and metagraywacke, coursed, 150 paces long upstream.
the base of brick chimney remains. The rock channel of
the canal was blasted out of Wissahickon metagrawacke and
schist between Locks 15 and 16. A masonry wall retains
the towing path for 200 ft. upstream of Lock 15.

13.46 (13.56) <u>OUTCROP ON TOWING PATH</u> Wissahickon
Wall along stream on towpath side, 150 paces west of Lock 15; Schist + metagraywacke.
canal cut in rock to Lock 16.
quartzitic schist forms low ledges, joints strike N80°E,
vertical; N35°W, dip 45°NE; and N60°E, dip 85°SE.

13.60 (13.68) <u>OUTCROP ON TOWING PATH</u> 100 ft. south of
Lock 16, dense gray Wissahickon metagraywacke with biotite

and quartz grains up to 1/16 inch size forms low ledges.

Small quartz grains cut the graywacke. Prominent joints strike N-S, dip 82°W; and N80°W, dip 70°N.

13.62 (13.69) LOCK 16 8 ft. lift, constructed 1829-31. The lock is built of cut Seneca red sandstone. The upper recess contains subrecesses and culverts connecting with the chamber. A log crib dam with a concrete spillway at the lower end of the lock forms a pool on the berm. The lock gates were destroyed June 27, 1863 in a Confederate raid led by Col. J.E.B. Stuart. Lockhouse no. 10, built about 1837 is on the berm and is a whitewashed masonry structure composed of coursed schist rubble.

Inlet gate & recharge culvert on towpath + berm side. Concrete cap placed on breast wall (1975)

Lock plan

Spillway 15ft + 5ft. north + 25ft. wall 200 ft. south of Lock 16 on towpath side of prism made of schist and metagraywacke. No paved revetment wall + 15 p. masonry wall

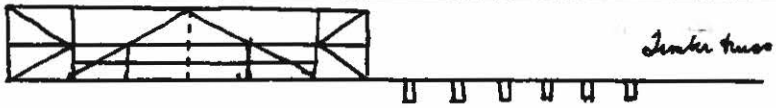
13.77 (13.82) STOP GATE AND GUARD WALL These structures were built in 1852 to block flood waters from the Widewater section of the canal. The abutments of the gate are hammer-dressed metagraywacke, schist, and Seneca red sandstone. The concrete wall on the berm, 20 ft. long, fills a former

376.25

35

Flared wings on berm, upstream and downstream sides, 25 ft. long.

Stairs on upstream side of wall on towpath. Rubble revetment faces upstream and downstream side; earth core over concrete.



Timber truss over canal at stop gate.

breach in a masonry wall that connects with a rock ledge. The area over the canal prism was formerly spanned by a machinery house which was destroyed in the flood of 1889. A single heavy timber which spanned the canal after 1889 was used to raise and lower stop planks that fitted into notches in abutments. The guard bank on the river side of towing path is 15 ft. high and extends west 500 ft. + south (0.36 mi.) It is faced with metagraywacke and schist rubble. The trail on Bear Island rejoins the towing path 100 ft. north of stop gate.

376.35 Railroad rails on towpath side of canal between blow off culvert + Stop Gate

13.89 (13.93) 376.37 **HIGHWALL ALONG TOWING PATH** Above the stop gate the canal is constructed along the edge of a high river channel with the towing path on a dry masonry wall embankment. Wissahickon metagraywacke cropping out on the berm has vertical cleavage trending N10°E and prominent joints at right angles to the cleavage, dipping 60°N.

13.90 aqueduct blow off culvert.

13.95-13.97 (13.98-14.00) OUTCROP ON BERM A cliff on the
376.45
berm is formed of Wissahickon metagraywacke and schist.
distinct cleavage or fracture N60°E ×45° downstream. Joint face vertical, parallel to canal.

13.97 (14.00) LOCK 17 8 ft. lift, constructed 1829-30.
The facing of the lock is hammer-dressed Seneca red sandstone with a backing of granite rubble. The graded flume, 70 ft. from lock on berm, has a stone over fall at its head. The lockhouse, built in 1898, was a frame structure on the berm. It was destroyed in early 1900's. A lock shanty was on the lower berm about 1910.
MP14/376.5/1

14.02 (14.05) PATH ON RIVER SIDE OF TOWING PATH This path leads to Great Falls and is a self-guiding geologic tour with descriptive plaques (Reed
Natural basin between locks 17 & 18.

14.07 (14.10) LOCK 18 Lift 8 ft., constructed 1829-30.
376.64
The lock is faced with hammer-dressed Seneca red sandstone
Wall on towpath, schist and metagraywacke for 100 ft. below lock.
with a backing of granite rubble; some gray limestone blocks and bricks were used in repairs. A culvert under the tow-

ing path, 15 ft. downstream from lock, was used as a feeder from 1831 to 1837. Water was conveyed from the river channel adjacent to the canal across which a low diversion dam was constructed 100 ft. north of lock. The feeder ditch was along side the towing path. The culvert arch has a span of 6 ft. and a rise of 3 ft., with 12 ringstones and keystone in the face of the arch. Tne water level of canal covers the culvert to top of arch. This feeder was abandoned in 1837 after a freshet damaged the small diversion dam. Ruins of lockhouse no. 11 are on berm. It was constructed in 1830-31 of coursed schist rubble and burnt in 1930. The graded flume on the berm is in front of lockhouse. 10 ft. from the lock. Concrete fish sluices in the river channel between Locks 18 and 19 were constructed between and but the plan to provide for a complete system of fish ladders was not finished.

376.70

14.15 (14.20) LOCK 19 Lift 9 ft., constructed 1829-30.

The facing of the lock is hammer-dressed Seneca red sandstone with granite rubble backing; limestone blocks and bricks were used in repairs. Smooth grooves, up to 3 inches deep, cut into the sandstone by towing ropes are on the southwest wing of the lock. A graded flume, ~~20~~ 30 ft. from lock on berm, has a 3 ft. masonry and concrete overfall at the lower end. A lock shanty was formerly at the upper recess on the berm. At the south end of the lock on the berm, there are low ledges of Wissahickon metagraywacke and schist; similar ledges are in the river channel adjacent to the towing path.

Engineers Letter book 15 Oct. 1832 - 8 Sept. 1834 (Purcell) at Great Falls Museum.

flume 20'

14.26 (14.30) LOCK 20 GREAT FALLS Lift 8 ft., constructed 1829-30. The facing is hammer-dressed Seneca red sandstone into which prominent rope grooves have been cut at the lower end of lock. A pivot bridge formerly crossed the lock. It was destroyed in the Civil War, but was rebuilt and used until 1924. The flume is in a culvert on

376.80

3 lume culvert mouth 16 ft. from lower end of lock

Sluice gate - upper gates, top of town gate 2 ft. x 2 ft.
Upper end recess on town side, crank shaft for town gate opening to recharge culvert.

the berm 15 ft. from lock and is controlled by a concrete frame weir with a screw gate at the head of the culvert. The tavern on the berm side, formerly the Crommelin House, was built between 1828 and 1830 as lockhouse no. 12 to serve locks 19 and 20. It was enlarged in 1830 and established as a tavern in June 1831. Two-story brick wings were added in 1831-32. In later years it served as a feed store and as a private club from 1913 to 1925. It was rebuilt in 1938 and opened as a museum on July 12, 1951. A large bench of cut, Seneca red sandstone is between the lock and museum. Northeast of the museum the Washington Aqueduct building is constructed of Seneca red sandstone. Other outbuildings near the museum were former shops and warehouses of the canal company.

14.27 (14.31) OVERFALL AND WASTE WEIR 50 ft. north of Lock 20 is an overfall 100 ft. long with a revetment of metagraywacke, built in 1830. A concrete frame waste weir,

4 gates with drop boards and paddle gates at the base, is at the north end of the overfall. It was constructed 1882-83. The Great Falls Dam of Washington Aqueduct extends
376.85 = dam
diagonally across river at this point and diverts water for the supply of the District of Columbia and parts of Virginia. The first dam, a short, riprap wing dam, was constructed in 1853. It was enlarged and extended across the Maryland channel to Conns Island in 1864-67. A masonry dam, 7½ ft. high and extending 2,800 ft. across the river to Virginia was built in 1884-1886. In 1896 it was raised to a height of 10 ft. The dam is cut Seneca gray sandstone capped by granite from Petersburg, Va.
Red ss. + granite in 1896 dam.

14.29 (14.33) 376.94 GRANITE BLOCKS A pile of cut granite blocks on the river side of the towing path are extra stone from
Footbridge 377.80
construction of Great Falls Dam. The granite is gray with an orange-tinted, glassy feldspar; fine grained black mica is prominent. One large slab of Seneca red sandstone is

377.22 end (upstream) parking lot; wharf for canoes, hike rental

also in the pile.

MPIS. 377.54

15.22 (15.25) CULVERT 21 COOL SPRING BRANCH Constructed 377.76 1830. The circular arch has an 8 ft. span and a rise of 4 ft. The face of the arch is cut Seneca red sandstone. The spandrels and parapet are coursed Wissahickon metagraywacke and schist. The culvert is filled to the top of the arch (1971). brings straight.

15.33-15.42 (15.36-15.45) OUTCROP ON BERM Wissahickon 377.85 metagraywacke and schist form low ledges on the berm.

15.74 (15.76) REVETMENT A low wall of schist rubble is 378.61 along towing path. It is the probable site of an old overfall.

15.86 (15.86) CULVERT 22 Constructed 1829-31. The face 378.39/378.70 (mileage adjustment) of the semicircular arch is cut Seneca red sandstone. The arch has an 8 ft. span and a 4 ft. rise, with 16 ringstones and a keystone. The parapet and coping are mainly coursed,

schist rubble. The culvert is partially filled, only 12 ringstones show (1971). Wings straight.

15.95 (15.95) OUTCROP ON BERM Low ledges and rounded spurs of Wissahickon schist are on the berm. visible in summer

15.98 (15.98) PUMP STATION On the river side of the towing path is a small building faced with quartzitic schist that houses the pumps for the Rockville water supply. 378.84 Edge of canal along river.

MP16 · 378.85

16.20 (16.20) OUTCROP ON BERM Low ledges of Wissahickon quartzitic schist line the berm. Schistocity strikes N25°E, dips 70°ESE; fractures are at right angles to the schistocity. 379.05 - 379.10

378.92 Ford crossing canal; horsepath - not safe.

16.30 (16.30) 30-FT. CLIFF ON BERM Wissahickon metagraywacke is exposed with schistocity striking N5°E, dipping 60°E. 379.13/379.20 odometer adjustment

16.4$\frac{4}{5}$-16.62 (16.4$\frac{4}{7}$-16.62) OUTCROP ON BERM Wissahickon 379.33

metagraywacke with schistocity striking N5°E, dipping 75°E, crops out in a ledge 40 ft. high. Prominent joints strike N55°W, dip 75°SW. The outcrop continues intermittently to Swains Lock.

16.62 (16.62) 379.51 LOCK 21, SWAINS (OAK SPRING) LOCK 8 ft. lift, constructed 1829-31. The lock is built of hammer-dressed, Seneca red sandstone. It collapsed and was rebuilt in 1861. Lockhouse no. 13, on berm, built 1832, is coursed rubble schist and metagraywacke, whitewashed. The flume is in a concrete culvert in front of lockhouse 20 ft. from lock, between the lock and the lockhouse with a concrete-framed, board insert gate at its head. pile of cobbles 50 ft. downstream = crib finder? – diversion for flume, not a finder. Culvert 23 formerly carried a stream under the canal just above the lock but was washed out in 1831. A concrete frame, single gate waste weir with insert boards is now at the site of the culvert.

Horsebark riding prohibited below Lock 21.

Abdg Culvert 23. – now waste weir, 6 ft. wide (5 ft. 5 in. effective width – reported to bear " A. C. James 1906" in concrete – not seen; riverside, upper half of waste covered by dirt and vines.

16.74 (16.74) OVERFALL (MULE DRINK) A rubble covered

160 ft site of culvert 24 1/2?

~~spillway, 18 ft. long, with schist and gneiss blocks, some~~
379.64 45 ft. wide, effective width 20 ft.

red sandstone, is 600 ft. upstream from Swains Lock.
Swains Lock: phone, bike and canoe rental, toilets, refreshments.

16.77 (16.77) <u>OUTCROP ON BERM</u> Garnet-staurolite-mica schist form low spurs along the berm bank.

16.91 (16.91) <u>OUTCROP ON BERM</u> A low ledge contains
379.81
garnet-staurolite-mica schist which strikes N5°E, dips 40°E. The outcrop continues as low ledges and spurs for 0.1 mile.

17.00 (17.00) <u>MILEPOST</u> The milestone is coarse grained
379.88
Aquia sandstone, now deeply weathered. Only stub shows, 1/2 ft. downstream of new MP.

17.36-17.54 (17.36-17.54) <u>FILTRATION PLANT</u> The water
380.35
intake and filtration plant of the Washington Surburban
Intake on riverside
Sanitation Commission is on the berm. The buildings are faced with quartzitic schist. The plant is the main source of water for the Maryland suburbs of Washington.

17.64 (17.64) <u>PIPELINE CROSSING</u> Three 42-inch lines of
380.46

the Transcontinental Gas Pipeline Co., bringing gas from Louisiana via Alabama, the Carolinas and Virginia (Charlottesville) cross the canal. Clearings along the pipeline show the high flood plain, 100 yards wide and 20 ft. above river, on north; to south in river, Watkins Island, with a rock cove covered by silt and sand rises 20 to 25 ft. above the river.

17.78 (17.78) 380.60 PIPELINE CROSSING of the Atlantic Seaboard Gas Pipeline, Columbia Gas System cross under the canal. Two 26-inch lines from Southwest Virginia and Kentucky via Harrisonburg, Virginia.

17.80 (17.80) 380.62 CULVERT 25 WATTS BRANCH Constructed 1830. The semicircular arch, has a span of 20 ft., with a 10 ft. rise. 28 ringstones (24 shown) and a keystone are in the face of the arch. The face stones of the arch and coping are cut Seneca gray, fine-grained sandstone. The parapet ~~is 3~~ 9 Coping are 4 ft.

flared wings

15 ft

high. The spandrels and parapet are coursed Seneca red sandstone and schist rubble.

17.80-17.93 (17.80-17.93) BOTTOM LANDS Alluvial flats are on the berm along a meander in Watts Branch.
Berm on embankment to 380.75
MP18 380,90

17.93- 1810 (17.93-18.10) OUTCROPS ON BERM Wissahickon chlorite-biotite-muscovite schist with schistocity striking N30°E, dipping 20° to 30°SE. form low spurs.

18.10 (18.10) OUTCROP ON BERM Wissahickon chlorite-biotite-muscovite schist crops out in a ledge 100 ft. high. A cave opening is at the east end of the outcrop.

18.16 (18.16) OUTCROP ON BERM Wissahickon chlorite-biotite-muscovite schist with schistocity striking N30°E, dipping 36°SE, forms a cliff 100 ft. high.

18.21 (18.21) SEWER VENT ON BERM This structure is faced with quartzitic schist. It is a part of the Dulles inter-

ceptor sewer.

18.30 (18.30) 381.12 OUTCROP ON BERM Wissahickon quartz- biotite schist with beds of fine grained metagraywacke crops out in a low ledge. Schistocity strikes N30°E, dips 37°SE., forms prominent ledge.

18.41 (18.41) 381.24 SEWER VENT ON BERM The vent is faced with gray quartzitic schist.

18.51 (18.51) 381.32 OUTCROP ON BERM Wissahickon quartz-biotite schist with knots of chlorite-muscovite forms a ledge. Schistocity strikes N20°E, dips 45°ESE; similar outcrops in low ledges continue to (18.70).

381.46 - outcrop

18.58 (18.58) SEWER VENT ON BERM The vent is faced with gray quartzitic schist.

18.72 (18.72) PUMPING STATION ON BERM The Dulles Interceptor sewer crosses the river from Virginia at this point. The pumping station is faced with gray quartzitic schist.

381.60 - Outcrop - schist, 20ft. ledge; cleavage N60°E, dip 47° downstream.

18.88-18.97 (18.88-18.97) OUTCROPS ON BERM Low ledges
False Blockhouse Point 381.71
bounded by a prominent bluff 70 ft. high at west end and a cliff 25 ft. high at east end are formed of Wissahickon metagraywacke, phyllite, and mica schist. Large clusters (porphyroblasts) of biotite are in the schist. Schistocity strikes N 10°E, and dips 40°E at east end, 20°E at west end; prominent joints strike N40°W, dip 82°NE, N70°W, dip 87°SW to vertical. The latter set of joints form a prom-
upper end - schistosity dips 5° away from canal; appears nearly horizontal;
inent face rising 25 ft. above the canal at east end of
"ribs" 2 in. to 2 ft. thick.
outcrop. Wall on river side of towpath; silt covered.

MP 19 381.95

19.10 (19.10) OUTCROP ON BERM Low ledges of Wissahickon metagraywacke, phyllite, and mica schist crop out on the berm.

19.36 (19.36) SEWER VENT ON BERM The vent is faced with
382.25
gray quartzitic schist.

19.42-19.55 (19.42-19.55) OUTCROPS ON BERM Ledges and a
382.33 - 382.35

382.40 - 2 to 16 in. "ribs" of schist, schistosity N20°E x 22°-42° dip, in 40 ft. ledge; joints N10°E x 65°W
382.42) and 120 x mixed

~~bluff 40 ft. high at west end of the outcrop are formed of~~ Wissahickon metagraywacke and quartz-mica schist. Schistocity strikes N-S, dips ~~42~~ 22°-33°E; joints at the east end of the outcrop strike N15°W, dip 80°W; at the west end the joints strike N65°W, dip vertical; N80°W, dip 68°SSW, N-S, dip 60°W. 30 ft. high; thick beds

19.61 LOCK 22 PENNYFIELD LOCK 7 ft. lift, constructed 1829-31. The facing is cut Seneca red sandstone with a concrete coping on the east end. A red sandstone and metagraywacke rubble revetment is on the east of the lock. Lockhouse no. 14, constructed in 1832, is on the towing path side of the lock. It is built of coursed gray schist, quartzite, and fine-grained, dark gray to black metagraywacke rubble, white washed. It was seriously damaged by fire in 1935. A graded flume is on the berm, 40 ft. from lock, with a 2-gate, concrete frame weir at the

weir 10 ft. wide; 3×5 ft., with boards at bridge at upper end; gate on towpath upriver.

4 ft. deep × 8 ft. wide; dry wall of schist rubble.

head of the flume. A waste weir is 100 ft. west of the informal overfall on Mackall's map at 19.81 replaced by waste weir.
lock. It is a concrete frame with 3 drop board gates, 2 of which have paddle gates at the base. A large block of gray Wissahickon quartz-mica schist with quartz veinlets is on the northewest side of the lockhouse; quartz layers 1/8 to ¼ inch thick and dense, thin layers of mica are prominent. The rock has a greenish gray sheen on the surface and is similar to boulders on the berm above the lock. A flood plain 20-25 ft. above river extends along the Potomac west of the lock. Brown, clayey silt forms the flood plain and 10 ft. of the silt is exposed in the creek bed at the lock.

382.82 - mooring basin 400 ft. long × 40 ft. wide, 0.61 mile east of culvert 30.

19.95 382.88 CULVERT 30 MUDDY BRANCH Constructed 1830. Rebuilt

The coping and semicircular arch are cut Seneca red sandstone. The span of the arch is 16 ft. with an 8 ft. rise. 26 ringstones and a keystone ~~are~~ show in the face of the arch. The springing line is at water level. The parapet 3 ft high and coping

Coping is red sandstone, 8 in. high

are 5 ft. high. The spandrels, flared wings, 8 ft long and parapet are coursed dark gray, gneiss and black fine grained metagraywacke. Embankment 10 ft. above coping Extensive breaches occured in 1830 and 1831 in the culvert. The upstream side of the culvert was badly damaged from a breach in 1835. The site of John L. DuFiefs' wharf is just east of the culvert. = basin

MP20 - 382.95

20.00 EAST END OF Marshall Bidwell DIERSONS WILDLIFE MANAGEMENT AREA. This wildlife area is one of several along the canel maintained by the Maryland Game and Inland Fisheries Department. 383.00 - 383.22 8 in. pipeline for water pumped from river to wildlife area.

383.40 - End embankment on berm.

20.75 383.70 PIPELINE CROSSING A gas transmission line of the Colonial Pipeline Co. crosses beneath the canal and follows the west bank of Lick Run. 36" + 32" lines, installed 1963. Extend from Gulf to eastern seaboard 5,100 mi. Remington, Va. to Gaithersburg, Md.

Opposite Fairfax / Loudoun Co. line.

20.99-21.22 (20.99-21.22) BLOCKHOUSE POINT Ledges, 150 ft. high on berm, are formed of gray-green Wissahickon chlorite-sericite schist. Schistocity strikes N5°W, dips

383.80 - begin two-gate wall on riverside

25°E to 45°E. Opposite Milepost 21 a 50-ft. ledge on the berm contains highly fractured schist with schistocity striking N5°W, and dipping 15°E and cut by joints striking N45°E, vertical; N15°E, vertical. A flat swampy area (21.00-21.14) lies in front of the ledges. West of the swampy area (21.14) are low ledges of gray Wissahickon schist with prominent fractures. Marks of drill holes, 5 ft. apart were made in 1830 in the face of the ledges. At the west end of Blockhouse Point a narrow ledge of Wissahickon fine-grained schist extends upwards 150 feet The schist contains sheared and slickensided quartz veins. Ledges of schist are in the river at the west end of Blockhouse Point. The wall along the river side of the towing path is gray schist rubble. - extends to 21.8 End 384.22

Sketch of Blockhouse Point
Drawing 4"h x 8"w for reduction to 2" x 4"

21.27 384.24 <u>OUTCROP ON BERM</u> Wissahickon quartz-mica

schist and phyllite forms a 15-ft. ledge. Schistocity strikes N5°E, dips 10°E.

21.31 384.28 OUTCROP ON BERM Gray Wissahickon quartz mica schist and phyllite with prominent fractures is exposed in a 25 ft. ledge. Schistocity strikes N15°E, dips 28°E. A revetment wall, 10-15 ft. high on the river side of towing path is constructed mainly of schist rubble.

21.38 384.35 OUTCROP ON BERM A bluff 150 ft. high, behind low ledges, is formed of deeply weathered and fractured Wissahickon chlorite-sericite phyllite and mica schist. Strike N20E, 30°ESE dip, drill marks 2 in. in diamter.

21.40 384.36 SEWER VENT AND PUMP ON BERM The structure
Low schist ledges below wall of canal, strike N20°E x 18°ESE dip.
is faced with gray quartzitic schist. An outcrop of deeply weathered Wissahickon quartz mica schist and chlorite-sericite phyllite, is in a ledge on the berm. Well ends at 384.40

22.00 384.90 MILEPOST This is one of the original mile-

posts. It is located 10 ft. from the river side of the towing path and is made of cut, coarse-grained Aquia sandstone.

22.06 CULVERT33 This culvert was constructed in 1830 and had a 6 ft. span. After the culvert was washed out in September 1868 it was not rebuilt and the stream was diverted into the canal.

22.09 385.06 LOCK23 VIOLETS LOCK 8½ ft. lift, constructed 1829-31. The face of the lock is mainly cut Seneca red sandstone with some concrete in the chamber on the south side at the lower end of lock. The upper recess walls of red sandstone and limestone are 3 tiers higher than the rest of the lock. The coping is limestone. The breast wall is at the lower end of the upper recess. Timber and concrete are in the floor in the upper recess. A mason's mark is in the center of the north wall of the chamber, 4 tiers

3 wicket gates in each inlet lock

concrete facing in area of upper recess miter sill. Inlet gate to recharge culvert in brick recess, paddle gate; pawl on towpath side. Wood scaffolding holes on upper end of lock on towpath side.

from the top. A raid on June 27, 1863 by Col. J.E.B. Stuart wrecked the lock gates. The lock was seriously damaged in the flood of 1877. A pivot bridge was built over the lock in 1836.

The Guard (Inlet) lock and feeder are faced with hammer-dressed Seneca red sandstone. Some schist is in the abutments of the old towing path bridge at east end of the lock on top of the coping. A few blocks of gray Seneca sandstone and trimmed metagraywacke are in the walls of the lock. The coping is hammer-dressed red sandstone. The original cost of the guard (inlet) lock was $7,296 and the feeder was $1,916. Lockhouse no. 15, constructed 1831-32, was a frame building formerly located on the berm. It burnt in the 1930's. The canal was opened from Little Falls (Lock 5) to Violets Lock on November 13, 1830. Rushville community, just north of Lock 23 prospered in the early days of the canal. It was named for Richard

Rush of Pennsylvania, Secretary of the Treasury of the United States 1824-28 who aided in obtaining foreign financing for C & O Canal project in the early 1830's.

22.20 DAM NO. 2 SENECA DAM 2,500 ft. long, constructed 1829-31. This was originally an arch stone dam founded on bedrock. It was 4 ft. high, backing a pool 4 to 5 miles long. The original cost of dam was $28,793. The dam was breached many times and was filled with stone, gravel, and brush. It was rebuilt extensively in 1867 but much of the dam was carried away by ice in 1868 and in 1873. It was rebuilt in 1877. At present it is little more than gentle rapids with weeds covering part of it.

Dam feeds to inlet lock, concrete diversion wall 4ft. wide x 4ft. high

22.34 - Waste weir built by NPS - replaces informal overflow that was shown on Mackall's map.
385.25 Concrete, 3 gate, all board insets 1971; right angle wings

22.41 385.30 OLD CHIMNEY On the river side of the towing path in picnic grounds is a chimney constructed of rounded river cobbles, primarily sandstone, and some red sandstone. A broad, high flood plain is on the berm

between Violets Lock and Seneca. It is 20 ft. above the river grading northwards into a low terrace, 60 ft. above the river.

Boat basin and stone docks 0.4 miles to east. Basin 386.10 to 386.68

22.76 385.68 LOCK 24 RILEYS LOCK 8½ ft. lift, constructed 1830-31 as an integral part of Aqueduct 1. The lock is faced with cut Seneca red sandstone. The upper recess connects with the trunk of the Seneca Aqueduct. Mason's marks are prominent on the berm side of chamber T X + . Lockhouse no. 10, on berm, was constructed 1829-30. It is built of cut and coursed rubble Seneca red sandstone, 1½ stories high. Site of house a Derby Mill on berm east of lock.

Lock 23 - Lock 24 - berm on low embankment.

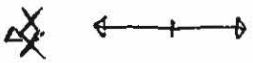
Auto Odometer Seneca: 92973 Falls Ch: 92948

22.80 385.70 AQUEDUCT NO 1 SENECA AQUEDUCT Constructed 1828-32. The face of the Aqueduct is cut Seneca red sandstone. The aqueduct is 113 ft. long between abutments and has 3 segmental arches, each with 33 ft. span and 7½ ft. rise. 28 ringstones and keystone are in each arch, with

Inlet culvert for recharge to lock 24 on berm - boxed in with stone

the springing line at the level of the creek. The piers
385.82
are7 ft. thick. The coping and parapet are 7 ft. high
waste weir - on berm - 2 paddle gates + 1 drop board gate - at head of aqueduct
with the coping 18 ft. above the level of the creek. The canal trunk is 15 ft. wide. Simple rectangular pilasters are on the towing path side of the piers and abutments. Remnants of the railing on the wings has 2 heights of iron balusters. Seneca red sandstone end posts are at end of wings.

Diagram- railing and corner post
Draft 4"h x 8"w; reduce for publication to 2"h x 8"w

Mason's marks are on the berm side at the west end of the trunk  and on the berm side at the east end of the trunk  . In a raid by Col. J.E. B. Stuart, June 27, 1863, a boat was burnt in the aqueduct. A timber trunk was placed in the aqueduct in 1873, because the masonry walls were 9 inches out of plumb and the arch was supported by the inner liner only. Some of the ring-

stones were crushed. The aqueduct was taken down and rebuilt in 1873-74 with iron braces placed to retain the stonework. The west arch fell September 1971, being carried out by water backed-up in a flood of Seneca Creek. The berm parapet and coping remained intact over west arch but were removed when temporary repairs were made. A 3 gate, concrete frame, waste weir is on the berm wing at the west end of the aqueduct.

386.15 - Wall
385.85 - 386.15 Basin
MP 23 - 385.85

SENECA TO HARPERS FERRY

22.84 (22.84) SENECA QUARRIES A large swampy area west of the aqueduct extending west to 23.13 is a former canal basin. Quarries on the north side of the basin were opened about 1774 and the stone was used in the Potomac Company canal locks on the Virginia side of Great Falls in 1797. Along the canal there are six major quarries- 1) John P.C. Peter Quarry, at the margin of the canal near the mouth of Seneca Creek adjacent to the stone cutting mill

This quarry was the source for stone for the Seneca Aqueduct, many locks and culverts on C & O and the Alexandria Canal. 2) Government Quarry on the east side of Bull Run 150 yards upstream from the Potomac, source for most stone used in the Great Falls dam. 3) Peters Quarry on the west side of Bull Run along the canal which was the source for most of the stone in the Smithsonian Building, Washington, D.C., 1848-54. This is the largest quarry in the Seneca area but it is hidden by a dense growth of honeysuckle. 4) Georgetown College Quarry, along the canal ¼ mile west of Bull Run Quarry. 5) Peters Quarry, 1,000 ft. west of Georgetown College Quarry, and 6) Lees Quarry north of Peters northwest quarry (4) (Renwick and Owen 1848). The quarries were active until 1898 with some stone shipped via the canal as late as 1904. The floor of the Government Quarry is covered by large unfinished blocks of sandstone that were abandoned when the Great Falls dam was completed

Warning on danger of walking above quarries and into mill.

using granite instead of sandstone. Walls of red sandstone, ruins of the cutting mill built in 1873 to replace one built in 1850 are at the northeast corner of the basin. Water from the canal supplied power to the mill. The mill tail race is on southeast side of mill. Stone was hauled from the quarries to the mill on a narrow gauge tram railroad powered by mules. The individual quarries were sold to the Seneca Sandstone Company in 1850 and resold to the Potomac Red Sandstone Company in 1867. This company was reorganized in 1872 as the Maryland Freestone Mining and Manufacturing Company. Operation of the Maryland Freestone quarry was suspended in 1874 for 9 years because of litigation with the Canal Company over water power. It was reorganized in 1883 and closed in 1889 because of destruction of canal by flood. In 1891 it was purchased by George Mann of Baltimore and reorganized as the Seneca Stone Company. The Canal Company installed a Blake 15 x 10-inch crusher at the Peters (Bull Run) Quarry in 1874 to

provide crushed stone for the towing path.

The rock at the quarries dips 15° to 20°Sw. Workable beds were from 18 inches to 7 ft. thick; they varied in color from gray to red, texture and hardness and shaly beds were mixed with the sandstone. Two sets of joints, one perpendicular to the dip and normal to the strike, the other vertical and parallel to strike aided in quarrying. The joints were spaced a few inches to several feet. Fine grained sandstone was used most. It was soft, easily cut and carved in quarrying but hardened after exposure. The rock is dominantly quartz with feldspar (microcline and and plagioclase) and muscovite (mica); grains are not interlocked and the cement is ferruginous.

Map showing location of quarries
orait 8"h x 10"w; print 3"h x 4"w.

23.31 386.30 CULVERT 35 BULL RUN Constructed 1829-30, rebuilt August, 1863. The coping and arch are cut Seneca

red sandstone. The segmental arch has an 8 ft. span and 4 ft. rise. The face contains 18 ringstones and a keystone with the springing line at water level. The parapet and coping are 1½ ft. high. Spandrels and the parapet are coursed Seneca red sandstone rubble. The wall on the berm of the canal extending east to basin, built of coursed red sandstone rubble, supported a race to the stone cutting mill. An old grist mill was on the west side of the culvert on the berm. The Government quarry is on the east side of the stream, 100 yds. north of the canal. Peters Quarry is on the west side adjacent to the canal. Sugarland Flats, a prominent terrace 20 to 60 ft. above the Potomac River is on the Virginia shore to the south.

386.65 - outcrop, College quarry? continues to 386.68.

23.32-23.81 OUTCROP ON BERM Red arkosic sandstone and shale, New Oxford Formation (Triassic), form ledges on the berm. The sandstone beds are up to 4 ft. thick, shale beds are 4 inches or less thick. Strike of

the beds is N18°E, dip 8°NNW at east, 12°NNW at west.
386.75-386.80 Outcrop

22.91 386.90 CULVERT 37 BEAVERDAM RUN Constructed 1831-32. The segmental arch is cut Seneca red sandstone with a span of 12 ft. and a rise of 6 ft. 10 ringstones and a keystone are in the face of the arch with the springing line at water level. The parapet is 2 ft. high. Spandrels, wings and parapet are coursed Seneca red sandstone rubble, with some dressed blocks. The culvert was badly damaged in the flood of September 15, 1843 and was torn down and rebuilt. It was rebuilt in 1863 again after the berm side of the arch fractured. In September, 1971 a freshet on Bull Run breached the berm side of the culvert. A wooded flat (high flood plain) is on the berm west of the culvert, 10 to 20 ft. below the level of the towing path and 8 to 12 ft. above river level. A stop gate (built 1835) was formerly west of the culvert but there are no remains of it.

MP24-386.98
MP25-387.95

24.94 informal overflow 100 ft. long. Ends 33 paces east of mile post, revetted 52-25 paces east of MP, low spot, gullys to river; also 20 ft. for 20 ft. same, revetted.
(117)

388.20 - 388.22 - Informal overflow 100 ft. long, revetment on river side of towpath. Towpath depressed 1 ft.

388.25 berm embankment ends

25.31 388.25 PUMP This is the source of water for spray irrigation used on the open meadow to north. Alluvial soil on the meadow is dark brown, fine sandy silt deposited from high floods of the river.

389.28 MP 26
389.35 Horsepen H.B.O

389.20 end embankment on berm

26.71 (390.05) CULVERT 38 HORSEPEN BRANCH Constructed 1830-32. The coping and arch are cut Seneca red sandstone. The segmental arch with 12 ft. span and 6 ft. rise has 24 (22 show) ringstones and a keystone in the face. The springing line is at water level. The parapet and coping are 2 ft. high.

Odometer adjustment? 388.78: 389.12

10 ft. embankment above coping.

Spandrels, wings and the parapet are coursed Seneca red sandstone rubble. The arch was breached in the west quarter (collapsed) in the center of the canal (1971).

No wing on east, 10 ft. flared wing on west, towpath side; on berm wings flared 10 ft. on downstream east.

in prism berm face moving out.

MP 27 - 390.28

27.11 - Culvert (Baron)? - near ft. bridge. Sycamore Landing parking: 390.50

27.49-28.40 MOUND ON RIVER SIDE TOWING PATH

The material in the mound was excavated from the canal and is pebbly to cobbly brown sandy silt with cobbles up to 1 ft. size. The cobbles are subrounded, mainly gray and

white quartzitic sandstone; some pebbles are dark red sandstone. The material is typical of the low river terrace in which the canal is excavated.

MP 28 - 391.28

27.91 - Culvert (Barron) - not seen.

27.55-30.09 TERRACE ON BERM A broad, open flat, 18 to 25 ft. above the river is on the berm. Sprinkler irrigation is used in the fields.

Canal cut below terrace level Sycamore Landing to 391.5. High ridge on towpath side.

28.36 Red ss. ruins of canal warehouse, barn, narrow basin (Hahn) - not seen, heavy vegetation

28.45 391.72 CULVERT 39 Constructed 1830-32. The coping and arch are cut Seneca red sandstone with a sugary texture. The semicircular arch, 4 ft. span, 2½ ft. rise, has 10 ringstones and a keystone in the face. The parapet and coping are 5 ft. high. Spandrels and the parapet are white quartzitic gneiss with small red garnets. The culvert is silted to the top of the arch (1971).

8 ringstones show (1975). 6 in. irrigation pipe passes through culvert.

flared wings, 5 ft. long

29.31 CULVERT 41 Constructed 1831. It is filled with sediment to the top of the arch (1971). The parapet, 7 ft. high, is Seneca sandstone and quartzitic gneiss. 4 ft. span

29.31 29.86-392.60 CULVERT 42 CABIN (CHISEL) BRANCH Constructed 1831-32. The semicircular arch is cut Seneca red sandstone with a 12 ft. span and a 6 ft. rise. 18 ringstones

MP 29 - 392.28

Straight wings; filled over arch, sump

28.80 - 29.31 canal at terrace level

392.85 - Clearing across canal

393.14 - Culvert - 16 ringstones + keystone + 2; Parapet 1 dia, 2 ft. + [illegible] coping, arch cut red ss, Spandrels, etc. red ss. Flared wings 10 ft. long 10 ft. timber on stone coping = Chisel Branch

and a keystone are in the face. The parapet is 1 ft. high. Spandrels and the parapet are hammer-dressed red sandstone. The original culvert with a 6 ft. span was carried away in a freshet August 19, 1843; a timber trunk was placed over the stream and the culvert was rebuilt with a 12 ft. span instead of 6 ft. in 1848-49.

393.15 - Culvert 12 ft. span, 6 ft. rise ?? may apply to Chisel Branch culvert.

30.27 393.63 OUTCROP ON BERM Ledges of red sandstone and shale, New Oxford Formation are in an old quarry opening. The sandstone beds are 1 ft. thick in the center of the outcrop, crumbly red shale is on the west with a slight dip to the west. Not visible in summer

MP 393.31 - MP30

30.31-30.50 OUTCROP ON BERM Low bluff formed of red crumbly sandy shale, New Oxford Formation is on the berm. The dip is slight to the west.

393.80 - Chisel Branch H.B.O. Not visible in summer

30.62 393.95 / 399.36 (7/5/75) EDWARDS FERRY OUTLET LOCK Constructed 1835-37. The two-chamber lock is 150 ft. south of main

[illegible] at head of lock, 4 board inserts; concrete fills recess of lock

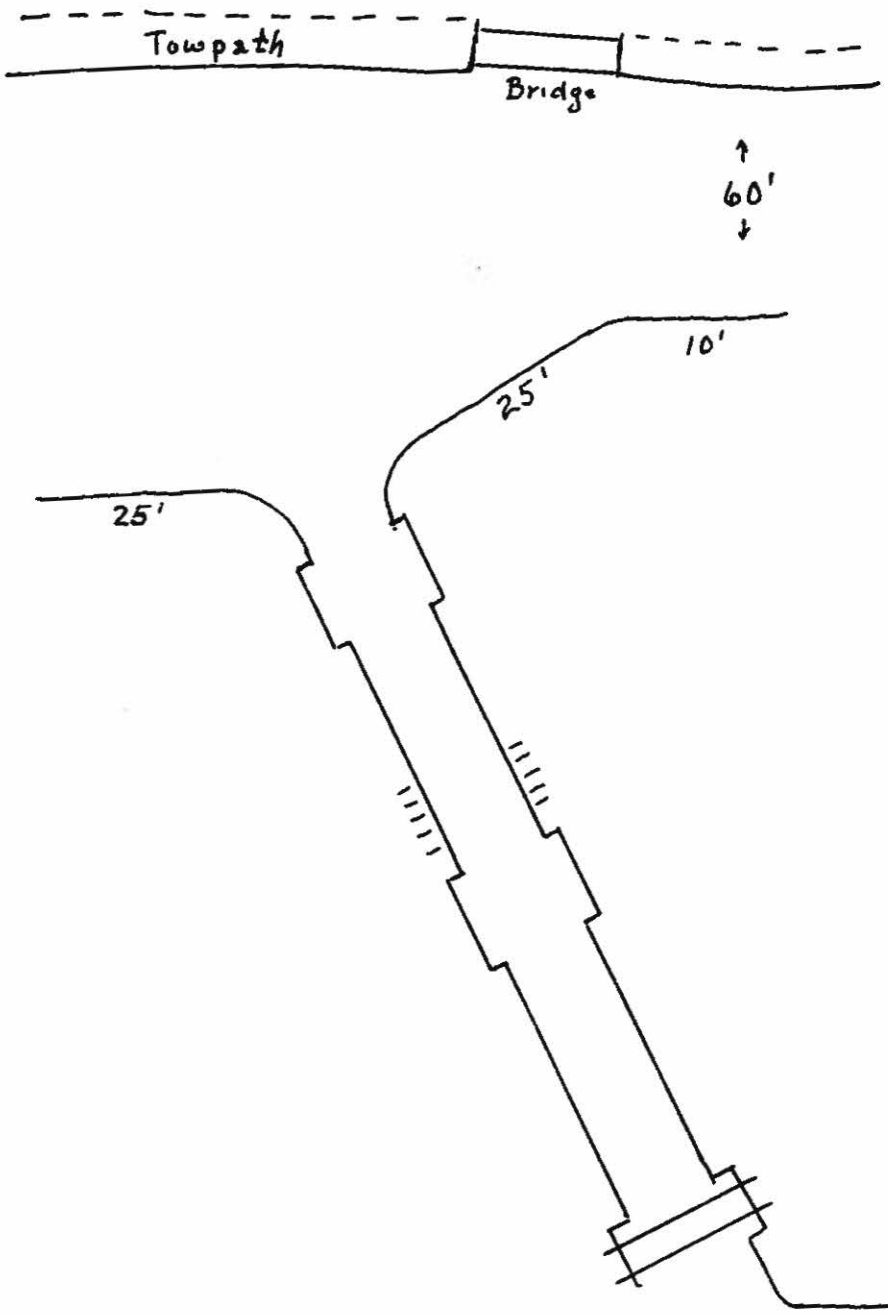
~~trunk of canal. It is faced with hammer-dressed, gray and~~ red Seneca red sandstone. The stone is mainly from Lees Quarry at Seneca. The abutment for the towing path bridge at the head of the lock is 11 ft. high. It is cut Seneca red sandstone with 3 tiers of rough-trimmed red sandstone at the top. The span is 36 ft. The original bridge, built 1836; was burnt in July 1864 in a Confederate raid. It was rebuilt several times afterwards.

Coping is fine grained white & gray sandstone.

Basin at head of lock 175 ft. long (N-S). ~~399~~. + waste weir. Coping on north lock: gray SS, cut. Sides of red in hammer dressed coursed rubble in walls.

30.78 (30.86) LOCK 25 EDWARDS FERRY 8½ ft. lift, constructed 1828-33. The face is hammer dressed Seneca red sandstone. The subrecesses in the upper recesses are 3 ft. wide x 4½ ft. high and were intakes for the old lock culverts. They are now blocked with rubble. Masons' marks E ⊳—◇ are in the chamber. Coping above the upper recess is concrete. A lower extension to the lock, built in 1880-81, is now a low mound of rubble 130 ft. long below the lock in line with the berm side of the chamber. The towing path

394.18 = 399.60



EDWARDS FERRY
OUTLET LOCK
4 July 1975

is raised in the area of the extension. This lock is the Western-most one with the old style breast wall at the lower end of the upper recess. The flume is on the berm 30 25 ft. from lock and is lined with red and gray sandstone rubble. The overfall at the lower end formerly had a concrete frame waste gate at the upper side of the road crossing. Lockhouse no. 17 is on the side of the towing path and is brick with red and white sandstone, crumbly purple sandstone, green shaly sandstone and quartzite in foundation. Foundation for an old warehouse on the berm below the lock, consists of red and gray sandstonerubble. A 2 story brick store is on the towing path at the east end of the lock. A pivot bridge placed over the lock in 1831 was maintained until 1925. Lock 25 is at the lower end of the 9-mile level.

Concrete box culvert carries road over flume, 6 ft. wide × 6 ft. deep; 8 ft. wide earthen road. Basin at head of lock 100 ft. long × 60 ft. wide. Timber bridge carries road over lock.

30.84 (30.00) CULVERT 43 AND WASTE WEIR 100 ft. west of Lock 25, culvert constructed 1831-32, original waste weir

399.61

1834. The waste weir constructed in 1904, is a concrete frame, 3 gates, 2 of which were formerly paddle gates and 1 gate with insert boards. Wings are coursed rubble of red and gray Seneca sandstone. The culvert is 20 ft. west of
Upstream side of culvert arch exposed in canal, red sandstone rubble; wing on west along towpath slightly flared; coursed red ss. rubble wing (straight) to waste weir
the waste weir and has a circular arch of cut Seneca red sandstone with a 6 ft. span and 3 ft. rise. 12 ringstones and a keystone are in the face of the arch. The abutment
shanked at base
is 1 ft. high. The parapet is 1 ft. high. Spandrels, parapet and the wall between the waste weir and the culvert are coursed Seneca red sandstone rubble.
Paved with slabs of red ss. 10 ft. entrenchment above coping.
MP31 399.75

31.22 400.01 BOULDER ON TOWING PATH A rounded, gray, sugary quartzite boulder, 4 ft. in diameter on the towing path is part of a terrace deposit. It was apparently rafted downstream by ice in the Pleistocene.

31.76 400.35 PIPELINE CROSSING One line, a 30-inch gas pipe of the the Atlantic Seaboard Co. from northern West
Good view across plain to river and to south.

Virginia via Winchester passes under the canal and connects with other Atlantic Seaboard lines in Montgomery County to the north of the canal.

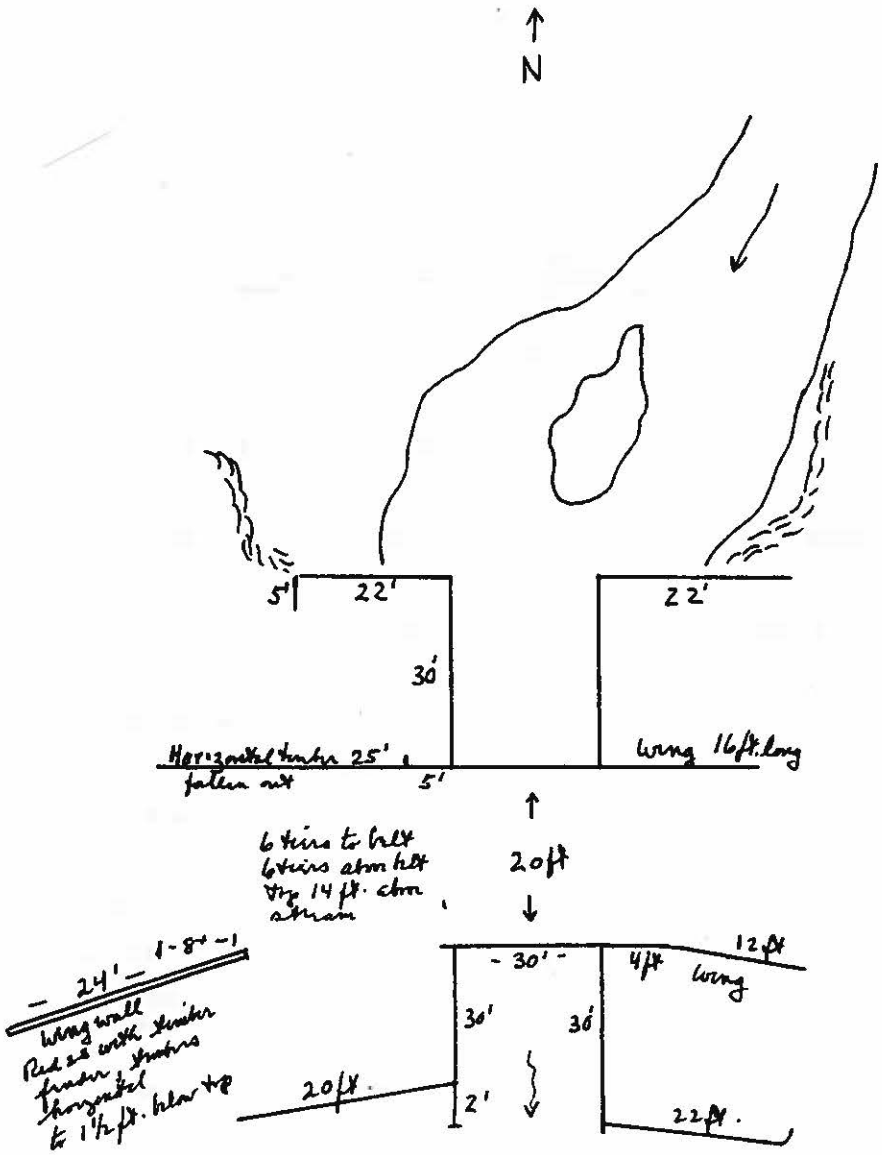
31.90 (31.97)?; 400.70 CULVERT 44 1/2 BROAD RUN Constructed 1829-32. The culvert was originally 2 stone arches, each with a 16 ft. span. It was destroyed in a freshet June 29, 1846 and a canal boat was swept through the breach. A timber trunk was completed over breachAugust 1, 1846 but collapsed in 1847; rebuilt with a permanent trunk in 1847, which gave way October 23, 1851 after a boat hit the wall. The trunk was replaced and later rebuilt at intervals of 10 to 15 years. The present timber trunk 16 ft. long on abutments of hammer-dressed purple and red Seneca sandstone; some gray sandstone is in the wing walls along the canal trunk. The timber trunk walls are 12 x 12 inch timbers tied with iron rods; triangular brace rods are beneath the frame of trunk. The flooring is 12 x 12-inch

Embankment on berm, pipeline to Broad Run.

from wall 15 ft. from trunk

Date - Feb. 23, 1911 in concrete on NW side of trunk (Barron)

trunk span: 29 ft. long; timbers 37 ft. long



Broad Run Trunk
6 July 1975

timbers. Rounded sandstone and quartzite cobbles up to 3 inch diameter from terrace deposits are in the bed of the canal at the culvert.

Sketch of trunk; draft $8^{h}x10^{w}$; print $3^{h}x4^{w}$.

MP32 = 400.75 / odometer adjustment = 401.68

32.50 401.15 CULVERT 45 ABRAMS (ABRAHAMS) BRANCH

Constructed 1830-32. This culvert had a stone arch with a 6 ft. span. Half of the arch collapsed August 19, 1843 and the culvert was eliminated by filling and drainage was diverted along the berm. The stream, however, enters canal now and debris fills the prism to within 2 ft. of the towing path downstream of the old culvert site.

401.55 footbridge across canal, no access

32.52 401.68 POWER LINE CROSSING Potomac Electric Power Company. 2 parallel lines, 3 + 6 (x2) - causes crackling in vicinity.

32.62 401.75 CULVERT 46 Constructed 1830-32. The coping and arch are cut Seneca red sandstone. The circular arch,

4 ft. span, 2 ft. rise, has 10 ringstones above and a keystone in the face. The parapet is 3 ft. high. Spandrels and the parapet are coursed red sandstone. A 10 ft. embankment is above the coping. Straight wings. Watershed to within 1 ft. of top of arch

32.96 (32.96) PIPELINE X - no pipeline
32.96 Culvert? - Hahn - based on MP33. No culvert, area is powerline with MP33 402.11

33.18-33.36 402.30-402.50 MEADOW ON SOUTH A high flood plain, 20 ft. above river level, lies south of the canal.
33.30 402.55 Road bridge from field. Tin piers formed of gas drums.

33.50 (33.50) SQUARE DRAIN (CULVERT 46 1/2) Constructed 1831. A 3 x 3 ft. square opening with a 6 ft. parapet crosses under the canal. It is built of Seneca red sandstone and is one of the few square drains remaining on the canal; It is now filled with trash (1971). No wings.
402.58
33.67 Culvert - Hahn

33.75-35.00 HIGH FLOOD PLAIN Harrison Island in the Potomac River to south is one of several large is-
402.80

lands in this section of the Potomac.

33.89 462.93 CULVERT 47 Constructed 1831-32. The coping and arch are cut Seneca red sandstone. The circular arch, 6 ft. span, 3 ft. rise, has 12 ringstones and a keystone,

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Sketch of faces of ringstones- 4 x 10, reduce to 1½ x 4.

---

each with designs cut into the face. The abutment is 6 ft. high and the parapet and coping are 2 ft. high. = 2 tiers + coping. Splayed wings almost at right angles to culvert face, 10 ft. long, are on the towing path side. Spandrels, parapet and wings are coursed Seneca red sandstone rubble. A 10 ft. sinkhole on towpath behind face of culvert, 10 ft. diameter x 15 ft. deep embankment is above the coping. A hole 25 ft. long, 12 ft. wide and 12 ft. deep is in the canal bed above a breach in the arch. Rubble masonry of the arch is exposed in the breach on south side and drainage of the canal from the east flows into the breach. Red shale, New Oxford Formation, is exposed at the base of the abutment on the river side of the towing path. It strikes N60°E and dips 10°NW.

MP34 - 403.06

34.22 403.26 CULVERT 47 1/2 Constructed 1831. The circular arch, 4 ft. span, 2 ft. rise, has 4 ringstones of cut Seneca red sandstone on the south (downstream) side and 12 rubble stones in the rest of the arch. The abutment is 6 ft. high. The parapet, 4 ft. high is coursed red sandstone rubble. The spandrels are red sandstone rubble on the upstream side and on the downstream side (south) they are rubble to 5 ft. above stream level overlain by large, irregularly cut red sandstone blocks. A 5 ft. embankment is above the coping. The berm side of the culvert has collapsed and the stream enters the canal. Timber footings for the culvert are exposed below the towing path. A 6-inch steel pipe for irrigation water passes through the culvert.

High terrace 20 ft. above canal; 40 feet above river, on berm from Culvert 47, for 780 ft. upstream along canal

Towpath face leaning out

Not seen 1975

Berm arch intact, 6 stir parapet + coping = 5 ft. Silted to springing line; 12 ringstones + keystone 4 ft. span. East side of berm parapet has fallen.

34.4 403.41 Turtle Run H.B.O.

34.49 403.49. CULVERT 49 (48?) Constructed 1829-31. The coping and arch are cut Seneca red sandstone. The circular arch, span 4 ft., rise 2 ft., has 10 ringstones and a keystone.

addenda - 5/7/77
White Ferry to Point of Rocks

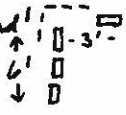
The abutment is 5 ft. high and has irregular blocks of red sandstone. The parapet and coping are 3 ft. high. Splay-ed wing walls are on the south side of the culvert. Span-drels, wing walls and parapet are coursed red sandstone rubble which is partly trimmed in the spandrels. A 10 ft. embankment is above the coping.

flared, 12 ft. long on south. Face on towpath side collapsed over arch and on north side.

Barrn: 10 ringstones + keystone; keystone large. Abutment 1 ft. high; parapet and coping 4 ft. high. No wings

34.61 403.64 SUMP POOL There is a large depression, 100 ft. on the river side of canal, scoured out of the flood plain. A stone wall along the towing path and a ravine to the river are probably remnants of an old over-fall.

South to north 1-49 grass sump slope close to towpath; 49-58 p. nose in middle, 58-75 p. stone curtain on side of towpath

At SE end 

34.7 Barrn cites overfall - rocks.

34.82 403.84 CULVERT ~~50~~ 49? Constructed 1830-31. This is the most ornate culvert arch on the canal. The arch and coping are cut Seneca red sandstone. The elliptical arch, ~~12~~ 10' ft. span, 3 ft. rise, has 12 ringstones and an elaborate keystone. The abutment is 8 ft. high. The parapet and

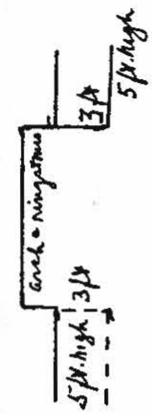
Sketch of arch
Draft 8"h x 10"w for printing at 3 x 4 .

10' 10' flared wings

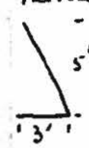
coping are 3 ft. high and are cut red sandstone. A 10 ft. embankment is above the coping. The south and north sides of the arch are breached in the middle of the canal where there are holes 12 ft. x 10 ft. and 6 ft. deep. A 4 x 4 ft. breach is in the rubble masonry of arch at this point. Irrigation pipe through culvert.

MP 35 - 404.01

35.05 <u>CULVERT 51</u> 50? Constructed 1831-32. The coping and arch are cut Seneca red sandstone that has weathered deeply. The arch circular, 4 ft. span, 2 ft. rise, has 10 ringstones and a keystone. The parapet and coping are ~~2~~ 3 ft. high. Spandrels and the parapet are coursed red sandstone rubble. Straight ~~Buttresses~~ wings are on the towing path face of the culvert. They are 5 ft. high and battered 1 on 2. A ~~8~~ 10 ft. embankment is above the coping. The culvert was washed out in the summer of 1839 and was



Batter of buttress wings



rebuilt.

35.42 CULVERT 52 (51?) 75 ft. south of Whites Ferry Bridge; constructed 1831-32. The coping and arch are cut Seneca red sandstone. The arch is semicircular with a 10 ft. span and 5 ft. rise. 16 ringstones and a keystone are in the face. The abutment are 2 ft. high. The parapet and coping are also 2 ft. high. Spandrels and the parapet are coursed red sandstone rubble. The entire culvert under under the canal prism has collapsed and been removed, only footing stones remain and the arch under the berm and towing path are intact.

Parapet and coping on berm: 3 ft., 14 on inner berm, 16 on outer side; abutment 1 tier: 1 ft. wings flared 45°, all Seneca red sandstone.

10 ft. embankment above coping.

Part wooden? 2 ft. abutment of stone across each side of old barrel. On the south side of barrel timbers are on this low abutment.

35.55 (35.71) WHITES (CONRADS) FERRY An old iron bridge over canal, 70 ft. span, is a slightly-arched pony (open) Warren truss. The timber deck is 12 ft. above the water level of canal. The abutments are Seneca red sandstone with large, hammer-dressed faces. The original was a Howe

404.50 / 404.80 odometer adjustment.

Facilities:- phone, light snacks, groceries, gas, boat ramp. Ferry service to Virginia

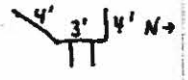
M+B - Montgomery Co. 1865 - B.R. White at Conrads Ferry.
Store at ~~Whites~~ Spinks Ferry. (133)

timber truss built 1865-66 and rebuilt 1871. The iron bridge was built 1876. Whites Ferry, formerly Conrads Ferry, has been in operation since early 19th Century and connects with U.S. 15 in Virginia via a county road.

35.60 (35.76) GRANARY The rubble and cobble wall on the berm is the foundation for a canal warehouse and granary. It was built in the 1870's or 1880's and was a 2 story timber building, 23 ft. wide and 70 ft. long parallel to canal.

35.72 (35.95) CULVERT 53 1/2 Constructed 1832. There are two culverts at this point. The south culvert is filled with sediment (1971) and only 6 ringstones and a keystone show. The circular arch, span 6 ft. (?), is cut light gray sandstone of the New Oxford Formation. The parapet and coping are 4 ft. high. The coping is cut gray sandstone. The spandrels and parapet are gray sandstone

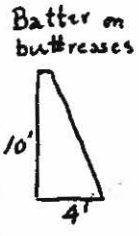
rubble A culvert 20 ft. to the north is a steel pipe with slabs of concrete rubble in wings and spandrels.

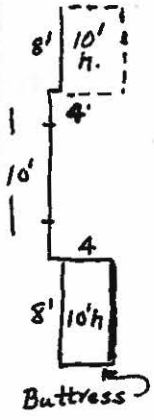


35.79 Road culvert 52½-(lost)
MP 36.00 405.00 543.45

35.86 (36.09) CULVERT 53 Constructed 1832. This culvert
405.10 543.55 Wings - straight face
is filled to the top of the arch with only the keystone showing. (1971). The parapet and coping are 4 ft. high x 20 ft. long. Spandrels, parapet and coping are coursed red sandstone rubble (New Oxford Formation). The spandrels on the south side of the towing path face have fallen. Arch apparently fallen (1975)

36.61 (36.81) CULVERT 54 Constructed 1831-32. This
405.82
culvert has a circular arch, 6 ft. span, 3 ft. rise, with 12 ~~16~~ ringstones and a keystone. The face stones are cut light gray sandstone, New Oxford Formation. The abutment is 3 1/2 ft. high. [There is an abrupt 3 ft. drop below the pavement level on the river side of the culvert.] Butt-
Rebuilt 1974-75.
resses are on the straight wings of the towing path face of the culvert. Spandrels, parapet and wings are coursed gray





sandstone rubble. [A breach 15 ft. wide across canal, 20 ft. long and 8 ft. deep in the center of the canal over the north side of the culvert and the rubble in arch is exposed.] Towpath crushed stone to Culvert 51. Crushed shale from Culvert 51 upstream.

The barrel of this culvert was damaged extensively by flood waters from Hurricane Agnes in 1972. Rebuilt

36.61-37.22 (36.81-37.46) TERRACE ON BERM Cobble strewn flat 5 to 10 ft. above towing path, 35 to 40 ft. above river. Ends 406.35

MP 37. 405.99 544.40

36.98 (37.20) CULVERT 56 Original culvert built 1832-33. 406.18 544.58

The stone culvert was replaced by a ceramic pipe 5 ft. diameter in 1914. The parapet is 5 ft. high and built of concrete. straight wings

544.90 low ledge red sandstone on berm, apparent dip 5° downstream.
544.95 stream comes into berm side canal; large delta fill in prism.

37.31 (37.55) OUTCROP ON BERM Low, discontinuous ledges 406.72 of New Oxford red sandstone crop out on the berm.

37.48 (37.74) OUTCROP ON BERM Low ledge of New Oxford red sandstone are on the berm.

545.10 ledge 40 ft. high on berm, red sandstone, beds 6 in.-1 ft., apparent dip 10° downstream; outcrop 200 ft. long.
545.18 Stream comes into canal on berm. Small delta in canal.

37.55 (37.80) OUTCROP ON BERM A ledge 30 ft. high of New Oxford red sandstone, strikes N5°W and dips 15°W.

37.74 (37.98) OUTCROP ON BERM A ledge 50 ft. high, 100 ft. long of gray limestone conglomerate, New Oxford Formation is on the berm. The rock contains subrounded pebbles and cobbles of dense limestone, and quartzite marble, 1/2 to 3 1/2 inches in diameter in a matrix of reddish, coarse grained sandstone. The beds are 1 to 15 feet thick. Red sandstone is at the top of the exposure. Boulders of conglomerate are in bed of canal.

MP38 406.90 545.28 Curve to northeast
545.35 Styam enters canal on berm; large delta in prism.

37.92 (38.18) SITE OF OLD QUARRY The hill to east of the canal opposite the Marble Hill Hiker-Biker Overnighter is reputed to be the site of a quarry for "Potomac marble" used in the columns and other parts of the House of Representatives in the U. S. Capitol. The quarry is cited in Geddes and Roberts initial surveys for the canal.

407.12 545.50 Marble Quarry H. B.O.

38.17 (38.37) CULVERT 60 Constructed 1832-33. The coping
407.35 545.73
and arch are cut Seneca red sandstone. The circular arch,
span 4 ft., rise 2 ~~1/2~~ ft., has 10 ringstones and a keystone.
The abutment is 3 ft. high. The parapet and coping are 4
ft. high. The spandrels, parapet, and wing walls are coursed
red sandstone rubble, New Oxford Formation. The abutments
10'/wings 16' long. 8 ft. embankment above coping.
are faced with concrete throughout the culvert. Stream strongly
odiferous. Small delta in prism on top of culvert from wash in. Breach in
prism over arch; sink 20 ft. long x 15 ft. wide.

38.21-38.82 (38.41-38.74) OUTCROP ON BERM A bluff 30 to
407.55-407.60 + 407.65-407.85
545.73-546.00 + 546.02-546.35
100 ft. high is formed of coarse grained red sandstone, New
Oxford formation that strikes N5°E and dips 10°W.
546.00 Stream enters canal on berm, small delta in prism.; also curves to NW.

38.87 (38.79) CULVERT 63 Constructed 1831-32. The cir-
407.90 546.38
cular arch is cut sugary gray quartzite from Sugarloaf.
The span is 8 ft. with a 4 ft. rise and has 14 ringstones
and a keystone in the face. The parapet and coping are
6 ft. high. The spandrels, wing walls and parapet are
coursed red sandstone rubble, New Oxford Formation. The
No wings, straight face.

8 ft. entrainment above coping.
coping is cut red sandstone. Half of the culvert was

towpath crushed stone to MP 38, beyond it is earth with some rocks and patches of crushed stone.

carried away by freshet, August 24, 1842 and was rebuilt.
MP 39 : 408.15 546.55

39.24 (39.17) WASTE WEIR This weir has a concrete frame with 3 gates for drop boards, 2 outer ones of which have paddle gates at the base. The waste weir replaced culvert 64 which was constructed 1830-32 with a span of 6 ft.
Stream enters canal on brm, delta in prism extends 300 ft. downstream • 100 ft. upstream.
Curve to NW between waste weir and lock.

39.44 (39.37) LOCK 26 FITCHS, WOODS LOCK 8 ft. lift,
408.55 546.92
constructed 1830-33. The face of the lock is cut red and gray sandstone of the New Oxford Formation. The breast wall is at the upper end of the upper recess, similar to all locks west to Cumberland. The upper end of the lock is now blocked by a timber dam. The lock formerly had an extension at the lower end but only a low bank in the canal and an elevated towing path extending south 150 ft. remain. The flume originally was constructed in 1835, and later rebuilt 6 ft. wide x 5 to 8 ft. deep behind the site of the

No visible gates in recesses; on towpath side holes in coping at recess for valve stems.

lockhouse. A concrete, board-insert gate is at the head of the flume. Lockhouse (no. 18) on the berm was constructed in 1829-30 and burnt in 1959. The foundation for the lockhouse contains gray and red medium grained sandstone (New Oxford Formation), containing quartz, mica, and chips of red mud and black and green metamorphic rocks. 40 ft. from lock Quartz pebbles up to 1/4 inch diameter are also prominent in the gray sandstone. The doorstep is white granite with quartz, biotite, and dull gray orange-tinted feldspar. The lock was damaged by Confederates in a raid on July 16, 1864.

39.42 - small culvert (Hahn)
39.51 - old masonry waste weir, buried (Prentice) } 408.65 see p. 133.
39.58 - culvert (Baron)

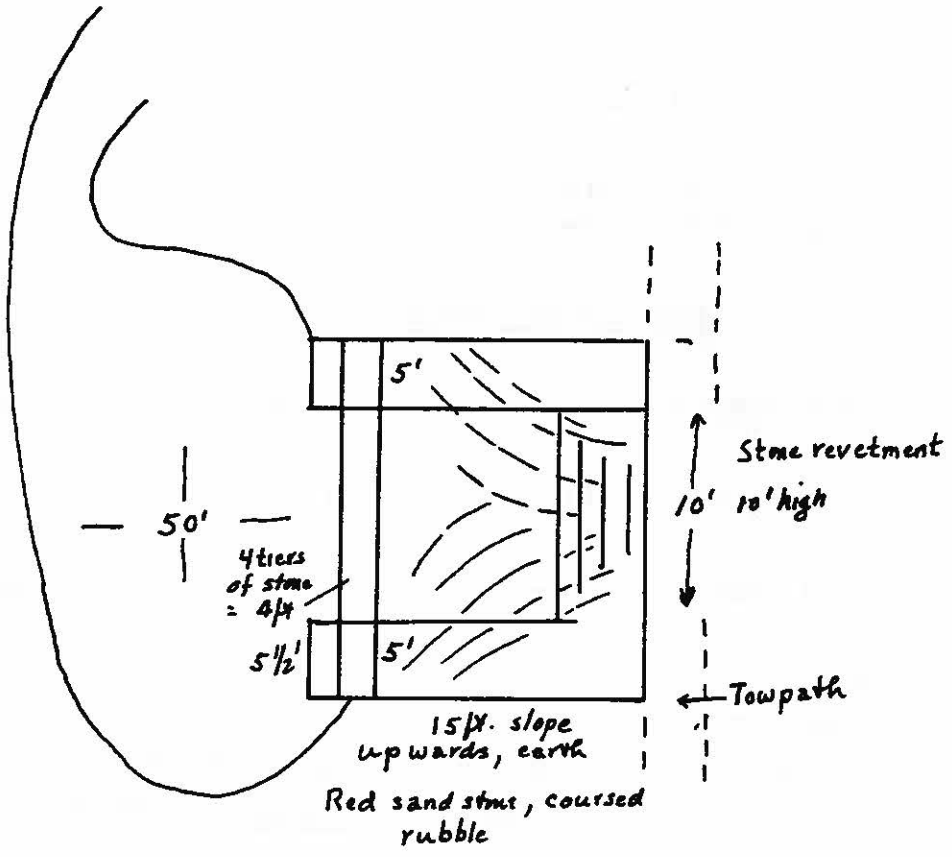
39.71 (39.62) CULVERT 65 Constructed 1830-32. The
406.78 547.15

Note - 0.51 mi. Culv. 65 to reported position of Culv. 66

coping and arch are cut Seneca red sandstone. Stone barrel The arch
Dam across prism; two 24 in. corrugated pipes under towpath? dam?. Rifling arch rifled down to south on towpath side.
has a ~~16~~ 12 ft. span and an 8 ft. rise. 22 ringstones and keystone are in the face of the arch. The abutment is 1 ft. high and the parapet and coping are 3 ft. high. The spandrels, parapet and wing on the south are red, coarse-
straight wings on north, flared wings on south; originally 15 ft. long, 5 ft. remain
grained sandstone (New Oxford Formation). A freshet on

On berm - rifling down inwards. Skewback and first ringstone are single block with trimmed face. Wings flared 45° on downstream side, 30° on upstream side; wings partly fallen on upstream side. Wings 8 ft. long. On berm - 22 ringstones, 1 keystone 1' parapet, 1' coping; 8 ft. embankment above coping.

(140)



Old Overfall waste
39.64
(408.65)

6 July 1975

August 24, 1842 destroyed two-thirds of the arch and the culvert was rebuilt in 1842. There is now a small breach in the arch on the towing path side of the canal prism.

406.80 Bridge to Dickerson warm water picnic area

MP 40 · 409.20 547.55

39.64 (408.65) **SITE OF OLD OVERFALL** A wall on the river side of the towing path is the remains of an old overfall. The overfall has a 4 tier base with a channel opening. The sides are 3 tiers high and are red sandstone of the New Oxford Formation.

place on p. 132

547.50 small stream enters canal on berm.

40.22 - Culvert 66 - not seen (reported 0.51 mi from Culv. 65)

40.22-40.46 **TERRACE ON BERM** 20 ft. above canal and rising inland to 50 ft. at the base of a hill, is a terrace strewn with river-worn pebbles and cobbles.

547.75 Small stream enters canal on berm; no siltation

40.67 (40.71) **CULVERT 66** Constructed 1830-31. This culvert is silted to the top of the arch (1971). The arch has a 6 ft. span with a parapet of gray sandstone, New Oxford Formation.

409.80 548.15 548.21

Inspection - fenced in small sink 30 ft. diameter, feeds to 36 in. Concrete pipe to river. Prism silted for 700 ft. downstream.

40.80-41.00 (40.85-41.05) **POWER PLANT** The Dickerson

409.85 - 410.00 Large plastic air cooling downstream of power plant

Power plant = 548.30

Plant of the Potomac Electric Power Company is on the hill on the berm. The outlet for cooling water from the plant crosses under the canal at 40.80. concrete lined channel to river. The intake is on the river opposite the power plant.

MP41- 410.05 548.36

Just south upstream of power plant is red earth, good outcrop.

41.00 (41.06) WHITES FORD Opposite the north end of the power plant is the site of a ford used by Confederate General Robert E. Lee (September 4-7, 1862), Col. J.E.B. Stuart (October 1862) and General Jubal (July 14, 1864) to cross the Potomac River.

41.04-4105 (41.11-41.13) OUTCROP ON BERM A cliff 40 ft. high, is formed of dark gray, medium grained sandstone and some red sandstone (New Oxford Formation). Gray shale with mud chips 1/4 to 1 inch diameter is interbedded with the sandstone. The strike is N5°E and the dip 10°W.

410.10 - 410.18 548.45 - 548.50

548.58 low ledge; stream enters canal on berm, small; no delta.

41.15 (41.25) OUTCROP ON BERM A low ledge of New Oxford red sandstone, 10 ft. thick, over a sill of diabase, 15 to

410.25, thin 410.30 - 410.40

20 ft. thick is on the berm. The beds slope to the south along the apparent dip.

41.27 (41.36) 410.30-410.40 548.60-548.71 OUTCROP ON BERM Ledges on the berm up to 25 ft. high, New Oxford red sandstone, strike N45°E and dip 10°NW. The apparent dip is 5° to 10° downstream. A sill of well-jointed diabase lies over the sandstone at the south end.

41.31 (41.39) 410.45 548.75 CULVERT 68 Constructed 1830-31. The coping and arch are cut red and gray sandstone, New Oxford Formation. The arch has a 6 ft. span and a 3 ft. rise with 12 ringstones and a keystone. The abutment is 4 ft. high and the parapet and coping ~~2 1/2~~ 3 ft. high. [The pavement is 1 ft. thick at lower end of culvert.] Wings, spandrels and the parapet are rough, hammer-dressed red and gray sandstone. Wings flared 45° with sides vented. 10 ft. embankment abv coping. The culvert is undermined and the south side of the arch and the wings on the towing path side are hanging Ok. in 1977, Rebuilt.

(1971).

41.45 (45.54) 410.56 548.85 LOCK 27 SPRINKS FERRY LOCK 8 ft. lift, constructed 1829-32. The face of the lock is cut Seneca redstone and some gray (pink tinged) sandstone, New Oxford Formation. A block of gray granite is on the berm side of the middle of chamber, 1 tier from top. The coping is from Lees Quarry, Seneca and ashlar from the ledges 2 1/2 miles north of the lock. Masons' marks are in the lower recess towing path side ∨, 15 ft. north of the lower recess, towing path side, 4th tier down ∧. The upper extension was built in 18__ by removing the head of the lock above the upper square quoins. A high embankment wall of red sandstone rubble, 150 ft. long beyond the upper end of the lock, with a timber breast wall 4 ft. high at the upper end are remnants of the extension. Iron rods and 2-inch eye bolts remain in the upper end of the extension. The flume on the berm side 10 ft. from of the lock has a concrete culvert

Stone revetment along towpath for 100 ft. below lock.

15 ft. long and control gate with board inserts at the lower end. Lockhouse no. 19 is on the towing path. It was constructed in 1829-30 and is built of sugary red sandstone and fine grained dark red sandstone (New Oxford Formation). The sandstone in the lentils over the doors in the rear of the house has prominent mud chips. The front door step is white quartzite from Sugarloaf. Culvert on flume at lower end: 3'x 3'; slot for boards in upper end — 4' high

410.60 548.90

A concrete frame, 3 gate waste weir is at the upper end of lock; 2 of the gates have paddle valves, the other gate has insert boards. The spillway on the river side is 20 ft. long with a 2 ft. drop at the end. The walls are sloping floor of concrete. red sandstone rubble. The original waste weir built in 1832 was a masonry overfall. date Jan. 26, 1915 on riverside in concrete.

Lock 27 is at the lower end of the 8-mile level. The roadway on the berm extends north from the lock to the Little Monocacy Culvert.

41.47-41.98 (41.56-41.98) OUTCROP ON BERM Low ledges of New Oxford red sandstone are on the berm; a low flood plain is on the river side of the canal.

41.98 (41.98 411.01 549.35 CULVERT 69 LITTLE MONOCACY CREEK Constructed 1830-32. The coping and arch are cut coarse-grained, pink New Oxford sandstone. The arch has a 20 ft. span and a 15 ft. rise with 36 ringstones and a keystone. The abutment is 4 ft. high and the parapet and coping are 5 ft. high. The spandrels, wings and parapet are hammer-dressed pink sandstone. The culvert was undermined by a freshet in 1843 and was repaired. It was washed out by a freshet and rebuilt in 1878 and rebuilt again in 1887. The spandrel, parapet, and face of the arch on the berm have fallen (1971). The road from Lock 27 and from the Martinsburg Road to Sprinks (Haulvigs) Ferry, near mouth of Little Monocacy Creek, formerly passed through the culvert.

Barrel: rifled, down to right from towpath
Flared wings 45°, 25 ft. long. 8 ft. embankment above coping.
Completely rebuilt in 1975-76.
Concrete arch & facing on berm.
Berm on embankment, Little Monocacy to Monocacy Basin.

MP 42 · 411.05

42.00-42.12 (42.00-42.12) BASIN The wide area in the canal, 500 ft. long x 100 ft. was a wide holding basin for boats waitingto cross the Monocacy Aqueduct. Rubble foundations, 45' long, of a former warehouse and wharf are at the north end of the basin. An old store 200 ft. on the northeast corner of the basin, was 2 stories high with the lower story built of stone and the upper story of clapboard. It is now in ruins.

411.18 / 411.31 - footbridge
Red soil earth towpath ends at Lock 27, good dirt to Monocacy Aqueduct

42.14 MONOCACY AQUEDUCT Constructed 1828-33.

421.24 - 421.30 End at 421.33 411.31 East end, 411.45 West end. 549.50 midpoint.

The aqueduct is 438 ft. long between abutments and 516 ft. between wing ends. The coping is 30 ft. above mean water level and 34 ft. above the foundation. The 7 segmental arches, each have a 54 ft. span and 9 ft. rise. The piers are 10 ft. thick with pilasters 7 ft. wide projecting 1 to 2 ft. beyond the end of each pier. The coping and parapet are 7 ft. high. The waterway on top of the arches is 19 1/2 ft. wide. 8,500 perches (210,375 cu. ft.) of

Sugarloaf Mountain Quartzite (Precambrian?) were used in the aqueduct; mainly from Nelson's quarry and another quarry on flanks of Sugarloaf 5 miles northeast of aqueduct. The white quartzite is in cut facings and the red quartzite is in the waterway. Some of the facing has split from frost action beginning in winter of 1828-29. The red quartzite weathers rapidly and much of it is now crumbly. The arches are cracked along the borders of the waterway and the pilasters and spandrels are cracked and pushing out (1971). The aqueduct has settled progressively with the greatest settlement of 1 ft. at the west end. This settlement is shown by the position of the plinth stones at the base of the piers exposed during low water. A wooden railroad made of L-shaped grooves in logs 12-16 ft. long, 8 to 10 inches in diameter was built in 1832 to carry the stone from the quarries to the aqueduct (Boyd,); sleighs were used to transport the stone in the winter of

1831-32. Original iron railing is partially intact on the towing path side of the aqueduct. Quartzite posts are at each end of the railing. Lead fills the knobs capping the iron railing posts and is exposed 6 sections east of quartz- ite post at west end. The circular iron balusters show forge laminations in the rope cut grooves near the ends of the railing. An 8-inch bull ring is on the berm coping at the west end of the aqueduct. Vertical grooves, 4 inches wide in the inner side of the parapets at the west end of waterway were for stop gate boards. On Sept. 8, 1862, Confederate General John G. Walker attempted to drop the stonework of the aqueduct by prying the masonry apart after drilling for blasting holes proved futile; little damage was done ( ).

1/3 of railing gone. Vertical square iron rods bind stones on towpath (plan)

stone binds on berm (side view)

plunging wings at ends of aqueduct.

Old warehouse adjacent to parking lot at aqueduct now gone (1975).

The Baltimore and Ohio Railraod bridge to the north is 350 ft. long, consisting of 3 deck plate girder spans on the original stone piers with concrete extensions. The

Towpath, dirt, good ↓

original timber span was destroyed in the Civil War.

42.30 411.45 - 412.50 Berm on embankment TERRACE ON BERM A broad lowland extends 4 miles west of aqueduct along the berm. It is 5 to 8 feet below the towing path, 20 to 23 feet above river and rises gently to the northwest. Scattered cobbles in tan to dark brown sandy silt soil covers the terrace.

411.65 Indian Flats H.B.O.

42.51 411.71 549.85 CULVERT 70 LITTLE TUSCARORA CREEK Constructed 1830-31. The arch, spandrels, and parapet are concrete. Some red sandstone is in the parapet. The arch has a ~~8~~ 6 ft. span and ~~2 1/2~~ 3 ft. rise. The parapet is 2 ft. high. The abutments, which are 3 ft. high, are concrete except for 3 tiers of red sandstone on the south. The berm face of the culvert has collapsed. On the berm side the arch has 14 ringstones and a keystone of cut New Oxford red and gray sandstones. The embankment behind coping on the towing path has subsided. (1971).

Sink over arch behind towpath face; 15' ft. embankment above coping, flared wings at 45°, 15 ft. long; culvert partly collapsed. stone over 3 ft. of concrete

MP 43 - 420.40 East end of crushed stone towpath = 419.00

412.80 - Embankment on berm
412.25 MP43 = 540.41 413.20 = MP44 = 541.35

44.05 CULVERT 71 TUSCARORA CREEK Constructed 413.24 551.38 1831-32. The coping and arch are red sandstone reported to be from Nelsons Quarry at Sugarloaf. The stone, however, more closely resembles red sandstone of New Oxford Formation. The span of the arch is ~~20~~ 16 ft. with a rise of ~~10~~ 8 ft. 28 ringstones and a keystone are in the face of the arch. The abutment is 6 ft. high and the parapet and coping are ~~2 1/2~~ 4 ft. high. The wing walls splay 45°. 20' long. The spandrels, parapet and wingwalls are coursed red sandstone rubble. Tuscarora Creek was used as a feeder to canal from 1833 to 35, during which time the water was rented from the owner, J.M. Cromwell. After 1835 the water rights from the old feeder were subleased to operate a grist mill. The canal company abandoned rights to the water on December 19, 1836. The feeder entered the canal at the curve, a mile west of the culvert.

10' embankment above coping

Barrel breached at center of canal on west; sink 20' diameter.

Berm & parapet gone. Sink on west 10' diam.; arch intact.

Wings 45° (6) lower part of wings fallen out.

Berm embankment breached; abutments undermined.

44.70 NOLANDS FERRY Originally a ferry crossed

413.65 - 413.80 Nolands Ferry Recreation area., toilets, tables, boat landing, no water

Tow path crushed stone

the canal here but in 1835 the canal company was ordered by the Frederick County Levy Court to build a bridge in place of the ferry. The bridge started in 1840 and designed by Lewis Wernwag was a wooden truss. It was completed in 1848 and rebuilt in 1858. It was torn down by Confederate troops in 1864 and rebuilt again. The timber bridge was 418.82 replaced by an iron, pony (open), skew Pratt truss in 1876. In 1913 it was replaced by a steel pony Pratt truss which was carried away in the 1936 flood. The abutments that remain are rough-dressed blocks of New Oxford red sandstone and gray pebbly quartzite. Brown 8/ft. embankment east of 417.70 An Indian trail crossed the Potomac at Nolands Ferry, ferry and a ford across the Potomac was established about 1750. A small community was formerly at the ferry. Recreation area 551.82 to 551.95 (Nolands Ferry Br.) Towpath, earth, few roots, Monocacy Aq. & Nolands Ferry. MP 44: 419.45

413.85 (418.78) Road & Water Plant: Water plant Road

A 150 ft. upstream is a 4-story water pumping plant 552.02 furnishing water for the city of Frederick that was built in Fred. County Metropolitan Water Commission 1970. The masonry structure is constructed of dense, black

limestone from the Grove Formation (Ordovician).
552.26 possible old "informal" overfall, 30ft. long feeding to ravine 15ft. wide through higher embankment on river; another similar one 200ft. upstream.

44.70-45.30 SECTION 78 The canal was divided in 1828 into 367 sections, each about a half mile long, for the purpose of letting contracts for construction. Section 76, completed June 24, 1829, was the first section finished of letting of 1828. A medal or a $20 cash award was offered R. and H. Fowler, subcontractor for Hurd, Canfield and Company; Fowler took the $20.

Tp. crushed stone to 414.70

414.3 Embankment ends on berm where B-O joins canal.

MP45 = 414.22 = 552.38

45.10 TUSCARORA CREEK FEEDER The feeder was in use from 1833 to 35 to augment the water supply for the canal until the canal opened to Harpers Ferry. The feeder was an earth flume along a shallow ravine from an impoundment on Tuscarora Creek, 1,200 feet to the north. [The Tuscarora Cement Kilns were located north of the feeder and probably utilized the Frederick Limestone (Cambrian).]? The first kiln was built in 1829 of fieldstone plastered

552.48

Across railroad, wooded area 100ft. wide between 2 fields; at right angle to railroad; extends back to creek. Ditch 20ft. wide; embankment 4 ft. high; old feeder is straight. B-O joins canal just to east. (154)

MP 46 = 415.23 (417.40) 553.35

with mud but collapsed in its first firing. By 1830 there were 5 kilns operated by Egleston and Mosher, who were also building 3 more kilns. The cement was sold to the Canal Coompany. In 1831 Thompkins and Burdick operated the kilns. They were closed down in 1832 because of the poor quality of the cement.

Berm embankment ends at 552.82

Crushed stone & crushed shale surface of towpath ends at 552.82

553.55 B&O joins canal; Low embankment on riverside of towpath; canal cut into terrace, cuts up to 10 or 15 ft. wide openings in embankment maybe an informal 'overflow'?; slight sags in towpath at some. Embankment ends 553.60

46.76-46.95 OUTCROP ON BERM Ledges of limestone conglomerate, New Oxford Formation, are on the berm. The rocks were quarried for building stone a short distance northeast of the Baltimore and Ohio Railroad and one of the quarries was cited as source of the columns in the House of Representatives ( ).

415.9 - 416.18
416.44 - 416.69
554.09 - 554.10 554.12 - 554.20 dip at 23° o.s. St. 345
554.22 - 554.25 554.28 - 554.30

visible in summer

MP 47 = 416.22 / 416.42

joint 20° St. 55° dip d.s to 100° ± 80°; vertical joint, str 20°.

47 = 554.35

47.13 416.32 OUTCROP ON BERM At the footbridge across the canal to Kamp Kanahwa are extensive outcrops of limestone conglomerate of the New Oxford Formation. The strike is N65°E and the dip 25°NW. The conglomerate is cut by

554.45
554.40 - 554.50

417.26 B&O leaves canal going east.

417.60 } South side of curve
417.65
417.70

417.20 - 417.70 Sandy tracks & roots

few cents crushed stone

RR parallels canal 418.00 - 418.40. Curve to south begins at 418.40.

417.70 - 417.95 rutted muddy

554.75 Outcrop on railroad = K conglomerate limestone

417.95 -

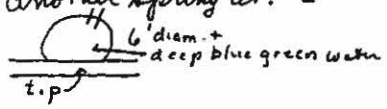
MP 45: 418.41.

fractures enlarged to fissures by solution. Pebbles and cobbles in the conglomerate are angular to subangular, 1/2 to 12 inches in diameter. Most of the pebbles are limestone in a matrix of red shale and limestone. The limestone pebbles are commonly rilled to a depth of 1/4 inch on exposed surfaces. 9 poorly developed fracture and joint systems cut the conglomerate.

Tp = muddy ruts ↓

Caution- It is illegal and dangerous to trespass on Railroad property. The conglomerate can be examined satisfactorily along the canal and at the berm end of the footbridge. Entry to the canal from Kamp Kanawha is private, Do not trespass.

another spring at: ↙?



47.56 554.89 **KANAWHA SPRING** The spring rises in a pool 30 ft. in diameter at river level on the towing path side of the canal. It was formerly enclosed by a dike that is now breached. The spring is a resurgence of subterranean drainage along solution fissures in the New Oxford lime

water is green gray

2 ft. wide x 4" deep x 3 ft./sec. - clear water - discharge.

stone conglomerate. An old wooden waste weir that was under the towing path at the spring was removed in 1971. (waste removed and filled.) Water flow: 6' x 3' x 2½' in the spring is polluted from drainage of septic tank fields which enters solution fissures.

554.95 Calico ~~Spring~~ Rocks HBO.

47.72 555.05 <u>CULVERT 72</u> Constructed 1830-31. The coping and arch are hammer-dressed, coarse grained gray (reddish tint) sandstone of the New Oxford Formation. The inner ring courses are red sandstone rubble. The span is ~~15~~ 16 ft. circular arch and the rise 7 1/2 ft. ~~24~~ ringstones and a keystone are 1 ft. abutment along full arch. 24 OK. on upstream side lower 4 crumbling; apparently not rebuilt on the face of the arch. The parapet and coping are 3 ft. full collapse above coping Straight wings 10 ft. embankment above coping. high. Buttresses are on the flanks of the arch. They extend 2 ft. out from the coping and 6 ft. out from abutment at base. The buttresses are 5 ft. wide. The spandrels, parapet, and buttresses are fine grained New Oxford red sandstone coursed rubble. The culvert rebuilt in 1869 at which time the buttresses were added. A 3 x 3 ft. breach is on the downstream side of the arch between the towing

B&O culvert: concrete, same size as canal. Old stone abutments [illegible], 4 tiers high = 5 ft. Circular arch [illegible] span.

path and the coping (1971).

48.02 555.31 CULVERT 73 Constructed 1829-30. The semi-circular arch is cut Seneca red sandstone with a 6 ft. span and 3 ft. rise. The parapet and coping are 4 ft. high and constructed of gray (pink tinge), medium grained New Oxford sandstone coursed rubble. The arch has collapsed and the culvert is silted. Only 4 ringstones and the keystone show (1971). No wings, straight face. 4 tiers + coping show. red ss.

48.13 555.48 CULVERT 74 Constructed 1831-32. The coping and semicircular arch are cut Seneca red sandstone. The arch has a 4 ft. span and a 2 ft. rise with 8 ringstones and a keystone in the face. The parapet and coping are 3 (= 4 tiers) 5ft ft. high. The spandrels and parapet are greenstone (meta-basalt) coursed rubble. Straight wings, embankment 12' above coping. partially silted up

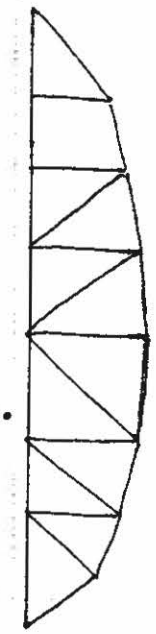
48.26 555.50 POINT OF ROCKS, PIVOT BRIDGE The pier in the center of the canal is 15 ft. wide, as well as the Bridge is 50 ft. long.

abutments are coarse-grained, New Oxford red sandstone. Much of color leached out of the rock. The original timber pivot bridge was built in 1833-34 by Lewis Wernwag with the masonry placed by Michael Byrne. Clearance above the canal water level is 11 ft. The span was rebuilt as a fixed bridge in 1844 and was raised to a clearance of 17 ft. in 1852. The present bridge has an iron superstructure, 71 ft. long and was in use as a main highway approach to the bridge over the Potomac until 1937. West of the bridge are large boulders of greenstone (metabasalt) and quartzite from the railroad cut along side of the canal. The railroad station at Washington Junction, 1/2 mile east of pivot bridge, is a photogenic classic of Victorian architecture. Point of Rocks was known as Johnson Point in the early 19th Century. Timber warehouse at R.R. and road. (gone 1977)

48.41 POINT OF ROCKS, HIGHWAY BRIDGE The first bridge across the river at this point was a covered timber

one with nine spans, constructed by the Potomac Bridge Company, 1851 to 1853 and opened on Sept.1, 1853 (Va. Dept. Public Works, 36th Annual Report, 1851, p. 496); a ferry was in operation previously. The road crossed the pivot bridge and followed along the river side of the towing path to the river bridge. In addition to highway, the original bridge carried a narrow gage railroad to haul ore from Virginia to the Baltimore and Ohio Railroad in 1858. The Narrow gage ore railroad crossed the canal on a timber trestle near the site of the present highway bridge. An 8 span, through Pratt truss iron bridge, 1460 ft. long, 40 ft. above the river, was built by the Smith Bridge Company, Toledo, Ohio, for the Frederick Bridge Company in 1889. It cost $46,000 and was swept away in the 1936 flood. The present 8 span through truss steel bridge was built by the Maryland State Roads Commission and opened December 27, 1937; each span is 165 ft. long and the total

2 deck, girder spans on Va. side, 5 on Md. side over canal and railroad.



Concrete piers; U.S.G.S. gage at pier in river bank, Md. side.

length of the bridges 1,689 ft.

48.42-48.60 POINT OF ROCKS TUNNEL In the early 1800's this area was referred to as the Lower Point of Rocks in distinction to Upper Point of Rocks, now Catoctin Tunnel (49.81-50.27). Because of the steep bluffs that descended to the edge of the river at this and three other places to Harpers Ferry, the right of way was in dispute between the Baltimore and Ohio Railroad and the canal company from 1830-32; after a long legal suit, agreement was reached on May 9, 1833 based on an act of the Maryland General Assembly, December 1832, passed March 22, 1833, whereby the canal company graded both the railroad and the canal for a total distance of about 4 miles along 3 stretches between Point of Rocks and Harpers Ferry. The railroad paid the canal company $266,000 in 12 monthly installments for the work, bought 2,500 shares of canal company stock, agreed not to build beyond Harpers Ferry until canal

canal reached Cumberland with the time limit of the C & O charter, agreed to erect a fence in the narrow areas if steam locomotives were used, and allowed the canal company 12 months to complete the joint grading. Grading commenced May 9, 1833 and was completed December 1, 1834. The fence was not built as the B&O paid the C&O $2,763 on Nov. 8, 1836 in lieu of erecting a fence and agreed to warn the canal company when a locomotive was coming. Joint construction at Point of Rocks involved 3,023 ft. of canal and 3,427 ft. of railroad. Most of the canal in this area was built on a revetment placed in the river. The grade of the railroad from 1834 to 1867 carried a double track line on a ledge cut into the bluff on the berm side of the canal. The Point of Rocks Tunnel, 788 ft. long, was started on December 16, 1865 by the Baltimore and Ohio Railroad as a part of a broad improvement program. It was holed through in 1867 and opened for operations in 1868. The line was

removed from the ledge at the base of the bluff after the tunnel was opened. The date 1902 over the arch commemorates the time when the tunnel was partly lined and faced with brick as a prt of a program of improvement of the original railroad line from Baltimore to Harpers Ferry. The ledge along the canal was widened and a single track placed on it in 1961; the remaining track was placed under the center of the tunnel arch in order to increase clearance for piggyback operations on the railroad.

The cut along the ledge is in greenstone (metabasalt) of the Catoctin Formation. It is a fine grained, dark green rock with zones of schist. Originally the rock was a Precambrian lava that underwent metamorphism near the end of the Precambrian. Large, disrupted quartz veins are folded and faulted within the greenstone; calcite, generally stained brown, with distinct rhombehedral cleavage is associated with the quartz veins. Schistocity strikes

N30°E, dips 20°SE. Several faults, steeply inclined to the east, cross the face of the cut. Arcuate fractures are common and joints trend N80°W, dip 30°E; N65°E, dip 65°SE.

DIAGRAM OF ROCKS IN B&O CUT
Draft-12"side x 8"high- reduce to 4" x 2.6"

IT IS DANGEROUS AND ILLEGAL TO TRESPASS ON RAILROAD PROPERTY. THE ROCKS AND MINERALS CAN BE SAFELY AND SATISFACTORILY EXAMINED WHERE SPOIL HAS BEEN PLACED IN OR ALONG THE BERM OF THE CANAL.

42.54-48.95 The concrete wall on the berm was
145 paces = 400 ft. from west end of tunnel to east end of wall.
built 1913 to 1916 to replace a timber cribbing and stone revetment. The site is famous for the much-used photograph of the Baltimore and Ohio Railroad showing an express train and a passing canal boat. The photo was made in this section on order of Daniel Willard, one of the railroad's great presidents, in

48.81 OUTCROP ALONG RAILROAD Ledges of Catoctin greenstone (metabasalt) extend west intermittently along the berm to Catoctin Tunnel.
Concrete wall between canal and railroad begins 150 ft. below w.w.

48.91 WASTE WEIR A concrete frame with 3 gates for insert boards; replaces an original overfall built 1833. No paddles

48.94 LOCK 28 DENTS LOCK 6 ft. lift, constructed 1832-34. The coping, circular quoins and upper 2 tiers in the face of the chamber on the berm are cut Patapsco granite. The coping on the towing path side is granite. The granite was hauled by railroad from Ellicott City near Baltimore. Bridge over tail of lock. The remainder of the chamber and wings are mainly scabbled, dense white quartzite quarried in Virginia south of Point of Rocks. The facing on the quartzite is scalloped. The breast wall is flush with the upper square quoin. The rubble wing wall at the west end

of the lock, along the railroad, is mainly schist. The low bank in the center of the canal prism, 150 ft. downstream from the lock, is the remains of a lower extension built in 1881. The flume, 15 ft. from lock on berm, is 6x6 ft. Flume now filled 5ft. wide x 5ft. high in section. A concrete culvert 10 ft. long is at the lower end and an insert board weir, 3 ft. wide is at the upper end of the flume. The original flume was constructed in 1834. Lockhouse 20 is on the towing path side. It is brick on foundation of greenstone, granodiorite, and quartzite rubble.

48.96 WASTE WEIR 40 ft. west of Lock 28 is a concrete frame, 3 gates, insert board , weir. Concrete flume on river side, 10 ft. x 2 ft. high; 2 ft. coursed rubble granite above. No paddles. 200 ft. west : large mound of dirt, 25 ft. long, 10 ft. high, 15 ft. wide in canal at mouth of run and culvert under railroad.

49.27 CULVERT 75 McGILLS BRANCH Constructed 1832. The span of the arch is 6 ft. 8? The parapet is 2 ft. high and is constructed of schist and greenstone rubble. The coping is cut, medium grained Patapsco granite. The culvert is filled to the top of the arch (1971).

B&O RR - square drain, 6 ft. span, 10 ft. high, steel beam and concrete slab.
B&O culvert : coping pushed 1 ft. out of line, water wells

49.36 OUTCROP ON RAILROAD Greenstone (metabasalt) forms low ledges along the railroad.

49.50-49.56 OUTCROP ON RAILROAD Low ledges of greenstone (metabasalt) continue along the railroad.

Towpath crushed stone

49.63 CULVERT 76 SLIP BOTTOM BRANCH Constructed 1832-33. The culvert has a 4 ft. span. The coping is coarse-grained Patapsco granite; spandrels and parapet are coursed greenstone rubble. filled to abon arch, 1975.

good earth few ruts

49.63-49.68 OUTCROP ON RAILROAD Low ledges of greenstone (metabasalt) are exposed along the railroad.

no. 77 or waste weir - informal overflow, 45 ft. long.

49.70 SITE OF OLD CULVERT The culvert is now filled. A small ravine leads to the river.

— occasional outcrops.

49.81-50.27 CATOCTIN TUNNEL (Upper Point of Rocks, Williams Point) Joint construction of the railroad, 3,107 ft. and the canal, 2,133 ft. were made at this point.

in 1833-36. The railroad was originally a double track line on the ledge cut into the bluff on the berm. The tunnel was constructed 1867-68 and partially lined and faced with brick in 1902. The old bench along the canal was enlarged in 1961 and the eastbound track placed on it. The westbound track was moved to the center of the tunnel for greater vertical clearance needed for operation of piggyback cars. The face of the cut is 80 ft. high, 300 ft. long, in Catoctin greenstone (metabasalt). The greenstone is medium-grained with knots of biotite up to 1/8 inch size; a horizontal quartz vein cuts the metabasalt. Prominent sheeting planes strike N10°W, dip 60°W with spacing of 4 to 10 ft.; joint strike N75°E, dip 40°NNW; N30°W, dip 32°NE. Parallel vertical drill holes used in pre-split blasting are prominent in the face of the cut. The greenstone can be examined in the canal and on the berm where large blocks from cut are deposited.

Metabasalt crops out on the railroad west of the tunnel, joints at N30°W, dip 65°NE. Fractures are numerous.

HBO: Bald Eagle Island.
Cliffs and ledges, 1250 ft. from tunnel to HBO and to 700 ft. west of HBO

50.55 OUTCROP ALONG RAILROAD Cuts and ledges 40 ft. high expose Precambrian medium grained greenish gray schist at the south, fine grained schist at the center and north end. Solution pockets up to 6 inches in diameter are at the north end. Schistocity strikes N5°E, dips 45°E; joints strike N5°E, dip 65°W; N20°E, dip 50°ESE; N35°W, dip 45°NE; N30°E, dip 68°NW; N55°W, dip 75°NE; N50°W, dip 63°SW.

Smooth arenaceous shearing faces in cut on north.

50.63 CULVERT 78 POPLAR BRANCH This was a road culvert constructed in 1832. The coping and arch are cut, medium-grained red sandstone, New Oxford Formation. The arch has a span of 8 ft. and has 8 ringstones and a keystone in the face. The parapet and coping are 3 ft. high with the parapet constructed of coursed greenstone

B.O culvert, 18 rs. + ks = granite, 3 tier abutment = 4 ft., 6 ft. span, 6 ft. rise, semicircular arch.
6 tier parapet + 1 tier coping - rough cut limestone.
2 small breaches in culvert arch on canal.

and granodiorite rubble. The culvert is silted and flooded to the top of the arch (1971).

50.70 OUTCROP ON RAILROAD Low cuts and ledges expose schist on the east and gray granitic gneiss to the west. Schistocity strikes N20°E, dips 40°SE. The gneiss varies from green gray to bluish gray and is coarse grained, consisting of quartz and feldspar with bundles of biotite up to 1/8 inch size.

Towpath from above Lock 29 to 1,000 ft E and Catoctin Aqueduct = earth, smooth, good. Below Lock 29 towpath to earth with roots.

50.87 LOCK 29 Lift 7 ft. Constructed 1832-33. The berm side of the chamber is mainly cut Patapsco granite; hammer-dressed quartzite is in a tier 2 tiers above the bottom of the lock on the berm side. The upper tiers on the towing path side of the chamber, all of the lower recess, and the lower wings are granite. The lowest 3 tiers of the towing path face of the chamber are hammer-dressed quartzite. The granite is light gray with orange-

Short rubble wall on low end of lock; coursed, at end of wing to flume

One block of ss. in coping on berm at lower wing corner.

tinted feldspar on weathered surface; biotite and quartz are prominent. The quartzite is scabbled with scalloped faces. Some red sandstone is in repaired sections of the chamber. The lock was lengthened by a crib extension on the upper end. To make the extension the head of the lock was removed above the square quoins at the upper recess. The berm embankment of the extension is well preserved; some timber from cribs are in the towing path bank of the extension. The breast wall of stone and timber at the upper end of extension is also preserved. Lockhouse no. 21 on the berm, constructed 1836-37, is brick on a metabasalt and granodiorite rubble foundation. The flume is 20 ft. on the berm from the lock and is a graded overfall, constructed in 1834. A pivot bridge was formerly overt the lower end of the lock.

The northeast wall of the flume has rubble of dark gray schistose gneiss, dense black hornblende diorite,

dark gray schist with laminae of biotite, quartz and feldspar, and metabasalt; a block of metabasalt has a band of prismatic crystals of yellow green epidote.

Towpath: Little Catoctin to 1000 ft. East of Catoctin: earth, rutted, fair; then good earth, few ruts to Sargent.

WARNING- COLLECTING OF MINERALS ON PROPERTY OF THE NATIONAL PARK SERVICE IS PROHIBITED BY LAW.

51.05 WASTE WEIR This weir is 700 feet west of Lock 29 and is a concrete frame, with 3 gates for insert boards. The original overfall was constructed in 1833. No paddles

51.10 CULVERT 79 CLAGETY (SUGARTREE) BRANCH

Constructed 1832-33. The coping and semicircular arch are cut, medium-grained white sandstone. The arch has a 10 ft. span and 5 ft. rise with 18 ringstones and a keystone in the face. The springing line is at water level. The parapet and coping are 2 ft. high. Spandrels and the parapet are coursed white sandstone rubble. The culvert was carried out by a flood in 1870 and was rebuilt. The towing path face of the culvert is hidden by dense brush;

8 ft. span, 8 ft.? rise, semicircular. No wings.

flared wings, 10 ft. embankment above coping.

B&O Culvert = 20 r.s. + ks = 6 ft., 4 ft. abutment parapet 4 tiers = 4 ft. to coping; - all limestone.

the berm face is visible from the road.

51.35-51.46 OUTCROP ON RAILROAD Blue to green gray gneiss with schistose zones is exposed along the railroad. The gneiss is primarily quartz, feldspar, chlorite and biotite with small garnets; it is deeply weathered to a brown crumbly rock. The schistose zone has coarse grained, pebbly quartz veinlets. The rock can be examined in the bed of the canal where there are large boulders.

51.51 CATOCTIN (No. 3) AQUEDUCT Known as the Crooked Aqueduct because of the curves on the approaches Coping and railing stood in fenced-off area in canal prism on east. that were required to place the aqueduct at right angles to the stream channel. Constructed 1832-34. This aqueduct was 92 ft. long between abutments and had 3 arches. The center arch was elliptical with a 40 ft. span and 10 ft. rise. 38 ringstones and a keystone were in the face.

The side arches were semicircular with 20 ft. spans and 10 ft. rises. Each arch had 28 ringstones and a keystone. The ringstones were granite cut at Ellicott Mills near Baltimore. The parapet and coping were 7 ft. high; the coping was 27 1/4 ft. above low water, 33 ft. above the foundations. The towing path parapet was 7 ft. thick and the berm parapet 5 ft. thick. The waterway was 25 ft. wide. The piers were 6 ft. thick and built of ranged rubble of biotite granite. Rough faced granite with cut beds and joints were in the spandrels, parapet and wing walls; some repair blocks of Seneca red sandstone at ends of the waterway on the berm. The railing along the towing path was wrought iron and at the east end a three-piece laminated forging that formed the rods is prominent where bent and separated. The contractor who built the aqueduct was accused by canal company of ordering and accepting undersized stone and a serious breach occurred in the area

Abutment wing wall at west end of bridge = coursed rubble 5 ft. thick coping = schist. East arch intact in 1975. Footbridge across creek in 1975 to north near B&O bridge. Wall of mortared gray schist rubble at ends of footbridge; footbridge is single concrete beam span with iron railing.

of the wing walls in 1835. A wooden trunk was placed in
gray green gneiss in belt and end stones, cut; rest is schist-gneiss rubble
coping granite: gray with black streaks.
the waterway and the stone work was repaired. In April,
quartz prominent in gneiss; feldspar white; mica scattered & minor.
On east is a grain of wire (gabion) and broken stones as wall to protect arch.
1838 a breach occurred at the east end and a wooden trunk was placed in the waterway. The trunk gave way June 18, 1838 and a wing wall fell. The stone work was repaired. Serious leakage developed in 1859 and by 1870 the aqueduct had to be partly rebuilt. The berm wall was pushed 15 inches out of line and was leaking badly 1873. The center arch began sagging in the 1920's because of the west pier which was weak. It was repaired but the berm parapet, spandrels and part of the arches fell in early 1950's. By 1960 the center arch was hinged at 4 points, sagged 1 ft. and was 1 ft. out of plumb; the west circular arch was
October: (on sign at aqueduct.
compressed. On September 30, 1973, the center and west arch collapsed during a freshet on Catoctin Creek.
Flat slab below water on site of old west pier.

Baltimore and Ohio Railroad bridge no. 39 is north of aqueduct. It consists of 2 arches with hammer-dressed

Cut and rough trimmed limestone on east & gneiss and limestone on west under towpath, cut & rubble on west. 7 ft. x 5 ft. corrugated steel culvert, wings & parapet arched railroad ties (1974)

granite ringstones and spandrels, piers, abutment and parapet of limestone; coping of granite. 20 ft rise, 6 ft. parapet

Outcrop of medium grained, green gray gneiss along RR.

51.91 SITE OF SQUARE DRAIN JACKS (CLAGETS) BRANCH, Constructed 1835. This drain is now covered. The square drain under the railroad, 4 x 6 ft. in size empties into the canal. The prism is silted to the towing path level. 6 ft h. x 10 ft. w. Abutments = 5 tiers, flat concrete span.

From mile 52 west the fill gradually tapers for 3,000 ft. It also tapers east to tne aqueduct. The fill contains about 26,000 cubic yards of silt, sand, and gravel deposited since 1924 indicating that creek carries at least 550 cubic yards of soil into canal per year from a drainage basin of about 5,000,000 square feet which is equivalent to removal of about 3 1/2 inches of soil per century over the entire basin.

Cut on B&O RR. - schistosity 30° E. along R.R. (dip) in thick bedded greenstone? Outcrop 150 ft. wide.

52.00-52.09 LARGE BOULDERS ALONG TOWING PATH The boulders are Precambrian dark green gneiss, mainly quartz

1 inch drill holes.

52.30 **CULVERT 81** Constructed 1832-33. The coping and arch are cut Seneca red sandstone. The arch has a ~~5~~ 4 ft. span, 2 ft. rise with 10 ringstones and a keystone. The parapet and coping are 4 ft. high The spandrels and parapet are quartzite and granodiorite rubble. The berm side of the culvert is plugged with debris. There is a washout in the berm bank at the culvert.
Short, flared wings; 12 ft. embankment. B+O culvert silted; rubble parapet only.

52.51 **CULVERT 82 LITTLE CATOCTIN (MIDDLE) CREEK**
Reconstructed 1975, concrete barrel on berm half; flared wings; rubble gneiss + greenstone in barrel.
Constructed 1832-33. The circular arch of cut Seneca red sandstone and limestone has a 16 ft. span and an 8 ft. rise. 24 ringstones and a keystone are in the face of the arch. The inner ring courses are biotite gneiss rubble. Spandrels and wings are coursed quartzite and gneiss rubble with some cut stones. The waterway and berm side of the arch have fallen and the parapet on the towing path side has been replaced with an earthen embankment 8 ft. high. The culvert collapsed 1847 and was rebuilt in 1848-49. The

culvert was formerly used as a road culvert.

The Baltimore and Ohio Railroad bridge on the berm has coping and a semicircular arch made of cut granite. The span is 16 ft. with an 8 ft. rise. 38 ringstones and a keystone are in the face of the arch. The spandrels and parapet are hammer-dressed limestone.

53.20 CULVERT 83 Constructed 1832. The coping and semicircular arch are hammer-dressed quartzite. The arch has a 4 ft. span and 2 ft. rise with 8 ringstones and a keystone in the face. The abutment is 3 ft. high and the parapet and coping are 5 ft. high. The spandrels and parapet are coursed quartzite and gneiss rubble. The pavement has a 1 ft. drop on the lower side of the culvert.

53.60 CULVERT 84 (Tobacco House Branch) Road culvert constructed 1832-33. The coping and circular arch are hammer-dressed dense, light gray quartzite. The span is 10 ft. with a 5 ft. rise.

16 ringstones and a keystone are in the face of the arch. The abutment is 4 ft. high and the parapet and coping are also 4 ft. high. The spandrels and parapet are coursed rubble quartzite and green biotite gneiss. Outcrops of gneiss are in the low bluffs on the north side of the railroad yards. A terrace of brown sandy silt soil is on river side of canal and rises 20 ft. above canal to west.

Rough stone, clay bound road; ↑ 8 ft. embankment above coping; flared wings ↓ good road

54.05 CULVERT 85 Constructed 1832-33. The circular arch is cut Seneca red sandstone, with a 8 ft. span and a 2 ft. rise. The parapet and coping are 3 ft. high. The coping is cut dense gray quartzite and the spandrels and parapet are gneiss and quartzite rubble. The culvert is filled to the top of the arch (1971).

Breach in berm; parapet and coping gone. Flared wings

54.10 TERRACE ON RIVER SIDE There is a terrace 20 ft. above towing path. A swale 200 ft. wide is between the canal and the terrace; the swale formerly used as a

Water Company

Portable toilets Picnic area.

landing field for light aircraft.

54.60 CULVERT 86 Constructed 1832. The circular arch is cut Seneca red sandstone with a 6 ft. span, 3 ft. rise and contains 6 ringstones and a keystone in the face. The abutment is 3 ft. high. The spandrels are quartzite and gneiss rubble. No wings, 8 ft. embankment above coping. A 12-inch iron pipe carries a sewer line through the culvert and connects with a treatment plant 50 ft. west and 50 ft. south of the canal. The new treatment plant was constructed in 1971 adjacent to the old one. 100 ft. on south side; embankment 15 ft. high surrounds plant. Water pollution control facility

54.80 CULVERT 87 Constructed 1832. The coping and arch are cut Seneca red sandstone. 8 ft. embankment above coping; flared wings The arch has an 8 ft. span and a 4 ft. rise with 14 ringstones and a keystone in the face. The springing line is at stream level. The parapet and coping are 4 ft. high. The spandrels and parapet are gray quartzite and gneiss rubble. The culvert

was rebuilt in 1863 but was washed out and rebuilt again in 1873.

54.97 WASTE WEIR This is a standard weir with a concrete frame and 3 gates for insert boards. Gray, coarse grainedgrained quartzite and hornblendite rubble are in the pavement on the river side of the weir. The original overfall at this site was constructed in 1833.

with boards in place; no paddles.

8 foot lift

55.00 LOCK 30 BRUNSWICK Constructed 1832-33. Cut Seneca red sandstone and dressed gray quartzite are in the face of the chamber. The quartzite facing is ribbed and the sandstone under the bridge is crumbling. A bank for an upper crib extension is on the berm at the upper end at the upper end of the lock. The stone work above the square quoins in the upper recess was removed to extend the lock. A flume in a concrete culvert, 8 ft. wide, 6 ft. high is 15 ft. from the lock on berm. The original flume was built in 1834, and water from the flume powered an old

Upper sill; fender + stone + bolts

Concrete piers

Causeway on canal 300 ft. west of lock

mill on the northeast side of the lock. Lockhouse 22, a
Mill burned in 1972; now a basin. Concrete wall on basin 100 ft. long where mill sat.
frame structure, was constructed in 1836 and was formerly 50 ft. north of lock opposite the northwest corner of the mill. The bridge across the lock was originally a pivot bridge built in 1841 on a design of Lewis Wernwag. It was rebuilt in 1869 and the last reconstruction was 1932.

The first highway bridge over the Potomac River at Brunswick was built by the Loudoun and Berlin Bridge Company in 1855-56, and opened on December 1, 1856. It was a timber covered Howe truss, 9 spans, 1,568 ft. long and cost $54,500. It was burned by Confederate troops on June 7, 1861 and a pontoon bridge was put in use in October 1862. The bridge was rebuilt in 1895, as a privately owned toll bridge. It was a 9 span, steel, Warren truss, curved chords without verticals. One steel Warren through truss, standard without verticals was over the canal. The bridge was purchased by the State of Maryland in 1922. The

present bridge was built on the north side of the 1894 spans by the Maryland State Roads Commission in 1953-55 and was opened July 28, 1955. It cost $2,850,000 and consists of 16 haunched deck girder spans over the river, canal and railroad. It is 2,425 ft. long with a 26 foot roadway. The Baltimore and Ohio Railroad yards along the berm of the canal were built in 1890-91. They were rebuilt and an eastbound yard added in 1906-07. The town was formerly named Berlin but was changed to Brunswick 1890.

55.33 CULVERT 88 Constructed 1832. The coping and semicircular arch are cut glassy gray quartzite. The arch has a ~~10~~ 8 ft. span and a ~~8~~ 4 ft. rise. There are 14 ringstones and a keystone in the face of the arch. The parapet and coping are 4 ft. high. The spandrels, flared wings (on horn) wings and parapet are coursed glassy, gray quartzite rubble. The culvert is silted to 1 ft. above the springing line. (1971).

B-0 culvert, 6 ft. semicircular arch on horn

56.08 CULVERT 89 Constructed 1832-33. The arch is cut red and gray sandstone and has an 8 ft. span and 4 ft. rise. 14 ringstones and a keystone are in the face. 10 ft. embankment above coping. The abutment is 2 ft. high. The parapet and coping are 5 ft. high. The coping is cut white, fine grained sandstone; the spandrels, parapet and wings are quartzite rubble. flared wings. Old cattle sheds on B&O RR, 1000 ft. east of culvert 90. Cattle sheds extend for 1000 ft. west.

56.45 CULVERT 90 Constructed 1832. The semi-circular arch is cut Seneca red sandstone. The arch has a 6 ft. span, 3 ft. rise, and 12 ringstones and a keystone in the face. The parapet and coping are 2 ft. high. The coping is dressed cut pebbly quartzite; spandrels and the parapet are coursed quartzite rubble. wings flared

57.00 CULVERT 91 Knoxville on Payne Branch. Road culvert, constructed 1832. The arch is cut gray sandstone with a 12 ft. span and a 6 ft. rise. 18 ringstones and a keystone are exposed in the face. Possibly one additional ringstone is on each

side of arch beneath the water. The coping, of cut red and gray New Oxford sandstone, rests on the keystone. The spandrels on the south and the south wing are coursed gray quartzite rubble; the north spandrels are coursed red and gray New Oxford sandstone rubble. The arch is intact on the berm but the spandrels, wings and parapet have fallen.

10 ft. embankment above coping

Embankment has been breached.

Small basin upstream of culvert.

57.36 CULVERT 92 Constructed 1832. The circular arch is cut Seneca red sandstone with a 6 ft. span and a 3 ft. rise. 8 ringstones and a keystone are visible in the face. The parapet and coping are 3 ft. high. The coping is dressed gray quartzitic sandstone; the parapet is gray quartzitic sandstone rubble. The culvert is silted to a foot from the top of the arch (1971).

3 tiers of parapet = 3 ft. + coping. 10 ft. embankment above.

Revetment wings

Footbridge 60 ft. east of culvert 92.

57.50-57.85 OUTCROP ALONG U.S. 340 About 600 feet of Weverton quartzite with shale zones are exposed in the high road cuts 600 ft. north of canal. The dip 35°E and the rocks are on the west flank of an overturned anticline.

Large slide, 200 ft long, 150 ft. upslope at west end of outcrop.

This is the type locality of the Weverton Formation.

58.00 SITE OF WEVERTON Weverton was founded in 1834 by Casper Weaver, incorporator of the Weverton Manufacturing Company. Four buildings were erected between the canal and the railroad after 1847. A dam 3 1/2 ft. high was built in 1847 across the river on the lower of two ledges of rocks ?? 500 ft. below Lock 31. It cost $60,000 and was removed in 1874. Channel along canal, Lock 31 to below forebay.

The towing path was raised above Lock 31 to protect the canal from the impoundment. Weaver died in 1849 and the company was reorganized. A bid for the new National Foundry failed in 1858 and the town declined. In 1861, the Henderson Steel and File Manufacturing Company opened a plant in one of the old buildings and a cotton mill was erected but foundation ruins between river and canal at 57.70; 150 ft. from canal not operated. All buildings now gone and only the forebay gates on the river bank 500 feet (57.88) below Lock 31 remain. The

Flume from mill race into west side of culvert on berm; culvert opening is a well 178
15 ft. deep; 10 r.s. & k.s. show; wall of dressed quartzite rubble. Well between lockhouse
and lock 8 ft. x 6 ft.; piling stone on berm upper end of finder. Well 10 ft. N-S.; 15 ft. E-W.

3 gate walls and gate recesses are coursed quartzite and phyllite rubble walls.

Race 150 ft. to west.

58.02 LOCK 31 8 ft. lift constructed 1832-33. The Mill race wall on south = quartzite rubble; 10 ft. rubble arch in wall 25 ft. west of well.
berm face of the lock is mainly dressed gray quartzite with some gray limestone in the chamber. The towing path face is concrete. Blocks of partially dressed limestone and quartzite removed from the towing path side of chamber are on the river side of the towing path. A low embankment well between lockhouse and lock, 8 ft. wide x 6 ft.
on the berm side below the lock is the remnant of cribs for 10 ft. embankment above culvert on towpath. 20 ft. from canal
a lower extension. The flume is on the berm between the
5 ft. w x 6 ft. h.
lock and the lockhouse and has a concrete frame waste gate, Slots 3 ft. x 3 ft. Concrete wall for 20 ft. on flume below slotted gate.
4 ft. wide x 5 ft. high. at its head. An overfall, 6 ft. deep, 8 ft. wide with a 4 ft. drop is at the lower end of the flume. A culvert is under the breast wall of the lock. The face on the towing path side, is a circular arch of cut Weverton quartzite. The span is 6 ft. and the rise 3 ft.
15 ft. parapet above, dressed quartzite 10 ft. with 5 ft. of rubble quartzite at top.
8 of the 12 probable ringstones and keystone show.

Lockhouse: 1½ stories, brick on north side of berm; wood shack on lower berm.

The parapet is 6 ft. high and built of quartzite rubble. A 5 ft. dry wall and 4 ft. embankment are above the top of the parapet. The culvert is filled to top of the arch with silt and trash. On the berm the culvert face is in cistern 20 ft. deep, lined with scabbled quartzite. 2 1/2 ft. of masonry is between the culvert and the breast wall beneath the lock. Lockhouse 23 constructed of brick in 1833 and is on the berm side of the lock. 30 ft. west of the head of the flume is a stone arch and race for an old mill. A pivot bridge was formerly over the middle of the lock. It was built in 1835 by Lewis Wernwag.

58.09 WASTE WEIR A concrete frame, 3 gate, waste INSERT BOARD weir is beneath the towing path. The lower wings are phyllite rubble. The original overfall at this site was built in 1833. Insert tracks, no paddle gates.

58.11 - Informal waste, .01 west of access point. (Prentice)

58.12 BOULDERS IN TOWING PATH Large gray quartzite, Weverton Formation, are prominent in the towing path.

Israel Creek - Trail 31. to cottages - towpath used as a road. bed of this towpath is clayey earth, no rock, some ~~sand~~ rock.

58.15 CULVERT 93 ISRAEL CREEK Constructed 1832. The coping and elliptical arch are buff gray sandstone. The arch has a ~~25~~ 22 ft. span, 8 ft. rise, and 26 ringstones and a keystone in the face. The springing line is at stream level. The parapet and coping are 3 ft. high. The spandrels, parapet and wings are dark gray, pitted, medium grained metagraywacke with quartz and a soapy appearing feldspar predominant. 3 laced wings 10 ft. embankment above culvert

B&O RR: 1 span; granite ringstones; limestone parapet & coping. 22 r.s. + 2 skewbacks. 20 ft. span; large keystone. To north of RR is old road bridge, arch of gneiss.

58.36 OUTCROP ON RAILROAD Slabby beds of Catoctin greenstone (metabasalt) and exposed in shallow railroad cuts.

58.59 OUTCROP ON RAILROAD Slabby beds of Catoctin greenstone(metabasalt) continue in this area.

58.72-58.99 MILLER'S NARROWS Joint construction of 3,500 feet of railroad and 3,052 ft. canal were made here in1833-35 and included reconstruction of a

section of the Harpers Ferry- Frederick Town Turnpike. Outcrops of granite gneiss are in ledges along the railroad and the high bluff at 58.81. Sheeting strikes 75°, dips 30°SE, schistocity strikes N40°E and dips 45°SE. A pile of granitic gneiss with conspicuous quartz crystals is on the river side of towing path. At 58.90 the revetment between the canal and the railroad is made of trimmed limestone blocks with sandstone + gneiss rubble at the base. 100 ft. to east, around curve, is a concrete wall extending 400 ft. to the east. To east railroad ties on gneiss + broken concrete base with limestone.

Begins at mile 59.0

Concrete wall on berm along RR.

Mile 59.

59.08 OUTCROP ON RAILROAD Granite gneiss crops out in a 40 ft. bluff. A small cave is 20 ft. above the railroad.

59.22 OUTCROP ON RAILROAD Massive granite gneiss, with arcuate fractures forming irregularly, rounded surfaces is exposed in a bluff.

59.36 OUTCROP ON RAILROAD Granite gneiss is exposed in a low ledge.

59.46 Site of ~~culvert~~ Culvert 94. Metal pipe under railroad feeding into canal.

Pier 10 from south on canal towpath. 11 piers in all = 12 spans. Half span at end is the 12th.
Footbridge across canal just west of U.S. #340 Bridge.

59.54 SANDY HOOK BRIDGE Construction of this bridge was begun in 1941, suspended in 1943 and resumed in 1946. Concrete piers The bridge was opened October 18, 1947. It is a continuous Warren deck truss with arched lower chords, 2,246 ft. long. It cost $1,146,000 and carries U.S. 340 across the Potomac River. East of the bridge is a 4 ft. concrete pipe culvert under the railroad that drains into the canal; the canal is silted to the level of the towing path (1971). This is the site of canal culvert 94, 4 ft. Old ravine on riverside of canal, 100 ft. east of B&O culvert. span, constructed 1833, but now buried. Sandy Hook was formerly known as Keeptryst. A small bridge over the canal here was originally constructed in 1834.

59.67 CULVERT 95?? Constructed 1833, later replaced by an embankment. A metal pipe now drains the canal 3 ft. h x 4 ft. w. - steel corrugated; timber flared wings at this point. A large block of stone 12 ft. long, 7 ft. wide, 5 ft. high is on the berm. It is gray fine-grained to dense Weverton Quartzite, with quartz veins 1/4 to 1/2

Sandy Hook H.B.O.

inch wide crossthe bedding; quartz blebs up to 2 inches wide, 6 inches long, are in zone 6 to 10 inches wide.

59.86 OUTCROPS IN RIVER Ledges of granite gneiss are prominent at low water. Blocks of grantie gneiss are in the revetment on the river side of the towing path.

59.90-60.70 REVETMENT The river side of the towing path is protected by a wall constructed of quartz-mica-schist and hornblendite + quartzite rubble. Wall slopes 45° towards river.

60.21 LOCK 32 8 ft. lift, constructed 1832-34. The stone is mainly cut, wavy-banded gray limestone from quarries in the Great Valley. Some cut blocks of granite gneiss from a quarry on the Virginia side of the river, up to 5 ft. long, 2 ft. wide, 1 1/2 ft. thick, are at the upper recess on the towing path side. The granite has mica in short, straight segments, many intersecting at right angles, glassy feldspar and very little quartz. The

Towpath, Harpers Ferry to Lock 32 - Smooth clayey earth, good. Below Lock 32 = roots.

Drain of old Potomac Co. sluice below lock.

coping on the berm side is mainly cut granite. The lock has washed badly and only the 2 to 3 tiers of the chamber remain on the towing path side of the chamber. Most of the chamber is intact on the berm. 2 tiers of the upper berm recess are gone and the wings have fallen. The towing path has washed down 3 ft. below the level of the coping (1974). Large granite blocks are on the towing path at the midpoint of the lock. The flume is 15 ft. on the berm side of the lock and has a concrete culvert 4 ft. high x 6?? (check) ft. wide, 10 ft. long at its lower end. The lock had a lower extension but only a low bank in the canal, covered in many places by wash, remains. Rectangular slots on the lower berm coping were for attachment of the extension cribs. Breast wall of the lock is 1 1/2 ft. above the square quoins of the upper recess.

Lockhouse no.24, constructed 1836-37, was formerly on the side of the railroad embankment at the midpoint of the

lock. It was reported to be frame with a rubble foundation but photos indicate it was built of masonry. In 1843 a train hit the northeast corner of the lockhouse as the railroad tracks were laid without regard to foundation of lockhouse and the superstructure of house was built after the railroad construction was complete.

Joint construction of 1,100 feet of railroad and turnpike and 1,126 ft. of canal was made between Lock 32 and Harpers Ferry in 1833.

The wall on the river side of the towing path is mainly quartzite containing pebbles up to 1/4-inch size and prominent veins of quartz; there is some quartzitic phyllite in the wall.

Weverton quartzite crops out in ledges above the railroad and along the road at the east end of the lock where it forms a prominent recumbent anticline. Ledges

of quartzite in the river, strike N30°E, dip 60°SE. There are large potholes in these ledges.

Diagram of structure- use Md. G.S. perspective original 8^h x 12^1; for reduction to 2.6" x 4

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500 ft. west of the lock the remains of an old iron truss from the Shenandoah River Bridge, Harpers Ferry, are visible at low water. The bridge was swept away in the March, 1936 flood.

60.30-60.63 WALL ON BERM A massive wall, along the railroad and highway, is mainly coursed quartzite rubble. Weverton quartzite crops out along the railroad.

Coursed rubble wall on berm, 20 ft. high; road at top; formerly R.R. roadbed.

60.36 VIEW SOUTH TO VIRGINIA Ledges of Weverton quartzite are prominent on the south side of the river. A talus slope is above the ledge along the power line. In ledge to the west, under power line, the rock beds are horizontal; 1,000 ft. east, at the east end of ledges, the beds dip 20°E.

Harpers Ferry

Diagram of structure on Virginia shore
original 8"h x 10"l; for reduction to 3.2" x 4"l.

60.67 SHENANDOAH INLET LOCK Constructed 1832-33. This is a single set of locks that allowed boats to enter and leave the canal from and to the river. This was the main access to the canal for trade on the Shenandoah River, which had been improved for navigation by the Potomac Company and later by the New Shenandoah Company. The lock is built of dressed limestone and quartzite. A towing path bridge, built originally by Lewis Wernwag 1834-35, crossed the tail of the lock. The lock was badly washed in the flood of 1877 and was totally ruined in the flood of 1889. In reconstruction of the canal in 1890-91 the lock was sealed off. The lower end (west) of the lock is now partly intact with the lower recess and wings standing. The lock chamber is filled with boulders and finer sediment. A guard wall 15 ft. high, of quartzite and quartzitic

(coursed rubble, mainly quartzite and quartz schist)

phyllite now cuts diagonally across the upper part of the lock. A dam across the Potomac River just downstream of the inlet lock was planned in 1831 to form a pool for traffic from the Shenandoah River and as a feeder but the plan was abandoned in 1832 and the Government Dam (no.3) above Harpers Ferry substituted as a feeder.

60.68-60.70 HARPERS FERRY The junction of Shenandoah and Potomac Rivers has been the site of 11 bridges. The first bridge was built in 1824 by Catherine and James Bite Wager, heirs of Robert Harper, founder of Harpers Ferry. It was a wagon bridge, timber, covered and extended across the Potomac from the culvert at the lower end of Lock 33 to just north of the point of the junction of the rivers. It had 4 spans, 3 of equal length with a somewhat shorter oneon the west end. It was dismantled in 1837 after the Virginia Legislature passed an act transferring traffic to the newly completed railroad bridge. The base

of the piers for this bridge are visible at low water. The culvert at the lower end of Lock 33 formed the approach to the bridge.

The Baltimore and Ohio Railroad reached the east bank of the river at Harpers Ferry December 1, 1834 and its bridge no. 40 was constructed 1835-36 and opened in March 1837. It was designed by Shaw and Wernwag and was a timber, covered bridge, 900 ft. long with 6 spans each 85 to 135 ft. long over the river. 1 skew span, 100 ft. long, was over the canal. The spans were 3 framed trusses abreast, two with a total width of 40 ft., carrying two railroad tracks on the south side and one 12 ft. wide carrying a common road on the north. The masonry work was by Charles Wilson and the superstructure was built by Lewis Wernwag. The timber for the bridge was cut at a mill owned 1824-43 by Wernwag on Virginus Island at Harpers Ferry. The bridge cost $23,450.60 plus $5,596.34 for repair to the piers. The

spans had a tracking path on the downstream side to permit towing of canal barges from the Shenandoah River across the Potomac to the inlet lock. Two curved spans on the north were added to the west end of the bridge in 1840-42 when the railroad was extended to Cumberland. The western-most curved span collapsed September 15, 1844 under a freight train and was rebuilt. It collapsed again on March 18, 1845. (B&ORR 1837, 1844, 1845). A new cast iron through truss bridge designed by Wendel Bollman, Master of Road for Baltimore and Ohio Railroad, was begun in the Autumn of 1851. One span was erected at the west end of the bridge in 1852. The truss was characterized by a square truss frame with diagonal truss rods radiating from the upper part of the end posts to the base of each vertical strut, giving the appearance of a giant spider web. Seven spans and the woodwork in the iron truss were burnt by Confederate troops on June 14, 1861 and the center

span dropped by use of explosives. A trestle that replaced spans was burnt a few weeks later and a new trestle was erected only to be carried away by a flood in April 1862. A trestle replacement was carried away by a flood again on June 7, 1862. A new trestle with iron replacing some of the wooden members was completed on June 16, 1862, but was destroyed by troops of Stonewall Jackson on September 24, 1862 after the battle of Antietam. Four additional cast iron Bollmann trusses begun in mid-1862 were completed on April 13, 1863, and withstood the flood in May of that year. However, they were demolished by Federal troops on July 5, 1863. A trestle bridge was improvised and service resumed on August 11, 1863. In April, 1864 a flood carried off the remnants of two spans and several more spans were carried off in the flood of May 16, 1864. At the end of Civil War rebuilding of the bridge using wrought iron Bollman trusses, was started. Two new spans were carried

away in flood on May 22, 1865. The piers and abutments were raised and improved in 1866 and new wrought iron Bollman trusses constructed 1868-70. The bridge, 1,708 ft. long had 7 spans, including curved spans at the west end. Each span had 3 trusses carrying a single railroad track on the south and a common roadway on the north. This bridge served the railroad until 1894 when it was sold to the Harpers Ferry and Potomac Bridge Company for $10,200 for use as a highway [toll] bridge. At this time the curve spans at the west end were cut back. The flood of 1924 carried away two of the Bollmann spans at the east end of the bridge. These were replaced by a steel Pratt through truss. The flood of March, 1936 carried away the entire bridge. After lengthy negotiations and a suit by the bridge company that involved Baltimore and Ohio Railroad's charter, the Maryland State Roads Commission purchased the rights of the bridge company for $75,000 and in October,

1936 placed planking on the 1894 railroad bridge to serve as temporary roadway. Piers of Wernwag and Bollmann bridge are intact. The pier on the side of the towing path is built of cut granite blocks from Ellicott Mills on a footing of quartzite rubble. The four piers in the river are hammer-dressed limestone in lower 13 to 14 tiers capped by four tiers of cut granite. Isolated stones on the capping were placed under the Bollman spans to raise them above flood water in 1866. The abutments are hammer-dressed limestone with some red sandstone at the top of the west abutment.

The steel bridge on the north side of the site of the Wernwag-Bollman spans is now used by the Baltimore Railroad Valley Branch. It was constructed by Pencoto Bridge and Construction Company, Pencoto, Pennsylvania in 1892-94 and opened April 1894. The eight piers contain 64,000 cubic yards of hammer-dressed "Gettysburg" granite. The west

abutment is granite with coping and backing of limestone; the east pier on the berm of the canal is limestone capped with granite. The superstructure consists of three through plate girders on the east approach and three on the west. There is 1 deck plate girder at the east abutment. The total length of the bridge is 900 ft. 10 inches and the deck is 43 ft. above low water level. The tunnel at the east end of the bridge was started in 1892 and headings met July 20, 1893. It was arched in 1896 and 536 ft. of brick lining added. A 37 ft. portal extension on the west and a 35 ft. one on the east were built to counter rockfall in 1896. The tunnel is 850 ft. long, 28 ft. wide and 24½ ft. high; 22,000 cubic yards of rock were excavated in the tunnel and 26.000 cubic yards in the approaches. Previous to construction of the tunnel the railroad skirted the bulff on a wide ledge on the berm of the canal. The 1894 bridge carried highway traffic of U.S. 340 as well as

type of truss??

Page 204 is void.

rail traffic from the Fall of 1936 to the opening of Sandy Hook Bridge in 1947.

The present Baltimore and Ohio Railroad main line bridge north of the 1894 spans was built in 1930-31 and opened June 1, 1931. It consists of 13 skew, deck plate girder spans, 1,365 ft. long, each span 100 ft. 6 inches long, except for two shorter spans of 99 ft. over the canal and 90 ft. at the east abutment. The concrete piers are 32 ft. high and the rails are 44 ft. 7inches above low water. The bridge cost $1,000,000. The west portal of the tunnel was enlarged in 1930-31 to connect with the new bridge.

Fires of 1931 & 1960+

A highway bridge formerly crossed the mouth of Shenandoah. It was built in 1865 as a four span iron, through Howe truss on limestone piers and abutments and replaced an older 4 span covered timber bridge about 700 ft. upstream

that was destroyed during the Civil War. The superstructure of the iron bridge was swept away in the flood of 1936.

Map of bridges- 8"h x 10"w original, reproduction 3.2" x 4"

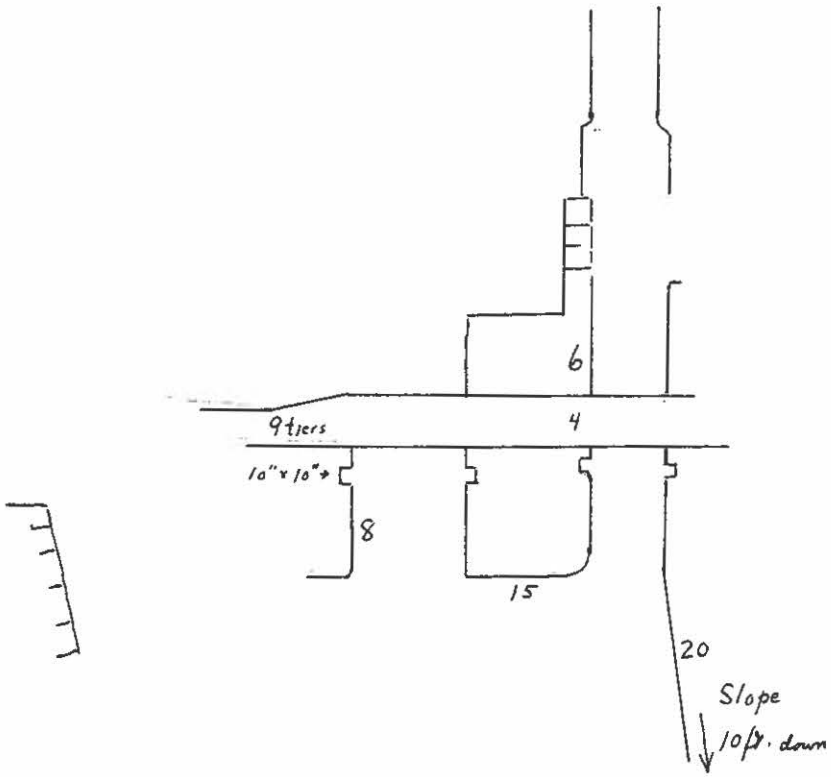
End running of 7/24/75

60.70 434.36 LOCK 33 8 ft. lift, constructed 1832-33. The facing is hammer-dressed, gray pebbly sandstone with some Seneca red sandstone. Cut stone is in the quoins and gate recesses. Granite blocks are in the upper part of the lock above the upper recesses. The breast wall is 4 ft. upstream from the upper end of the upper recesses. The lock walls rise 5 ft. above the rest of the lock at the upper recesses. Slots 12 inches wide, 6 inches deep at the head of lock are for drop planks of the stop gate. The miter sill is exposed in the upper recess. A 30 ft. extension at the lower end of the lock is the site of the former abutment of the Wagers bridge. It is built of coursed quartzite rubble and is 4 ft. higher on the berm

Some gray limestone

Lock 33

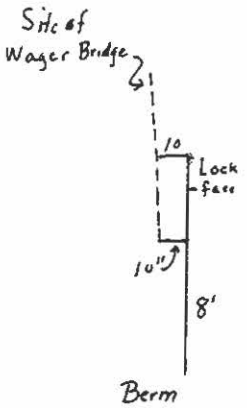
Sketch: 7·26·75.



4 ft. abutment on upstream side;
16 ringstones + keystone,
8 ft. span culvert along
flume; flume 12-15' wide
6 ft. deep, 12 ft. wide f.b
batter in face of breastwall
1 in 5 - Lock 33.

Cliffs of quartzite, 300 ft. ± high

South end of Lock 33



Same on
Towpath side

face than the rest of the lock. Masons marks are in the chamber walls

A deep flume is 20 ft. on the berm. The stop gate for the flume, 12 ft. wide, is at the head of the lock. Slots for the control planks are 6 x 6 inches. The flume passes through a slightly skewed culvert, 40 ft. long, at the lower end of the lock. The culvert was part of the old Wagers bridge abutment. It has a semicircular arch with an 8 ft. span and 4 ft. rise. 16 ringstones and a large keystone are in the face of the arch. The ringstones are cut quartzite and silicic siltstone with some limestone on south face. The towing path is washed down in the lower two-thirds of the lock and the rubble and mortar backing is exposed. The lower 15 ft. of the extension is partly collapsed.

A lockhouse formerly was on the river side of the tow-

ing path. It was a 2 story, frame structure and was swept away in the flood of 1936. A footbridge was formerly over during the days canal was in operation. the tail of the lock. The shell of the stone building on the berm is the old ~~Salty Dog Tavern~~ Spinners Store, burned in 1959. The walls are silicic siltstone and quartzite rubble. The revetment wall on the river side of the towing path is quartzic rubble. The revetment wall on the berm between Locks 33 Rubble on river side = remains of old bank - several buildings formerly on it. and 34 is silicic siltstone and quartzite. A timber crib wall on the river side of the towing path, 10 ft. above the level of the towing path, formerly extended from Lock 33 to the Shenandoah Inlet Lock. also on river side, debris now in canal below railroad bridge

Diagram of Lock 33 area- 8"h x 10"W, reproduce 3.2" x 4".

60.90 434.18 f.b. 500 ft. high OUTCROP A cliff along the road on the berm is formed of siliceous siltstone (phyllitic quartzite) of the Harpers Formation. The beds are crinkled beds with Kink bands (monoclinal kink bands slippage and drag folds along the joints, and crenulations, offset joints indicative of the intense compression undergone in folding

of the Blue Ridge. Prominent joints strike N30°E, dip 60°SE; N30°E, dip 60°NW; E-W, dip 45°S., E-W, vertical and N60°W, vertical. The bedding is obsured by plates about 1/2 inch thick formed by cleavage which strikes N30°E and dips 20°E. Ledges of phyllitic quartzite are prominent in the river.

MP 61 = 421.60 (434.05 - 7/24/75)

61.02 421.64 (434.02) OUTCROP ON BERM A 50 ft. cliff is formed of Harpers silicic siltstone. 5°-20° d.s. schistosity, strike right angles to road; 421.90 cliff on berm, schistosity dips 28°W; Strike N-S.; Joint N50E x dip 60°E N-S joint, dip 80°E.

61.34 433.80 OUTCROP ON BERM Ledges up to 100 ft. high on berm and along the road are formed of Harpers silicic siltstone with wavy schistocity surfaces striking E-W, dipping 32°S. A prominent joint strikes N15°E and dips 78°NW.

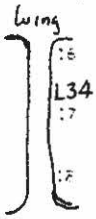
61.57 422.14 LOCK 34 (Goodharts Lock) 8 ft. lift, constructed 1832-33. The face is mainly hammer-dressed limestone; some white sandstone and Seneca red sandstone

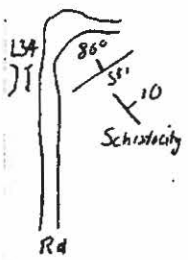
are in the upper part of lock. The lower circular quoins and the lower part of the lock are faced with fine-grained gray sandstone. Rope grooves up to 1 1/2 inches deep are in the limestone and sandstone at the east end of the lock. The upper end of the lock is blocked by a wooden gate and embankment. The flume is 15 to 20 ft. on the berm and there is concrete frame gate, 6 ft. wide, 14ft. long x 6 ft. high. with insert boards, at the upper end of the flume. The embankment on the berm side at the head of the lock is probably an old approach crib. Lockhouse no. 26 on the towing path was formerly a frame structure but only the foundation of siliceous siltstone rubble remains. An outcrop of Harpers siliceous siltstone is on the north side of the lock.- Small

Flume - 6ft. deep, lined with coursed rubble

brick ? (Hahn) - no bricks seen. Lockhouse destroyed in 1936 flood.

Remnant of fender crib on berm at upper end of lock, 15 ft. long.





Circulated anticlines.

Pump at Lock.

422.25 - I beam bridge over outflow ~~bridge~~ on towpath.

61.67 422.30 OUTCROP ON BERM A 30 ft. ledge contains Harpers siliceous siltstone; the schistocity strikes N80°E (3) and dips 25°S, 45°S at west.

Joints N50E, dip 70°W. & E-W, dip 80°W.

422.35 - Outcrop on berm - Joints N10E, vertical to 80°W dip & 80°SE dip

Schistocity N20E, dip 45°SE.

61.77 OUTCROP ON BERM Harpers siliceous siltstone is exposed in a ledge. The schistocity strikes N40°E and dips 45°SE. Fracture cleavage dips 45°NW. A prominent joint strikes N80°E, dip 75°N. The jointing and fracturing form a rectangular pattern that is prominent on the face of the cliff.

Diagram- fracture-joint pattern
draft- 6"^{h} x 8"^{w}, reduce to 3" x 4".

61.82 OUTCROP ON BERM Harpers siliceous siltstone is exposed in an 80 ft. ledge.

61.87-62.04 OUTCROP ON BERM A ledge of Harpers siliceous siltstone is on the berm. Schistocity strikes N40°E and dips 44°SE. Joints strike N35°E and dip 80°NW to

422.40 Solution pockets along joints.

vertical; arcuate fractures strike N25°E and dip 75°WNW. Solution cavities, 6 inches to 2 ft. in diameter, are at the downstream end of the outcrop. Drill marks, 2 ft. long, 4 to 6 ft. apart are in the ledge.

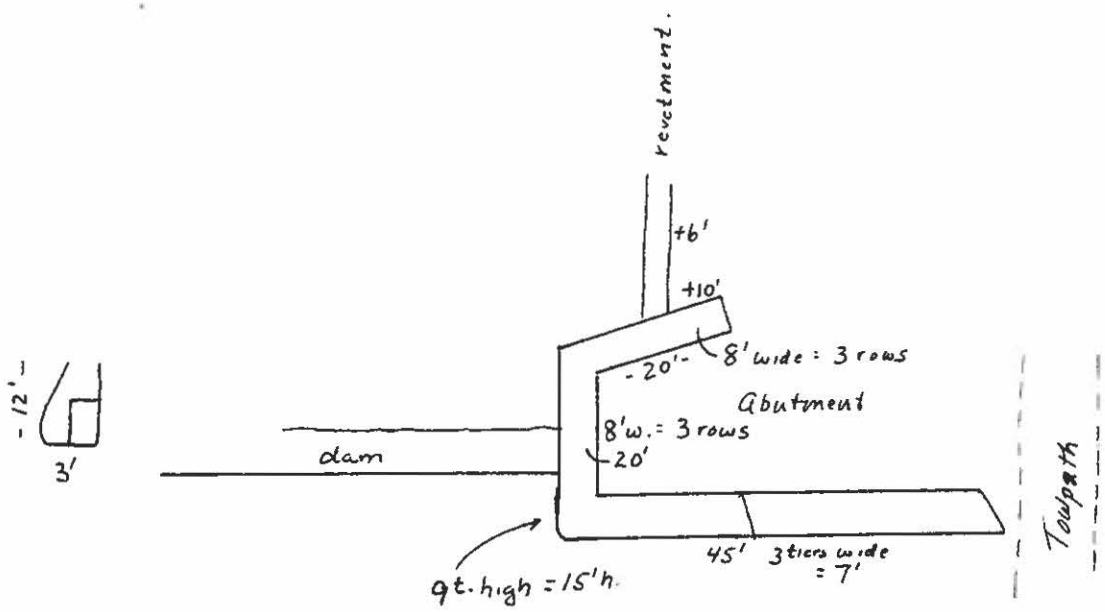
MP62- 422.55
Intermittent outcrops to 422.53, large one at 422.47, same dip.

62.20 422.73 **UNFINISHED DAM** A masonry wall on the river side of the towing path is the abutment wall of a dam on which construction was commenced in 1859. It was stopped in 1861 by the Civil War. The wall is constructed of dark blue to black limestone from Bentz quarry, opposite mile 87 above Dam no. 4, on the West Virginia side of river. Some blocks have crinkled, dark, clayey bands up to 1/2 inch wide; other blocks have blebs of calcite. Ledges of Harpers silicic siltstone are in the river.

Revetment on riverside of towpath, Lock 34 to new dam
Blocks in dam up to 6 ft. long, 18 in. thick, 2 ft. wide

62.33 **DAM NO. 3 AND GUARD LOCK** The masonry and timber crib dam with concrete facing, 3 to 5 ft. high, backs a pool 3 to 4 miles long. The dam is built in a zig-zag line, 2,000 ft. long, on ledges across the river to a power canal on the west side. The first dam at this site was built in 1799 to divert water to the U.S. Government Armory in Virginia (now West Virginia). It was replaced in 1809 and 1820. The dam was repaired extensively in 1867

Revetment along guardwall, 300 ft. below dam to outlet lock; earth to Lock 36.



New Dam below
Dam no. 3.

after ice carried much of it away. A lock with 2 sets of gates was at the entrance to the power canal until Civil War time. The present Guard Lock is 300 ft. above the dam and was constructed in 1832-33 with hammer-dressed limestone. The quoins are cut limestone. The lock is 30 ft. long, with two sets of gates. The head of the lock is now blocked by a wooden guard gate. A guard bank with a revetment of Harper silicic siltstone extends from opposite Lock 35 just below the dam to Lock 36 and is now used as the route of the hiker-biker path. A timber bridge (being reconstructed in 1971), formerly carried the towing path across the feeder to the lower end of Lock 35. The canal between Locks 35 and 36 occupies channels between islands now covered by fill and is very vulnerable to floods. Extensive washouts occurred in 1852, November 1877, June 1889, and March 1924. An outcrop of Antietam Sandstone (Cambrian) forms a low ledge at the lower end of the guard lock. The

? Lockhouse formerly on hill above lock = frame, only foundation remains.

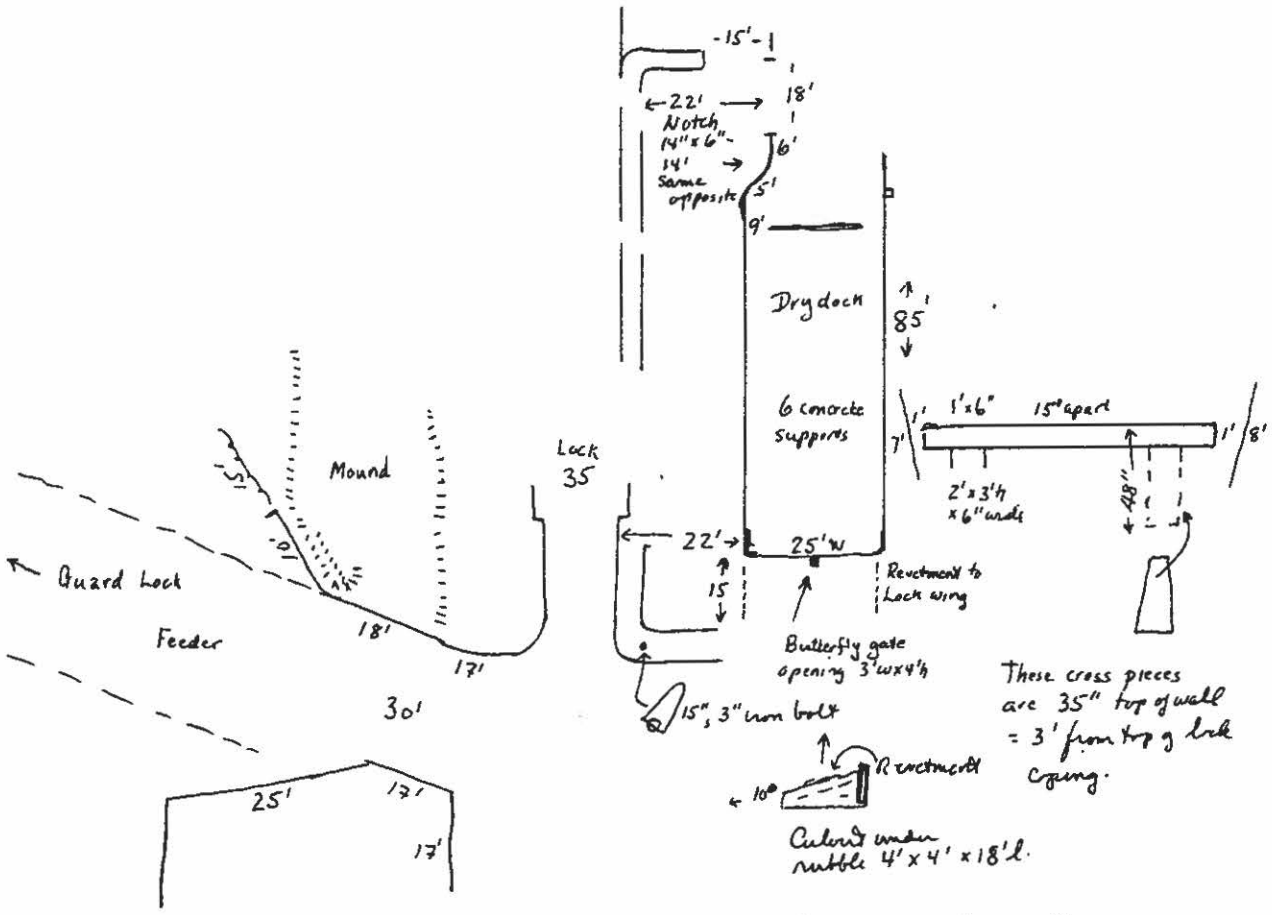
Guard Lock

sandstone is quartzitic, dense, banded, and gray to white in color. The banding is 4 inches thich. The strike is N35°E and dip is 85°SE to vertical. The Antietam sandstone is also exposed in ledges in the river at the dam where the surface is stained black. Prominent strike joint in the ledges. The sandstone also forms a prominent cliff on the West Virginia shore wherethe dip is 45°ESE. The Potomac Company canal around Dam 3 was a sluice extending a mile NPS bridge not finished 7/26/75 and 4/29/88. downstream from the dam on the site now occupied by the present canal. The C & O Canal was opened for navigation upstream to Dam no. 3 on November 26, 1833.

62.32 422.85 423.14 LOCK 35 8 ft. lift, constructed 1832-34. Access to this lock is via the towing path east from Lock 36. The towing path formerly crossed the feeder on a timber bridge that is now being restored (1971). The lock constructed of hammer-dressed limestone with a block of from Knotts Quarry, 5 mi. away in Va. (W.Va.).

204a
7/26/75

Drydock & feeder at Lock 35



Drydock walls = rubble quartzite, limestone & Harpers phyllite + river cobbles.

Seneca red sandstone at the northwest end and 3 blocks of granite at the west end and in the coping on the towing path side of the chamber. A concrete cap is at the lower end of the lock on the towing path side at the abutment for the towing path bridge. The miter sills, are intact in both recesses. A dry dock on north side of lock, built of rough rubble masonry, was 125 ft. long, 24 ft. 5 inches wide at the top, 20 ft. 8 inches wide at the base, and 8 ft. deep. 6 concrete barge supports, 17 ft. 3 inches long, 3 1/2 ft. from the bottom cross the dry dock at 14 ft. 5 inch centers. A butterfly valve and a short drainage tunnel are at the lower end of the drydock. The lower wing wall of the lock is straight, at right angles to the lock and extends across the lower end of the drydock. The original lockhouse for Locks 35 and Guard Lock 3 was in a low area enclosed by the guard bank near Lock 36. It was constructed in 1836-37 and was brick, 2 stories high, on a

No crib fenders

Lockhouse on hill above lock, frame, only foundation remains

foundation of red sandstone, limestone, quartzite and silicic siltstone rubble. It was later used as a section house and was heavily damaged in the 1936 flood. Only the walls and foundation remain.

Outcrop on berm in drydock area of Lock 35.

An outcrop of Antietam Sandstone forms a 40 ft. ledge on the berm east of Lock 35.

Basin between Locks 35-36.

62.40 423.05 423.23 Lock 36 8 ft. lift, constructed 1832-34. The facing is mainly hammer-dressed limestone from Knotts Quarry in West Virginia. A block of Seneca red sandstone

No flume

is on the towing path wall of the chamber. A 6-inch concrete cap is above the stone coping except at the lower recess. A 15 ft. long embankment on the berm at the head of the lock is the remains of a crib fender. This lock was most troublesome to the boatmen because of its narrowness and short length (89 ft. 11 inches, the only lock on the canal less than 90 ft. long). The lockhouse was on the hill

Cross timbers under miter sill at head of lock, miter gone.

Foot bridge across lock.

Lock

Wing wall on berm: 50' long.

64.70 430.25 Culvert 96

MP64 430.95
431.50 South end of overfall
431.46 - 431.50 Outcrop - strike N45°E, dip 60°E, 4-6" bds
curv t west t north, t west is ES
100' wide - view over Potomac.

431.55 - 431.68 Outcrop, irregular ledgy up to 40' high, Et. Long curv east.

431.72 Ledge 40' high; highly fractured; small 6 in. solution holes. Et.

431.78 Ledge 20' high, prominent vertical joint, N30°E.

431.83 Ledge 30'h, Et dolomite } curv t west

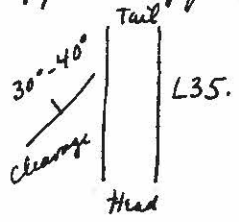
MP63 431.85

431.90 Bluff 20' high; 40' above canal.

432.45 Lock 36

432.52 Opposite middle of Lock 35, outcrop on hill on berm. Highly fractured gray quartzite, 15' ledges.

432.64 @ opposite upper end of lock 35 -



End at 434.55

in the woods, 40 ft. above the lock. It is 2 stories high with clapboards on a footing of sandstone rubble. The road from the northeast corner of the lock leads to the lock-house.

62.43-(62.47) Boat basin + borrow pit (Prentice)

62.48 423.35 WASTE WEIR The waste has a concrete frame with 3 gates for board inserts. A low wall of coursed silicic siltstone and sandstone rubble is at the toe of the spillway. This was originally a masonry overfall constructed in 1834. To the north are old manganese mines and pits of the Potomac Refining Company, which were opened in 1876 by Wells and Davis. These openings were flooded out. In 1898 McIntosh sank a 23 ft. shaft 100 ft. north of the canal but abandoned it within a month because of flooding. E. R. Cooper, of Baltimore, resumed operations in 1908 and organized the Potomac Refining Company in 1910. Shafts were sunk to 60 ft. and tunnels extended to the ore. Pumps were installed. However, most of this production was from

pits. The ore is along a faultplane with the Harpers Formation on the east and the Tomstown Dolomite on the west. It is mainly nodules and slag-like masses of manganese dioxide and iron oxide ( ).

62.9 Huckleberry Hill HBo 423.69

63.00-63.30 (423.76) OUTCROPS ON BERM Low ledges of Tomstown Dolomite are on the berm. 50' above canal, gray facies.

423.81 ledge of dolomite = 50' high, narrow ledge

63.00 (MP) = 423.81

63.30 (424.08) OUTCROP ON BERM An 80 ft. ledge is formed of blocky Tomstown Dolomite with beds up to 2 ft. thick. 4 joint planes are prominent. The beds strike N40°E, dip 30°SE and are overturned to the west.

(424.20) Thin-bedded dolomite, beds 1/8-1/4 in.; irregular, yellow clayey partings. Some beds up to 1ft. thick; strike N30E, dip 60°NE; dark gray platy beds.

63.31-63.38 OUTCROP ON BERM A ledge, 40 ft. high, contains gray phyllitic Antietam Sandstone in 4 to 12 inch beds. The strike is N25°E and the dip is 60°SE. The beds overturned to west.

424.18 - prominent ledge ?

63.40 422.22 TERRACE ON WEST VIRGINIA SHORE The terrace is part of a low flood plain.

63.53 - informal overflow - 246' long (Prentice)

Revetment 100 ft. long, rough, curved limestone wall on seaward side of towpath, 3-8 ft. high. Another informal overflow, 2 mi. above this, 1 mile above kiln. 2"x12" planks along stones for mule drivers. Towpath formerly rip-rap surface (424.35) (222)

64.00 (424.72) **OUTCROP ON BERM** Low ledge of Harpers siliceous siltstone are on the berm.

MP 64 = (424.72) : overfall, wall 4ft. high
64.14 (424.69) = site culvert no. 95 (no indication of culvert)

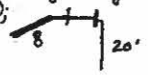
64.68 (425.42) **CULVERT 96** Sawmill Branch Constructed 1832-33. The coping and semicircular arch are cut limestone. The arch has a ~~10~~ 8 ft. span and ~~8~~ 4 ft. rise with ~~19~~ 14 ringstones and a keystone in the face. The parapet and coping are 2 ft. high.

abutment = 2 tier, 18 inches high.

The spandrels, wings and parapet are coursed rubble of phyllitic sandstone, coarse-grained pebbly sandstone, and blocks of vein quartz. The culvert collapsed in 1839; was rebuilt; collapsed and was rebuilt again.

Sink on berm by road, 10 ft. diameter.

Overfall - wall 4 ft. high, 80 paces long in all; 35 p. north of culvert, 45 p. south.
On berm - same arch, 2 ft. parapet • coping; 8 ft. masonry wall above coping.
Wings flared ~15° 4 ft. embankment + 4 ft. revetment above culvert. Wing on west at right angle at south (berm);



64.75-64.84 **OUTCROP ON BERM** Low ledges along road contain exposures of siliceous siltstone, Harpers Formation. Ledges of similar rock are in the river.

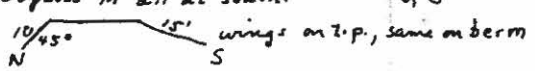
64.99
~~65.00~~ 425.72 **CULVERT 97** Constructed 1832-33. The coping and semicircular arch are cut limestone. The arch has a ~~10~~ 8 ft. span, 5 4 ft. rise with 14 ringstones and a key-

stone in the face. The parapet and coping are 1 1/2 ft.
Keystone cracked.

high. The spandrels, wings and parapet are limestone and

blue gray phyllitic sandstone rubble is above the coping on
3ft. embankment + 3ft. wall above coping.
Overfall at culvert 97; north end 63p. to MP 65; culvert 97: 90 paces. 160 paces in all at south.
5ft. sink in berm base; berm O.K.

the towing path side.
Circular bar in river, 50ft. in diameter.
(425,73) = MP 65 50ft. west of culvert



wings on T.P., same on berm

65.19-65.45 (426.15-N.end). DARGAN QUARRY The quarry was

apparently opened for stone for the canal in the 1830's and

was used sporadically for lime until the 1930's. A limekiln
Stone kiln ran through WWII, 6 or 8 years beyond end of war; hammer mill for magnesia "Patent plant" (per Roy Houser, near Dargan) 5 kilns, hydrator built for magnesia; ran until 1924. "Marble stone" from quarry & in woods 2 miles beyond quarry. T. Sutham - same as road.
is at the south end of the quarry, on the berm of the canal. (425.95 / 429.70)

It has 2 arched hearths facing the canal. The brick arches

are 6 ft. wide and 8 ft. high. The kiln is built of blocks

of dolomite and is 36 ft. long and 30 ft. high. There is a

limeshed on the southeast side of the kiln. A similar shed

was formerly in front of the kiln on the berm of the canal.
147 paces, 500ft. east of kiln, brick wall? on berm?

CAUTION-WHITE HYDRATE OF LIME IN A PILE AT THE SHED IS

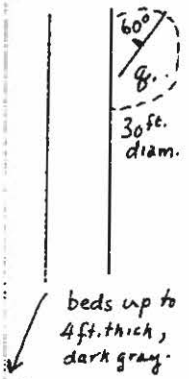
CAUSTIC AND CAN HARM EYES AND SKIN.

The quarry is in the Tomstown Dolomite which strikes

Quarry debris in canal, yellow clay partings, prominent transverse joints.

N10°E and dips 45°45SE. It is gray and highly fractured.

The quarry is divided in two parts by a spur of limestone. The south part of the quarrry is 150 ft. long, 60 ft. deep and 100 ft. wide. The north quarry is 200 ft. long and
└ debris partially fills canal.
wide and 80 ft. deep. The two quarries are connected by a
Stone wall and road on berm 50 ft. west of tunnel. Road extends 100 ft. to west of quarry
(426.05)
tunnel 60 ft. long. An anticline, cut by a fault is in the north quarry where the beds strike N30°E, dip 30°NW on the north limb and 30° to 36°SE on south limb. A second smaller fault is 50 ft. south of the fault cutting the anticline. Several cave openings are in the north quarry. One on a fault has fault gouge in the cavern fill. A large amount of travertine is in the south quarry. Four sets of joints are in the quarries and the rock fractures into angular cone-shaped structures up to 1 ft. in diameter and 4 ft. long.



beds up to 4 ft. thick, dark gray.

(426.20) - Small quarry at canal level, dip 45° in thick beds on north.

65.3 - wood crib dam on berm (opposite tunnel) (Barron) - cave on berm 3'w. x 5'h.

(429.66) 65.4 - Stonewall on berm - 2' high, 20' long

(426.05) opposite tunnel - outcrop on berm - dark gray, thick bedded dolomite, cleaved, N-S strike, dip 45°E, vertical calcite veins; yellow partings every 1/4 - 1/2 inch. Outcrop is ledge 40 ft. high.

65.68 (426.35) TERRACE ON BERM SIDE Rounded spurs with gravel caps are 60 to 80 ft. above the towing path

level. Houses Falls, is in the river. The Potomac Company had a sluice canal 150 ft. long on the West Virginia shore to overcome a drop of 3 ft. at the falls. On WVa. side = cut for iron ore for Antietam Furnace.

MP 66.00 (426.75) (428.90) overflow, revetment 2 ft. high, 65 ft. long.

66.35-66.50 (428.25 - 428.52) (427.20) OUTCROP ON BERM Four ledges up to 40 ft. high of dense gray Tomstown Dolomite with numerous calcite veins and gashes are on the berm. The beds are 4 inches to over 2 ft. thick and are highly fractured. The strike is N20°E and the dip is 37°NNW. A joint strikes N30°W and dips 70°NE.

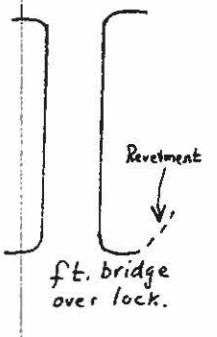
66.7 (427.45) Wood crib dam on berm (Barron) 10 tier, high = 6 ft. 6 in. logs with fill of rocks, blocks

ravine inflow - or may be dock.

(427.45 - 425.47) (428.10 - 428.22) Outcrop on berm, 30 ft. ledge, Tomstown dolomite, dip 35° d.s. (W) Strike N.E. to canal N10E.

66.98 (427.79) LOCK 37 MOUNTAIN LOCK 9 ft. lift constructed 1832-33, rebuilt 1843 and 1872. The face is gray dolomite with tan clayey layers 1/4 inch thick alternating with wavy, lensitic, gray layers 1/4 to 3/8 inch thick. The rock is from a quarry in Maryland 1/2 mile away. Some of the limestone blocks have shallow round lift holes in their faces. A pile of old blocks from the lock are on the towing path. Two of the blocks have cuts for circular

(434.89 - begin, end Mt. Lock Recreation 446.35)



quoins. A concrete floor is in the upper recess surrounding the old miter sill; the miter sill has rotted out. A lower crib extension, now a lowpile of rubble, is on the berm below the lock. The flume is on the berm 30 ft. from the lock and has a concrete culvert 6 ft. wide x 5 ft. high with an insert board waste weir 15ft. long. at the head. The slot for the boards is 12 inches wide x 4 inches deep. The flume is 4-6 ft. deep, 10 ft. wide and lined with limestone rubble. Basin at head of lock - 100 ft. long ? The lockhouse is on the berm and was constructed in 1836-37. It is brick, 1 1/2 stories high. Sinkholes have caused subsidence in the canal in the vicinity of the lock.

MP 67.00 (434.76) (427.85) (434.95) Campground. - 90 ft. long overfall, 10 ft. high, 45° slope, mainly limestone rubble. (434.94-434.96) (walling on riverside of towpath, 250 ft. long.).

67.08 (434.98) CULVERT 100 Constructed 1832-33. The

Berm on embankment 50 ft. east of culvert to 435.10.

coping and semicircular arch are cut, dark gray limestone. 14 ringstones, keystone, all cut. Spandrel & wings hammer dressed. The arch has an 8 ft. span and a 4 ft. rise and there are 14 ringstones and a keystone in the face. The abutment is 4 ft. high. The parapet and coping are 3 ft. high. The spandrels and parapet are dark gray limestone rubble. 10 x

Arcuate wings - same on berm - timbers also exposed on berm. 10 ft. embankment on berm is revetted. - revetment on berm side of canal at culvert; 10 ft. revetted embankment above coping on t.p.

wings 45°, 12 ft. long at 45°.

Recreation - tent camping, toilet, pump picnic tables

(435.10) Foot bridge ; 435.13 pump.

10 inch foundation timbers, spaced 10 inches apart and transverse to the axis of the culvert are exposed on the river side and throughout the culvert. The culvert was destroyed in the flood of 1889 and rebuilt in 1891.

67.14 (435.05) WASTE WEIR This is a standard concrete frame with 3 gates and insert boards. A low wall of coursed quartzitic phyllite, ~~and~~ limestone + sandstone rubble are at the toe of the spillway. slope basin

No paddle gate in waste weir.

Berm on embankment to 67.37.

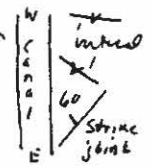
67.20 - Mountain Lock HBO - Recreation area begins on west side of waste weir.

(435.55) - Quarry - 40ft. long 20ft. back to front, in irregularly bedded limestone, solution along joints; joint parallel to canal, at ft. abutks to canal both vertical; gray shaly dolomite. Difficult to see in summer.

67.73-67.87 (435.68) (445.75) on return = end of outcrop. OUTCROP ON BERM Four ledges, up to 50 ft. high, contain massive to slabby Tomstown Dolomite. The strike of the beds in the third ledge is N40°E and the dip is 55°NW. The strike in the western ledge is N30°E and the dip is 20°SE. A spring is in the canal bed at the base of the second ledge.

fractures, 60°-80°W dip.

Small solution opening 1ft.w. 2ft.h. at (435.75)



(435.85) Ledge 60ft.h., 3 small solution openings, 30ft. above canal + in ravine at west end, jointed.

(435.95) Ledge 15ft.h. on berm: limestone; scattered ledges along slopes on berm.

68.04 (445.61) (445.45): fault covered. OUTCROP ON BERM A bluff 60 ft. high contains dark gray, slabby Tomstown Dolomite. The strike

Strike 310° x dip 80°NE. + N10E - jointed

68.00 (435.96) (445.56)

is N10°E. and the dip is 72°E. Small solution cavities are in the dolomite along a prominent bedding plane, 10-30ft. above canal. Fracture N40E, dip 40° on west end of outcrop - pseudoanticline.

68.20 (436.18) Site of culvert no 101 - not seen - 40ft long, rock-filled gulley on t.p. side

68.22 (436.44) (445.25) **OUTCROP ON BERM** A low ledge contains Tomstown Dolomite. Large spring at base, stream from spring sinks in canal at 445.18. Several smaller outcrops in indistinct ledges. natural joints 20 Spring } Ledge 60 ft. h., slabby limestone

68.50 (436.45) to (436.56) (444.95) **SHARPLES LANDING (BRIENS FERRY)** The pile of limestone waste on the berm from outcrop to Sharples Landing towards water served as a loading ramp for limestone and lime from Wades quarry and the limekiln at the old furnace at Antietam in the early 1900's. Culvert 101, a road culvert at this site, constructed in 1833, Berm on embankment to Antietam Aqueduct, collapsed 1837 and a bank was placed over it.

(436.55) - Ravine
(436.58) Berm breached, stream enters
(436.75) prior footbridge

68.85 (444.70) **SHAFFERS (Wades) LANDING** This is the site of a pivot bridge across the canal erected by the Antietam Iron Works after the collapse of culvert 101. Knotts Island - quarry in limestone opposite landing.

MP 69 (436.90 / 444.55)

69.34 **BRIENS BASIN** was formerly on the berm just below the Antietam Aqueduct. This inlet masonry is partially covered but still remains. Probable stone wall water gate to basin. NPS road descends into canal prism. The basin served as a

Old masonry on berm; 10 ft. on berm to basin, just east in woods.

(437.15) Antietam Rec. Area
(437.25) Basin 100' l x 100' sloping banks.

wharf area for the Antietam Iron Works. The stack of the old furnace, later converted to a 3 stack limekiln, and old brick buildings are intact at Antietam 1,000 ft. east of the aqueduct. The first furnace, erected in 1765, made cannon balls for the revolution and parts for Rumsey's steamboat in 1786. The second furnace was built in 1845 and rebuilt after the Civil War. Its 50 x 11 ft. stone stack had a capacity of 100 tons per week and was operated until 1883. A forge and nail factory operated from 1831 to 1853. Much of the plant was dismantled in 1891 and the stack was converted to a limekiln with 2 additional kilns built on the east side of the furnace. Tram, basin to furnace 1877+

69.40 (437.28/448.18) ANTIETAM (NO. 4) AQUEDUCT Constructed 1832-35, cost $25,022.49 including railing. The aqueduct is 108 ft. long between abutments and has three elliptical arches. The two side arches each have a 28 ft. span and 10 ft. rise. 30 ringstones and a keystone are in the face of each. The

↙ abutment : 2ft

center arch has a 40 ft. span and 10 ft. rise with 38 ring-stones and a keystone in the face. The piers are 6 ft. thick. The parapet and coping are 7 ft. high. The coping is 26 ft. above the foundation and 23 1/2 ft. above the stream. The towing path parapet is 6 ft. wide at the top and 7 ft. at the bottom. The waterway is 22 ft. wide at the top and 20 ft. at the bottom. Pilasters 4 ft. wide project 21 inches at the base and 15 inches at top at each pier. The foundation pads are rubble capped by rounded arrises 3 ft. 8 inches high at the base of the piers. The flared wings are at each pier are 46 ft. long and 7 1/2 ft. thick. The Aqueduct is constructed of gray, wavy-banded Tomstown Dolomite from a quarry 3/4 mile to the east. Wooden rail on coping. Blocks are cut on the bed and joints but faces are rough. The water table and belt are cut stone. The parapet and wings are coursed scabbled stone. One repair block of granite is in the coping on the towing path side. The

wings on the west contain sandstone rubble. One block of Seneca red sandstone is in the lower end of the waterway. Crenulated bedding and other slump features show well on the weathered faces of the dolomite blocks. Solution marks resembling bird foot impressions are prominent on some of the faces on the limestone block. Some blocks in the coping are crumbling along bedding planes and fractures. In the 1900's a timber crib was placed on the upstream side of the east pier for support and protection. A road formerly passed under the aqueduct. The aqueduct was breached in 1859 and extensive repairs were required. On July 21, 1864 the Confederates blasted down the berm side to the arches and the ringstones were torn out. The towing path side was blasted down two-thirds of the face and a 20 ft. section of the center arch was destroyed. The aqueduct was rebuilt in 1864 and vertical iron rods were installed for support. (now seen on berm side) The aqueduct was restored by the National Park Service in

Recreation area: pump, toilets, picnic tables, fire circle.
(442.85) ledge in river.

the late 1950's.
Foot bridges (437.45, 437.50, 437.70)
(437.80) end of recreation area.
(437.95/443.50) MP70
(438.18) - sinkhole 10'x10'x10'd. on top side; 2d. 30ft. 5'x5'x8'deep.

70.38 CULVERT 103 Constructed 1832-33. The coping and semicircular arch are cut limestone. The arch has a 4 ~~5~~ ft. span and a 2 ~~1/2~~ ft. rise with 10 ringstones incl. stewbacks. and a large prominent keystone in the face. The parapet and coping are 1 1/2 ft. high. +10ft. embankment above coping. The spandrels, parapet and wings, 45°, 10' long are limestone rubble. Same on berm, abutment 1ft. high. There is a 2 ft. drop at the front of the pavement on the riverside. From this point to Shepherdstown there are embankment on the berm.

Sink on berm of prism 10ft. diam. x 10ft. deep.

(438.50) End embankment on berm from Antietam campground, 4-6ft. high.
(438.65) Stonewall on berm, coursed rubble, 200' long, conn culvert to (438.70)

70.78 (438.68) CULVERT 104 MILLERS BASIN Culvert constructed 1832-33. The coping and semicircular arch are cut gray limestone. The arch has a span of 6 ~~4~~ ft. and a rise of 2 ft., with 16 ringstones and a keystone in the face. The abutment is 5 ft. high on the towing path side. The springing line is at stream level on the berm. The parapet and coping are 3 ft. high. The spandrels and parapet are coursed limestone rubble.

Basin east of culvert = 70.68. Stonewall on berm 125ft. long, wharf + warehouse.

Wing walls flared, 10ft. long.

Water from sawmill from canal.

At culvert, stones at rt. ∠ to canal, dip ↑ downstream 85°

A basin served the sawmill and limekilns of Jacob Miller. The basin and limekilns were built in 1846. The sawmill was erected in 1864.

The Elbrook Limestone is exposed at the base of the culvert and it also forms a bluff in back of the house on the hill to the northwest. In the bluff a syncline on the east has beds that strike N5°W and dip 50°W. The west limb forms east side of anticline with beds that strike N20°W and dip 22°ENE. The limestone is irregularly banded, wavy, light gray with laminated beds. The beds are 1 inch to 2 ft. thick. Prominent joints strike N25°E, vertical, 4 ft. spacing; N10°W, dip 80°W; N35°E, vertical; N70°W, vertical; N55°W, vertical. The joint surfaces show "bird-foot" pitting on the weathered faces. At the peak of the anticline are beds of massive dark gray Elbrook Limestone with joints with plumose surfaces. The west limb of the anticline strikes N20°E and dips 25° to 40°WNW. There are no joints

but numerous closely-spaced fractures are present. The upper beds above the prominent ledge have several changes in dip because of small folds. Ledges in the river, exposed at low water, dip steeply to the east and the direction of the ledges is offset upstream at the center of the river by a change in strike and dip.

Berm embankment with road, Millers Sawmill to (438.85) = 71.05
(438.87/439.00) MP 71 Informal overflow 106ft. long, 1-2ft. high.

71.58 (439.46) CULVERT 105 Constructed 1833. The coping and semicircular arch are cut limestone. The span of the arch is 4 ft.; the rise is 2 ft. The parapet and coping are 3 ft. high. The culvert is filled to the top of the arch with silt and debris (1971). Wings at Rt. L, 4ft. long, 10ft. Embankment abov culvert.

71.65 (439.65) POTOMAC CEMENT COMPANY Vertical cement kilns are 350 ft. north of the canal. 1 kiln in front is facing the canal and 2 are on the west side covered by a barn. The arches over the hearths of the kilns are brick and the faces above the hearths are limestone. The kilns

Pile of stone of waste dump along road to 439.70.

~~were built in 1888 by William H. Blackford and had a cap-~~
acity of 300 barrels per day. They were operated until 1903. The limestone for the manufacture of the cement was from a quarry in the Elbrook Formation behind the kilns. (Mathews and Grasty, 1910). The kilns back against a terrace of tan silty sand with water-worn cobbles up to 6 inch size.

Similar old kilns are on the West Virginia side of the river at the old Botelers and Reynolds cement mill. Botteler's mill originally ground flour but was converted to grinding cement and the kilns were erected in 1828. Botelers and Reynolds mill supplied most of the cement used in the canal up to 1834. The mill was burnt by Federal troops in 1861.

(439.60)
A low dam formerly crossed the river at this point but only the masonry abutments remain and a straight line riffle across the river indicates the location of the structure. The dam was built

by Dr. Henry Boteler in 1822 for power for his mill. The dam was a timber crib 3 ft. high and pool to Shepherdstown making it possible for boats to cross river and enter Shepherdstown inlet lock. Much of the crib work was carried off and the abutment washed badly in the flood of October, 1873. The dam was destroyed in the flood of 1889.

Prentiss 71.39

Packhorse Ford, also known as Blacksfords and Botelers Ford, crossed the river here. An old game trail was adapted as a ford in 1736 and used until 1755 when a ferry was established at Shepherdstown. The Confederate army in the Antietam Campaign of September 1862 used this ford.

71.75 Small drain into canal, timber crib + riprap for dock - not located. (440.00) MP 72.

72.47 (440.40) NORFOLK AND WESTERN RAILROAD BRIDGE

Concrete wall along canal on t.p. at bridge

This bridge was constructed 1908-09 by McClintic-Marshall Corporation of Pittsburgh, Pa., as a replacement for an older bridge 500 ft. upstream. The concrete piers and steel trestle towers support a single track, 5 span, steel deck

Pratt truss over the river and 7 plate girder deck trestle spans on the north. 1 deck plate girder span is on the south approach. The bridge carries traffic of the Shenandoah Valley Branch, Norfolk and Western Railroad, between Hagerstown, Maryland and Roanoke, Virginia. An old canal wharf is on the berm west of the bridge.

Rounded hills 35 to 100 ft. above the canal to the north are terraces with well-rounded sandstone and conglomerate boulders up to 2 ft. size in tan silty sand. Rounded cobbles up to 8-inch size are common.

Proper term, River lock, used below. -pg

72.64 (440.52) SHEPHERDSTOWN ~~INLET~~ LOCK Constructed
Bridge piers 50 ft. to east.
1833-35. The facing is hammer-dressed limestone. The circular quoins at the river end of lock are well preserved. The river end of the lock is now open and the canal end is blocked by a wall of limestone rubble and earth fill that serve as part of the towing path. Abutments of the old
River lock dropped down to river from canal

towing path bridge are at the upper circular quoins and wings at the entry to the canal. The lock was abandoned in 1889 after the flood washed out Botelers dam that formed the pool on the river side of the lock.

Piers of the old bridge of the Shenandoah Valley Railroad (now Norfolk and Western Railroad) are on the east side of the inlet lock. They were constructed in 1880. They are 20 ft. wide, 15 ft. thick at canal level and 20 ft. x 10 ft. at road level. They are 50 ft. high and are built of wavy-banded, gray, rough-faced limestone blocks, 18 inches thick, up to 4 ft. long and 3 ft. wide based on timber cribs, Iron braces 5 ft. apart are in the upper half of piers. Vertical L beams at the top of the piers supported a deck between the trusses. 5 piers carried a 5-span, steel deck Pratt trusses with curved lower chords over the river. A 5-span plate deck girder bridge with trestle supported by 4 towers was on the north approach. The bridge was dismantled in

1909.

Wall for wharf on W. Va. side of river.

The monument on the south side of the river at the top of the bluff is a memorial to James Rumsey, inventor of the steam boat. The first trial trip of his boat was at Shepherdstown in October 1783. The boat was rebuilt and a trial trip at Harpers Ferry was made in March 1786. It was demonstrated at Shepherdstown on December 3 and 11, 1787. Rumsey was an engineer with the Potomac Improvement Company engaged in making Potomac and Shenandoah Rivers navigable ( ).

8/15/75 bike traverse to here

Car odometer F.C.- 94634 Shepht - 94697

8/16/75 End bike 471.40 471.44

72.80 (440.70) LOCK 38 SHEPHERDS LOCK 5 ft. lift, constructed 1832-33. The face is hammer-dressed, gray and black Conococheague limestone quarried directly opposite the lock on the West Virginia side of the river. The limestone rubble walls on the berm side of the lock extend to an old basin above the lock. The lock had a lower extension and low embankment on the berm below the lock is a remnant

Stone walls, bridge abutment to flume culvert on berm.

timber and bolt on north side of mound still in place.

Extension + stone wall on berm 25 ft. below bridge abutment.

Old bridge abutment near end of extension, pier on prism side of towpath.

Stone wall - sloping to end of extension along prism side of towpath; stone wall, vertical, slightly flared for 50 ft. beyond this downstream.

22/Y.

of cribs. The flume was on the berm and was 5 ft. wide, 4 ft. deep, lined with limestone rubble. The culvert at the lower end of flume is a semicircular arch with a 5 ft. span and a 2 1/2 ft. rise. It is faced with cut limestone.

The lockhouse was built in 1837-38 and was a brick structure, 2 stories high. It was on the towing path but was carried away in the flood of 1936. The limestone abutments 150 ft. east of the lock formerly carried a timber highway bridge over the canal. The original pivot bridge at this point was built in 1834-36 to connect with Blackfords (Thomas Swearingens) Ferry which was operated across Potomac from 1755 to 1850. It was burnt by Confederate troops in July 1864. A new pivot bridge was built in 1866 and a fixed pony (open) timber truss was constructed in 1884. A revetment wall is along the towing path for 150 ft. below the bridge site. The wall on the berm below the bridge abutment is flared and is 30 ft. long.

A timber frame warehouse was on the berm side between the lock and flume.

Knodes ferry Inn – ruins of ferry Inn on berm in middle of lock. Burned 1972; built in late 1700's. 2 story timber.

press, concrete, asphalt leads up to it; used as post 1936 bridge over canal to ferry.

On the berm at lower press cement has impressions of timber casts; asphalt leads up to cement. – used for post 1936 bridge over canal to ferry.

A timber, covered bridge was built across the Potomac in 1849-50 by the Virginia and Maryland Bridge Company. It had 4 spans on the 3 piers. The limestone for the piers was quarried near Botelers and Reynolds Cement mill. The bridge cost $37,069.85 and was burnt by the Confederates in 1861. A new, covered, timber bridge was erected in 1871. One span on the West Virginia side was carried away in the flood of November 1877. It was rebuilt but the entire superstructure was carried away in the flood of 1889. It was replaced in 1890 with a through Pratt truss IRON bridge of 4 spans on the original piers with raised coping by the King Iron Bridge Company of Cleveland, Ohio. It was remodeled in 1924 by the Atlantic Bridge Company and heavier floor placed on it. The bridge was purchased by the State of West Virginia in 1929. The entire bridge was carried away in the flood on March 18, 1936 (Welshans, 1937) and only the piers remain in the river. 300 ft.

downstream from present highway bridge. A ferry was reestab-
lished until a new bridge was constructed by the Maryland
State Roads Commission. The new bridge is a 6-span, Wich-
ert type, continuous deck steel truss. It is 1,021 ft.
long, 72 ft. above low water level and was opened July 15,
1939. It cost $250,000.

Shepherdstown, on the West Virginia side of the river,
was founded in 1727 as New Mecklenberg. Thomas Shepherd
incorporated the town in 1762 and the name was changed to
Shepherdstown in 1798.

72.86 (471.78) (440.73), 0.03 mi. west of bridge - informal overflow, 68 ft. long. No apparent revetment.
just a low spot. 150 ft. west of bridge.

73.00 (471.95) (471.20) TERRACE ON BERM Rounded hills are cover-
Stone pavement on towpath to west. Revetment wall ends at MP 73+.07. (472.02)
ed with sandy silt containing rounded cobbles. Low, irreg-
ular outcrops of Conococheague limestone are in small
ledges on the side of the hill. Ferry Hill Plantation on hill on berm
built early 1800's, Now Hdq. NPS - C.O.C.N.H.P.

73.17 (472.02) - (472.08) (471.02) OUTCROP ON BERM An 80 ft. bluff is form-
(Sketch of outcrop made).
ed of thick massive beds of dark gray Conococheague Lime-
Revet wall on riverside??

stone. A 10 ft. zone of beds 1 inch thick are in the middle part of the outcrop. The strike is N10°E and the dip ia 35°ESE. Joints strike N55°W, dip 84°NE; N50°E, vertical; N30°E, dip 70°SE. Small caves are at the center and north end of outcrop, 20 ft. above canal. The north cave opening is 3 ft. high x 2 ft. wide.

42.15- 472.22 Limestone, 3 ledges up to 200 ft. high 4 to 6 in. beds, Strike at right angles to Canal. Dip 30° upstream.

472.22 ravine

73.26 **OUTCROP ON BERM** An 80 ft. cliff of Conococheague Limestone is on the berm. The beds are massive except at the northeast end of the outcrop where beds are 4 to 6 inches thick. The strike is N5°E and the dip is 30°E. Flat, weathered surfaces show angular breccia fragments 3 to 6 inches in size.

30° — Canal downstream →

472.22 outcrop of limestone 6 in. to 2 ft. beds. Strike of beds at right angle to canal. Dip 45° upstream

472.28 - Bluff 100' high.

472.30 - Bluff 150' high, prominent vertical, [illegible] joint

73.29 Two small caves, 20 ft. above canal; top one 4 ft. high x 2 ft. wide; strike of rock N20E, dip 35°NW (upstream)

470.94 Cliff on berm, 60 ft. high, limestone

472.35 begin curve to left; End outcrop

472.38 - 472.40 Low ledge of limestone.

73.46 470.72 (470.40) **CULVERT 107** Constructed 1832-34. The coping and arch are cut limestone. The arch has a ~~6~~ 4 ft. span and a 3 ft. rise. 6 ringstones and a keystone show in the face of the arch. The parapet and coping are 10 ft. high. (9 tiers)

No wings

10 ft. wall above arch to coping; coping at towing path level; no wings, grades into dry wall on flanks. Narrow ravine on towpath & berm side; 8 ringstones + keystone + 2 [illegible] backs on berm arch. Dark gray limestone crops out in stream valley on towing, 1 in - 6 in. beds, some up to 2 ft. thick, irregular laminations. Limestone dense 45° Berm

35° Smooth face, not bedding

Canal downstream →

472.56 - 472.60 intermittent outcrop. 472.60 ravine, curve to left.
472.64 - Ledge of massive limestone, 50 ft. above canal. Similar intermittent ledges to 472.75
472.82 - Ledge of limestone 200 ft. high, 100 ft. back from berm; similar at 472.90

The parapet is coursed limestone rubble. The culvert is filled to the top of the arch with sediment (1971). Same on berm. No wings on berm

40° / Limestone on berm
← U.S.

73.57 470.60
472.50 - 472.56 OUTCROP ON BERM A cliff 100 (150 ft.?) ft. high, 300 ft. long, is formed of Conococheague Limestone. Beds are 2 to 6 inches thick and strike N30°E, dip 80°SE.

Limestone cleaved, thin bedded.

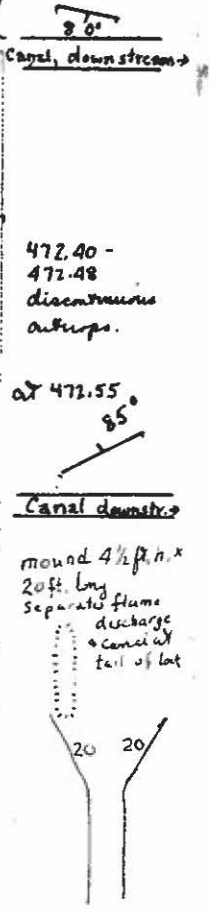
Stone paving on towing path ends 100 yards below Lock 39
Bluff at 472.52: 150 ft. high; bluff at 472.55 150 ft. high, beds 1-6 in thick

85° / Canal downstr. → at 472.52

This mileage appears incorrect

73.70? 47.20
MP 74 also 47.20
(471.74) (472.95) - MP 74 LOCK 39 (Mitchells Lock) 6 (9 ft.?; looks like 6 ft) ft. lift, completed 1832-34. The face of the lock is hammer-dressed Conococheague Limestone quarried in Virginia near Shepherdstown. The stones are up to 8 ft. long, 3 1/2 ft. wide, 1 to 1 1/2 ft. thick. Two types of limestone are in the lock. One has a rough surface, irregular bedding, with black chert lenses up to 4 inches long x 3/4 inch wide, and rectangular breccia fragments 1 to 6 inches in size. This is best seen in the revetment at northwest end of lock. The other type of limestone is fine grained, regular, thin bedding, smooth surfaced, cut by dense gray, very thin, ir-

Snubbing post on towing path at lower end of lock; flume on [berm].



regular calcite veinlets. In the lower four tiers below the old water line, flat surfaces contain "bird-foot" solution marks up to 1/4 inch deep. Solution ribs on limestone protrude 1/4 inch. The miter sill is intact in the upper recess, but only bolts remain in the lower miter sill. The flume is ~~20~~ 26 ft. on the berm and has a concrete waste gate at the head. The gate is ~~5~~ ft. wide x ~~6~~ ft. high, with slots for insert boards. A 20 ft. mound on the berm upper end of the lock is the remains of a fender crib. A snubbing post is on towing path at the lower end of the lock. The brick foundation for the lockhouse is on berm at upper end of lock. It was constructed in 1836-37.

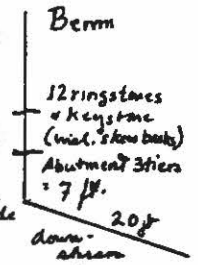
8 ft. long down along flume

flume 6 ft. wide; cement wings, 15 ft. d.s.

Boulders on berm.

Stone pile lower end of lock - ?? 20 ft. long mound, 4 ft. high on lawn end of lock, end of berm wing; separates flume drainage.

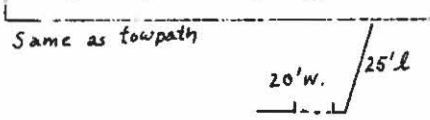
74.05 CULVERT 108 100 ft. upstream from the lock, constructed 1833. The semicircular arch has a span of 6 ft. and a rise of 3 ft. 12 ringstones and a keystone are in the face. The abutment is 3 ft. high. The parapet and coping are 2 ft. high. A 5 ft. drop is at the

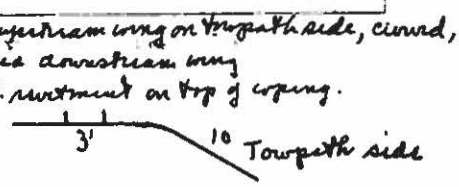


6 ringstones (incl. skewback) on downstream side of towpath arch, 6 ringstones, no skewback on upstream side

3 tier abutment = 4 ft., parapet + coping = 2 ft.; drop of 2 ft. at mouth of culvert

4 ft. embankment above coping





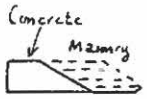
river side end of the pavement. The ringstones and coping cut limestone; the rest of the culvert is coursed limestone rubble. Limestone crops out on the berm side of the culvert and the beds strike N19°E and dip 45°WNW.

Blue dense with shiny black partings

Discontinuous outcrops on berm 470.10 to waste weir.

74.07 470.75 **WASTE WEIR** This is a concrete frame, board insert waste. The base and wings are limestone rubble. The original overfall at this site was constructed

Concrete wing and limestone rubble wing on riverside, concrete; 15ft. long, masonry = 30ft. long



No paddles.

1833.

✓74.12 Time post or time marker - originally 6ft. high; 3ft. high, could be stub of telephone pole.

x 74.15 Dry slope wall, riverside Towpath; upstream for 0.9 mi; not seen, checked thoroughly.

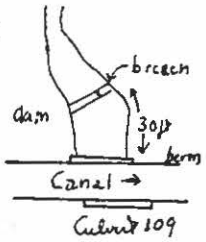
✓74.22 Section dock + building foundations + Company House

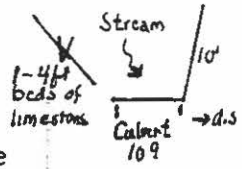
74.24 469.94 **CULVERT 109** Constructed 1833. The irregular arch is cut gray, orange stained, limestone and sandy limestone. It has a 6 ft. span, and 4 ft. rise. A large canteddringstone gives additional rise. 12 ringstones and a keystone are in the face. The abutment is 3 ft. high. The parapet and coping are also 3 ft. high. The coping is cut gray limestone and the abutments are red sandstone. The spandrels, wings and parapet are coursed limestone rubble. Some gray sandstone and gray brown quartzite are

12 ringstones + keystone; 3ft. drop at front; parapet + coping 2ft.

Earthbankment 8 ft. above coping. Berm face battered, 1ft. in 6ft. Rest of culvert same as towpath, but no parapet on berm. Outcrop in stream. No wings on towpath side

Sink in middle of prism over culvert





25' 15' Foundation 3ft. high; formerly 2½ storeys Stone wall 125 ft. long x 4ft. high Rubble wall 20ft.

Rubble wall 30 ft. long

Culvert 109

in the abutments and spandrels. The pavement is concrete and stone. The inner ring courses limestone rubble. There is a 4 ft. drop at the mouth of the culvert. A 2 1/2 story section house 18ft. by 33ft. is at the upper end of the stone wall which extends along the berm. 300 ft. west of the culvert on the river side is a small pumping station for Sharpsburg water supply (74.30).

✓ 74.26 - Pumping plant, Sharpsburg water 10ft. sq. at rivers edge
469.90 outcrop of limestone; low ledge 100 yds. from berm; face of ledge rounded.

74.27-75.00 extends to 468.90 TERRACE ON BERM The front of the terrace is at canal level and the terrace rises gently to the base of the limestone hill, 100 to 300 ft. from canal.

74.50-75.50 469.25 = 75 MP. This section of canal had frequent breaks because of fissures and sinkholes in the limestone beneath the flood plain and terraces.

468.84 – 468.95 widewater; up to 300 ft. wide.

75.29 468.85 - Killiansburg Cave, H.B.O.

75.63 468.84 OUTCROP ON BERM A bluff 70 ft. long and 100 ft. high is formed of gray, massive Conococheague

468.64-468.82- discontinuous ledges of limestone
Berm embankment 469.05

Limestone. The beds strike N20°E and the dip is vertical. Fracture cleavage shows as steps 1 to 4 inches apart on the limestone faces. The limestone breaks into irregular slabs, 1/2 to 1 inch thick, on weathered surfaces. Two small cave openings are at canal level (Sharpsburg Shelter Caves). The west one (downstream) is 5 ft. high, 2 ft. wide leading 20 ft. to a small crawlway 20 ft. long. A small solution tube is above this cave. The east cave (upstream) is a 20 ft. discontinuous low ledges of limestone along here to Killiansburg Cave.
passage to a small dome pit, 8 ft. in diameter. Beyond the domepit a crawlway trends west connecting with the downstream cave; beyond the junction are narrow crawlways and fissures extending south for 100 ft. (Franz & Slifer 1971, p. 99-100). A fracture pattern, 1 1/2 x 1 ft. spacing is etched on the walls of the cave.
468.55 - South end of walking along trail path

75.69 468.52 KILLIANSBURG CAVE Two large cave openings are in the bluff. The one at canal level has a flowstone bench, 3 ft. above a floor of clay. Flowstone is on

sketch map

the walls. A small spring issues below the clay floor. The cave entrance is 10 ft. high and 10 ft. wide reducing to a small crawlway 20 ft. in. The limestone beds are cut by closely spaced fractures at right angles to the beds. Joints strike N65°W, vertical; N70°W, dip 80°S; N60°E, dip 55°SE; N35°W, dip 80°SW.

A second cave is 40 ft. above the canal level. The entrance is 20 ft. wide and 18 ft. high. A large, triangular-shaped, passage extends 40 ft. but narrows and lowers to 4 ft. high. Joints are similar to those in the lower cave; an additional joint strikes N5°W with a vertical dip. The limestone at the front of the caves has ribs etched out by solution. The ribs are vertical and spaced 2 to 4 inches. The caves are in the Conococheague Limestone which strikes N25°E and dips 35°NW. The axis of the caves are along the strike.

75 ft. east (upstream) is a cave opening 4 x 4 ft. in (468.51)
size, 30 ft. above canal The rock is stained orange from
the silt fill of the cave.

Continuous outcrop

Killiansburg cave was used as a refuge for inhabitants of ~~Hagerstown~~ Sharpsburg during the Civil War in 1863.

75.78 Rubbish wall on towpath; long straightaway.

75.80 468.40 CAVES ON BERM A small, low cave opening, 8 ft. wide, 2 ft. high, is in a ledge 20 ft. above the canal. Prominent wall on towpath.

300 ft. east (upstream) two solution openings are in a ledge. They are 1 to 2 ft. in diameter. Conococheague limestone forms the ledges with beds 2 to 6 inches thick striking N 35°E and dipping 35° to 45°NW.

468.30 - Two caves, 50' x 60' above the canal; 10' wide, 4-5' high 200 ft. south of small opening

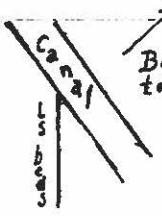
75.90 468.29 - SMALL SOLUTION OPENING In a ledge on the berm, 45 ft. of canal is a solution opening 3 ft. wide and high. Soil and debris are spewed out below the opening. The second opening is 30 ft. above the canal, 200 ft. to the east (upstream). Strike of beds N30°E, dip 40° upstream; vertical joint trends 140°. Beds up to 4 ft. thick.

Discontinuous outcrops to west.

75.95-76.10 OUTCROPS ON BERM Discontinuous ledges of fractured. Beds strike N35°E, dip 45°-60° upstream massive Conococheague Limestone are on the berm.
76MP - Small cave, ◇ 4ft. diam, 30ft. above canal.
76MP - 468.20
468.10 - upper end of wall.

76.17 468.00 CAVE ON BERM The entrance, 3 ft. wide and 4 ft. high, is in a ledge. At 6 ft. in the passage drops 5 ft. to a narrow walkway 125 ft. long. The trend of the cave follows the strike of the rock beds. The Conococheague Limestone is highly fractured and strike N 35°E with a vertical dip. Joints strike N60°W, dip 60°SW, beds of limestone on towpath side
Revetment shows well here; discontinuous outcrops to east.
N40°E, dip 45°NW; N85°W, dip 45°N; N70°W, dip 60°NE.
467.80 - 467.90 Limestone, beds 6 in. to massive, strike N 40°E, Dip vertical
467.80 - 468.05 Revetment wall along towpath
467.81 - Sink, 5 ft. wide, 10 ft. long (downstream direction in stream, swallow hole.

76.58 467.60 CULVERT 111 Constructed 1833. The coping and semicircular arch are cut limestone. The arch has an 8 ft. span and 4 ft. rise with 6 ringstones (incl. skak) on the north, 5 on the south, and a keystone. No wings The west abutment is 7 ft. high. East abutment 8 ft. high, concrete.
The lower 5 ft. of the abutment is concrete. The parapet and coping are 3 ft. high. The spandrels and parapet are mainly of limestone with some sandstone. 3 ft. of dark 10 ft. embankment above coping.
Limestone outcrops on berm in stream.



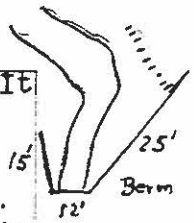
Beds of limestone on towpath side.

Large boulders at mouth of stream in Potomac River; up to 4 ft. in diameter; sandstone.

(252)

76.5 - Stonewall, Chapline Stone Warehouse. (not seen)

Turning basin, 25 ft. long on berm at culvert; timber dock to west. Snyders Feed Warehouse on west half of dock. Concrete bridge pier 10 ft. west of dock. Remnants of stone wall is 20 ft. east of bridge



gray to black organic sandy silt is on the flood plain. It
On berm, dark gray, wavy bedded limestone, strike of beds N 40° E., vertical dip.
is exposed in the ravine downstream from the culvert.
Footbridge ?? - gone in 1975.
On berm arch: 10 ring stones incl Skbk. 1 ft. abutment on rock. Vertical joints in limestone 310° & 340°

76.65 SHARPSBURG (Snyders) LANDING An old section house is in ruins on the berm. It was formerly a frame structure, 2 stories high. A foot bridge is at the site of the old swing bridge. The concrete abutment of the swing bridge is on the berm with 2 ring bolts. A concrete pier 10 ft. out from berm and a similar pier and abutment
Cable bridge piers 10 ft. west of dock.
are on the towing path side of the canal. The Snyder Coal and Grain Warehouse was formerly on the berm. It was washed out in 1936. Sinkholes in the limestone gave considerable trouble in this section of the canal.

76.66 Footbridge - gone in 1975.

76.69 467.48 OLD OVERFALL The limestone revetment on
extends 47 paces to south, crossing three ravines
76.87 467.38 Service bridge, Snyders Landing boat launch, toilet (1975)
the towing path is the site of an old overfall, 18 ft. wide.

76.75 CULVERT SITE The limestone revetment
Overflow ?
and boulders of sandstone are at the site of a former culvert.

466.34 - 466.35 Towpath revetment 2 ft. high.
466.50 Town end of berm embankment.
40 paces west of MP 78 is town end of revetment.
467.13 - MP 77

- Cholera area to west on canal -

77.98 466.18 (Prentice = 78.15) CULVERT 112 Original culvert built 1834.

The parapet is coursed limestone rubble on the towing path side. 8ft. high; no wings; sewer pipe (ceramic) below parapet. The rest of the culvert is buried. A 2 1/2 ft. vertical sewer pipe on the berm curves to a horizontal pipe beneath canal and carries the present drainage. Berm had wings 6 6

MP 78: 466.22 Informal overflow, extends 90 paces to south (466.25 - 466.33)
465.90 riffles in river.
465.50 V riffle in river; berm on embankment.

79.00 465.30 (MP) TERRACES ON BERM Wide flats at 20, 45, and 60 ft. above river level are covered witha gravelly soil.

A V-shaped barrage is in the river. (seen in 1975)

79.25 464.95 - Footbridge, V in river.

79.39 464.85 (Prentice 79.41) LOCK 40 Lift 8 ft., constructed 1833-35. assume the 6 ft. lift.

Gray Conococheague Limestone is in the berm walls. The lower 3 tiers are smooth-faced; tiers 4 to 7 from bottom are rough hammer dressed and the top 2 tiers are smooth faced. The smooth-faced limestone is dark gray, wavy banded. The hammer-dressed stone is light gray and fine grained. The wall on the towing path side is all smooth faced. The circular quoins have 1/4-inch deep solution rills. The

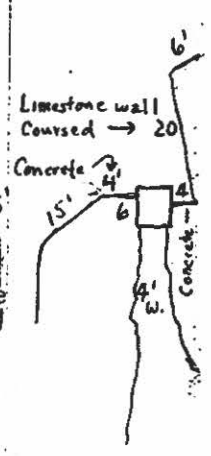
78.80 - Prominent cliff in L. Va. (465.35), 150 ft. high - limestone.

466.09 Towpath wall, 2 ft. high, coursed limestone rubble. Extends to 466.22

78.18 Beginning of stone wall on berm, old property fence, extending to 79.00 (maximum 1975). Prentice indicates wall at 78.35.

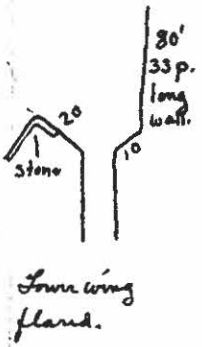
465.18 - Stonewall 2 ft high upper part of berm. 100 paces long.

The limestone is from a quarry on the Potomac River, West Virginia side about 1/2 mile from the lock. The lock was partially rebuilt after it collapsed into a sinkhole. A wooden stop gate and earthen embankment now blocks off the upper end of the lock. The flume on the berm is 20 ft. from the lock. A concrete waste weir is at the head of the flume and is a single gate 4 ft. wide and 6 ft. high with insert boards. The mound at the upper end on the berm side is probably the remnant of a fender crib.



Large river cobbles & boulders, up to 3 ft. size, in flume below concreted area.

The lockhouse on the berm. It was built in 1836-37 and only the stone foundation remains. The meadow on the berm is a terrace rising inland from the canal level to 40 ft. above the canal. Another terrace is 80 ft. above the canal. Rounded sandstone boulders from the terraces are in the floor of the lock chamber.



79.59 464.62 WASTE WEIR A concrete frame waste, 12

ft. wide, has openings each 3 ft. wide with insert boards. No paddles
/ none left in 1975
Some boards, 2 inches thick, 6 inches wide remain in the
+ concrete
slots. A limestone revetment is on the river side of the
Vertical blocks (limestone) on floor of the spillway
spillway. The original overfall at this site was construct-

ed in 1835. A terrace on the berm is at towing path level.
South end of HBO - wall, coursed limestone rubble, 90 paces long, Extends across HBO
to 23p. from w.w.; wall up to 10 ft. high, top 6 ft. below lwg towpath, 25 ft. from towpath.
79.6 446.60 Horseshoe Bend H.B.O. (Should be 464.60)
79.83 464.45 REVETMENT WALL ON TOWPATH This prob-

ably the site of an old overfall or culvert. Large gully to river,
42 paces long; walls cobble and limestone rubble.

79.88 464.30 CULVERT 114, Roses Culvert Constructed

1833. The coping and semicircular arch is cut limestone.

The arch has a 4 ft. span and a 2 ft. rise. 8 ringstones

and a keystone are in the face. The abutments are 2 ft.

high. The parapet and coping are 2 1/2 ft. high. The

spandrels, parapet and wing wall on the west (downstream)
Wing on downstream, towpath side flared 45°, 15 ft. long.
No wings on berm
are coursed limestone rubble. A ledge of Conococheague

Limestone is at the base of the culvert on the towing path

side. The limestone is black, dense to fine grained with

Outcrop in stream on berm also.

wavy bands of orange clayey limestone 1/4 inch thick, spaced 1 to 2 inches. The beds strike N20°E and the dip is vertical.

120 paces upstream of 464.15; sinkhole 3'x3' on berm; swallow hole = 1/8 cfs. (1975).

MP 80 - 464.25

80.05 distance from MP to OK <u>OUTCROP ON BERM</u> A ~~30~~ 40-ft. ledge of massive, dark gray, finely crystalline Conococheague Limestone is on the berm. Calcite veins 2 inches thick are parallel to the beds. Rills to a depth of 1/16 inch are on the surface of the limestone. The beds strike N10°E and dip 35°ESE. Joints strike E-W and the dip is vertical. Cleavage which strikes N27°E and dips 52°ESE, appears as false bedding. Fractures strike N80°W and dips 45°S.

464.15 - Limestone revetment sloping up to 10ft., towpath riverside, 100 paces long.

464.65 - Large sink on berm, 10ft. diameter, plugged; wall 83 paces long on towpath 2ft. high, partly covered by towpath surfacing material.

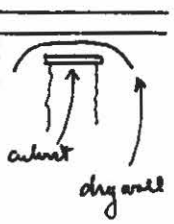
80.23-80.27 464.65 - 463.95 <u>OUTCROP ON BERM</u> Conococheague Limestone in ledges up to 120 ft. high is exposed on the berm. The strike is N35°E and the dip is 80°SE at the north ~~and 45°S at the south.~~ joints

463.95 - 464.00 Rock revetment 1-4 ft. high; depressed towpath - 463.85?? 463.93

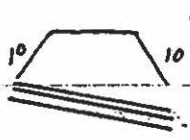
80.40 <u>OUTCROP ON BERM</u> Conococheague Limestone

is in a cliff with the vertical face parallel to the canal. The strike is N10°E and the dip is vertical.

80.45 463.72 ~~CULVERT~~ 115 MONDELL Constructed 1832-
Stone wall 40 ft. long at Stone House on berm.
33. The coping and semicircular arch is cut limestone. The arch has a 6 ft. span and a 3 ft. rise. 10 ringstones
on berm - 8 ringstones (including shoeback) + keystone
and a keystone are in the face. The abutment is 3 ft. high. The parapet and coping are 3 1/2 ft. high. Spandrels and parapet are coursed limestone rubble. An 8 ft. dry wall of
curved at ends.
limestone is above the coping. A ledge of Conococheague Limestone is at the base of the culvert on the tow ing path side. The strike is N~~35~~30°E and the dip is vertical. Tan colored travertine, in a bed 1 to 2 ft. thick, sloping 10° towards river, is on top of the bank on the towing path side. Walls of the old Harris warehouse are at the bend in the the road on the berm. It is made of coursed Conoco-Cheague Limestone rubble. No wings



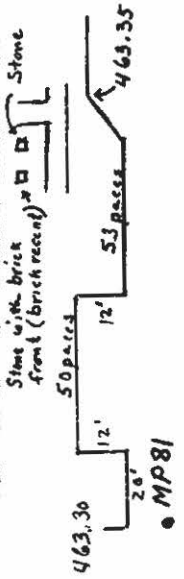
- Footbridge - gone in 1975



80.90 – Stone wall on berm, site of Harris warehouse.

80.95 TAYLORS LANDING (Mercersville) A revetment of coursed, trimmed rubble limestone is on the berm. An outcrop of Conococheague Limestone is at the east end of the revetment.

West of Taylors Landing there are low terraces on the berm 15 to 20 and 45 to 50 ft. above the canal. Extensive limestone karren ledges are on the hill behind the terraces.



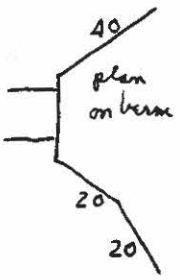
81.00 NPS bridge – Taylors Landing Boat Ramp 463.29

MP81 : 463.36.

81.64 CULVERT 116 MARSH RUN MIDDLEKAUFFS BASIN

Basin : 81.62

Constructed 1832-34. The coping and semicircular arch is cut limestone. The arch has a span of 10 ft. with a 5 ft. rise. 14 ringstones incl. skbk and a keystone are on tne river side. 16 ringstones incl. skewback and a keystone are on the berm. The abutment is 6 ft. high on the river side and 4 ft. high on the berm. The parapet and coping are 4 ft. high on the river side and 12 ft. high on the berm. A 6 ft. embankment above coping is on the river side. Limestone wing walls on the berm are 36 ft. long on the east and 48 ft. on the west.



The spandrels, parapet and wing walls are coursed limestone rubble. Conococheague Limestone crops out on the creek north of the road. The strike is N5°E and the dip is 35°E.

change in bike odometer 4-62.18 = 42.66

Falls within culvert.

No wing on west; revetment wall 20ft. long on east at 45°, serves as wings.

81.91 462.40 SPRING A timber-cribbed revetment on on the river side of the towing path, 20 ft. high holds the embankment above a large spring. 2ft. wide × 6" deep × 2ft/sec (flow, 1975)

Partly walled at tunnel under fill below

82.00 461.87 - MP 82 CLIFFS ON WEST VIRGINIA SIDE OF RIVER

The Conococheague Limestone forms continuous cliffs along Whitings Neck.

82.46 461.18 Big Woods H.B.O.

82.20 462.18 (461.18) TERRACE ON BERM A broad gently sloping meadow at canal level is strewn with gravel.

462.18 - 461.51 (meadow) – 461.30 (woods) terrace.

460.93 - MP 83

83.13 OUTCROP ON BERM The Conococheague Limestone forms a ledge. The strike is N5°E and the dip is 45°E. Discontinuous outcrops are to the west.

460.81 - water from spring flows downstream, sink in center of pasture, 2ft. in diameter.

260 paces from Bergen Cave = Cluster of Springs = Stream Springs

83.21 - Stonewall on berm, quarry behind.

83.31 460.52 BERGEN (DAM NO. 4) CAVE The entrance is on

Stream exits at entrance of cave, small flow.

From Bergen Cave downstream, flat and quarry for 70 paces, 26 paces to spring. : 460.62 - Ledge 40 ft. high, 1-4 in. limestone beds, dip of beds 50° down stream (260) strike N-S. Δ solution opening 3 ft. on a side; possible quarry also.

the berm in a low ledge of Conococheague Limestone. The strike is N10°E and the dip is 55°E. Tne limestone is dense, gray and cut by cleavage striking N60°W and dipping 65°-70°SW. The cleavage forms plates 1/2 to 2 inches thick. Joints strike N10°E, dip 45°W; N80°W, vertical. The cave entrance is 15 ft. wide and 20 ft. high witha passage of similar dimensions extending north for 100 ft. The floor rises gently and small stream is on the floor. At 100 ft. the cave is offset to the east end and the passage is 4 ft. wide and 4 to 6 ft. high for 40 ft. to the north after which it gradually reduces to a crawlway with a pool. A side, fissure passage on the east of the main passage connects with the domepits 30 ft. high (Davies 1961, p 39-41; Franz & Slifer 1971, p.74-75).

CAUTION- THE CAVE EXTENDS INTO THE ZONE OF TOTAL DARKNESS; LIGHTS ARE NECESSARY BEYOND THE FIRST FIFTY FEET;

460.48- outcrop, ledge 100 ft. high, beds strike N10°E, dip 45° downstream; beds 2-6 in.

THE FLOOR IS SLIPPERY. DO NOT BREAK OR REMOVE STALACTITES;

LOOK, PHOTOGRAPH, BUT LEAVE THEM FOR OTHERS TO ENJOY.

83.5 · Site of culvert 117 - not seen (1975)

83.62 460.20 - 460.16 OUTCROP ON BERM The Conococheague Limestone forms a ledge 30 ft. high. The beds strike N25°E and dip 80°E to vertical at east end and 70°E at west end. beds 6 in. to 1 ft. thick

83.74 460.10 OUTCROP ON BERM Sketched A 40 ft. ledge of Conococheague Limestone is on the berm. The beds dip 70°E on the east. These beds are faulted against beds dipping 45°E on the west. The limestone is highly cleaved along the fault. A solution opening 2 ft. wide x 4 ft. high is on the east side of the ledge. Discontinuous outcrops extending upstream from the fault, dip 45°E.

Diagram- bluff with fault
3"x 3" original; 2" x 2" reproduction

83.77 460.05 OUTCROP ON BERM A low bluff of Conoco-Cheague massive limestone has small solution openings

Limestone is mainly massive; strike of beds N10°E; dip 42°E. (downstream), 60° at lower end of outcrop. d.s.

filled with orange brown silt.

83.88 459.92 - Small basin and stone dock; small stretch on berm, 10 ft. long, of stone work (wall?) on berm.

83.89 459.90 OUTCROP ON BERM Conococheague Limestone is in a ledge 80 ft. high. The beds strike N20°E and dip 46° to 70°E on the east side. An anticline is at the base of the west end of the ledge. The east limb dips 46°E; the west limb dips 80°W. A prominent crack, sloping to the west, cuts the center of the ledge. sketched

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DIAGRAM, structure in bluff- 5" x 10" original
final 2" x 4".

83.95 OLD QUARRY ON BERM The Conococheague Limestone, with massive beds up to 10 ft. thick are on the west side of a ravine. They strike N25°E and dip 45°E. A quarry is on the east side of the ravine with a 50 ft. front along the canal. The quarry extends north 75 ft. The beds in the quarry dip 80° to 85°E at the top and are vertical at the base. Stone wall and foundation. 200 ft. long, 50 ft. wide (quarry); prominent ribs of clayey calcite in downstream side of quarry

83.96 CULVERT 118 Hensons Culvert Constructed 1833-34. The straight wings.

MP84 459.76 Small outcrop of limestone on berm.

coping and semicircular arch are cut limestone. The arch has a 6 ft. span and a 3 ft. rise. 10 ringstones and a large keystone, 14 inches wide at the base, 22 inches wide at top, are in the face. Same on berm. The parapet and coping are 4 ft. high. 10 ft. stone revetment above coping, extends 40 ft upstream and 60 ft downstream from culvert. The spandrels and parapet are rubble limestone. A 3 ft. dry wall is above the coping. The culvert is partially closed by silt (1971).

84.21-84.40 459.62 DISCONTINUOUS OUTCROPS ON BERM

Conococheague Limestone, in beds 1 to 3 ft. thick are in low bluffs. The beds strike N15°E and dip 47°E.

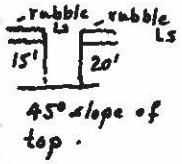
459.55 (where roads come in.) Limestone and cobble revetment wall on towpath downstream of waste weir

84.37 WASTE WEIR This is a concrete frame with 3 gates for insert boards. The frames are broken out (1971). This is the site of an overfall constructed in 1835. Now has no gates or boards; open bridge. Has date of Dec. 1921 in concrete of w.w. Now wicket valves (1975)

wall ends opposite w.w.

Outcrop in discharge area of waste weir, strike of beds Rt. angle to road + river, dip 60° downstream to natural on east side

Power house wall ends opposite waste weir.



45° slope of top.

84.40 459.36 DAM NO. 4 The original dam was built in 1832-34 but is now covered by the pool from the present

Concrete footing and concrete footing spillway at upper end of power house.

Power house built of trimmed limestone

Masonry revetment wall - crenulated limestone rubble, 150 ft. long on downstream end of power plant.

dam. It was a timber crib with stone fill and wooden sheathing, 810 ft. long, 52 ft. wide at top and 15 ft. high. The timber ties were bolted to bedrock. The front slope of old dam was 1 1/2 to 1 and the back slope 2 to 1. The dam, stop gate and guard lock cost $79,095. The guard bank enlarged from 39,103 cubic yards to 43,013 cubic yards in 1835. The abutment bank was breached in 1834, 1836, 1843, 1846 and 1847. The dam was breached in 1836 and 1840. A serious breach on May, 1846 carried away 80 ft. of the structure. The repairs were carried away in July and November, 1846. The dam, abutment bank, and guard bank were rebuilt extensively in 1847 to 1848. The guard bank was breached 1836, 1846, 1847, 1852 and a large breach, 120 ft. long 1857 when the entire river passed through it. Another breach in the guard bank occurred in 1858.

A new gravity type masonry dam, directly in front of the crib dam, was started in 1857. Stone for this dam was

from a quarry in the Concocheague Limestone, 400 ft. north of the dam. The Maryland abutment was finished in 1856 and later extended. A freshet in 1859 took out the abutment and masonry work on the Virginia (West Virginia) side and opened a 100 ft. breach in the guard bank. In 1860 another freshet took out the repair work. The masonry dam was completed in 1866 and was 630 ft. long between abutments and 715 ft. in overall length. After power plant installation in 1915 it was 810 ft. in overall length. The dam is 18 ft. wide at the base, 12 ft. wide at the top and 20 ft. high. The dam is built of limestone masonry rubble, grouted and faced with squared limestone blocks set in mortar. It cost $240,000 in 1866. The pool impounded is 8 miles long. The Nov. 24, 1877 flood caused 180 ft. of center of new dam to give way with the breach extending to the low water surface on the downstream side and 4 to 5 ft. below the crest on the upstream side. The guard and abut-

ment banks were also breached. A 175 ft. break occurred on the Virginia side of the dam in 1878 and was repaired in 1879 at a cost of $29,309. The 1889 flood caused a breach in the guard bank and the abutment bank. A concrete core was then placed in the abutment bank. The Maryland abutment was rebuilt in 1892.

Water power rights at the dam were leased by the Martinsburg Power Company in 1906 and the power plant on the West Virginia side was placed in operation in 1915. It has two 500 KW generating units and is now operated by the Potomac Edison Company ( ).

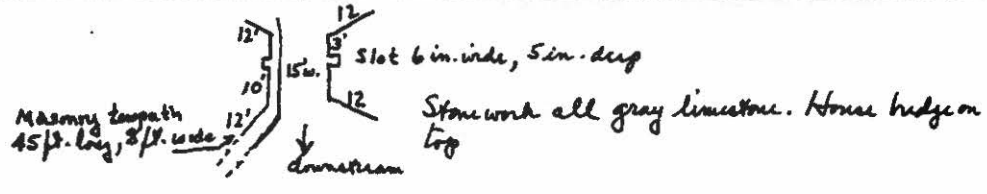
Foundation leakage through solution openings in the limestone foundation became serious in the 1920's with the worst leaks 60-75 ft. and 115 ft. from the Maryland abutments These were grouted with 100 tons of asphalt in 1930. In spite of the repairs, 75 ft. of the dam in the area of the leaks was carried away by floods and ice on February 29

459.36 - Dam no. 4 drop gate; insert grooves on south abutment above towpath; leaves at 254 ✓
stop gate

and March 19, 1936. It was rebuilt by Trustees of the C & O Canal Company for $33,282 with money advanced on the annual rent by the Potomac Edison Company. Still later the abutment bank washed out on May 13, 1937.

MP&S - 458.75 - MP

The abutment bank between the dam and the canal has a core wall (cutoff) of masonry and concrete placed in 1889 with an earth embankment over core. The abutments of the stop gate at canal end of abutment bank are built of ham-
Dam no. 4 -
South abutment above towpath
mer-dressed, finely varved limestone cut by small fractures. Rope grooves cut the limestone. A machinery house was over the stop gate but it was carried away in the flood of March 1936. It was rebuilt as a museum by the National Park Service and was carried away by the flood in Storm Agnes,
(rebuilt)
1972. An outcrop of gray Conococheague Limestone is
now covered by embankment
on the berm side of the stop gate. The beds strikes N10°E and dip 35°E. West of Dam no. 4 the canal is 10 ft. below the pool of dam and is protected by a guard bank one mile



8/16/75
Car speedometer
Red Bird Inn 93876
Shepherdstown 93883
Start 8/10?/75 (8/16?)
Big Slackwater parking + Canal = 458.40 on bike odometer.

long, 17 ft. above the canal on the river side of the towing path.

Plan Dam no. 4 to Guard Lock
Original 8"W x 10"h; final 4"W x 5"h.

84.73 - footbridge
85.21 - Cliffs on W.Va. side of Potomac.
85.35?, 85.5? NPS bridge & boat ramps, etc.

85.44 TERRACE ON BERM A broad bench slopes upward from canal level and a second, gravel strewn terrace is on the top of the hill, 140 ft. above river level.

85.62 GUARD LOCK 4 10 ft. lift, constructed 1833-34. It is faced with hammer-dressed Conococheague Limestone in blocks 2 ft. wide, 2 ft. thick and 2 to 5 ft. long. The wall at the head of the lock is 20 ft. high, where a bridge crosses it. There are slots for stop gate planks at the head of the lock. The lock gave access from the canal to the pool behind Dam no. 4. A pierhead, constructed in 1834, formerly was on the upstream side of the lock. An embankment on the berm at the lower end of the lock is the remains of a crib for a lower extension. The

Lockhouse on berm on road north + east across feeder. 5ft. high stone foundation, 15ft. from road.

lockhouse, constructed in 1837, was on the berm 100 ft. from the head of the lock but only the stone foundation remains.

25 ft. north of the lock is a culvert under the towing path and guard bank which carries a feeder to the canal. The culvert has a semicircular arch with a span of 8 ft. and a rise of 4 ft. There are 10 ringstones and a keystone in the face. These are cut limestone. The abutment is 1 ft. high and made of concrete. The parapet and coping are 1 1/2 ft. high. The culvert was constructed in the 1870's. A concrete frame control gate is on the river side of the culvert.

There is no canal for 3.28 miles above Guard Lock 4. The barges were towed in the pool. The towing path along the river bank was constructed 1833-34 and 1836-38. Except for

the first mile most of the towing path has been washed away.

85.62-85.69 OUTCROP Limestone of the Rockdale Run Formation is exposed in a bluff 60 ft. high east of towing path.

85.89-86.58 (85.69-86.38) HIGH FLOOD PLAIN The broad, flat area to east of the towing path is a flood plain that is covered by the river occasionally.

85.95 (85.73) OUTCROP The limestone in the hill to the east of the towing path is part of the Rockdale Run Formation.

86.51 (86.40) OUTCROP A 5 ft. ledge of dark gray Stonehenge Limestone, strikes N15°E and dips 66°NW.

86.61-86.67 (86.50-86.58) OUTCROP A low cliff of Stonehenge Limestone with beds 1 ft. thick to massive, strikes N20°E and dips

70°WNW.

86.73 (86.66) OUTCROP An 80 ft. bluff of Stonehenge Limestone is along the towing path. Solution alcoves are developed in face of bluff. 80 ft. north along the outcrop is a ravine scoured to bedrock.

86.78 (86.72) OUTCROP A 20 ft. ledge on the towing path is formed of dark gray Stonehenge Limestone. The rock is massive and has fine angular calcite veins. The limestone weathers white.

86.94 }? end regained towpath
87.1 }

Cave area sketched.

86.80-87.65 (86.75-87.65) GALLOWAY CLIFFS Cliffs, 20 to 80 ft. high, are along the towing path. They are formed of dark gray Stonehenge Limestone. The beds are contorted with an overall strike of N30°E and dip of 60°SE. A small cave at 86.80 (86.75) is 20 ft. east of the canal. The entrance is 10 ft. above the level of the towing path and is 6 ft. square. The cave extends8 ft. to a crawlway which trends

86.96 masonry wall on towpath at rocky point jutting into pool.

south parallel to the towing path. A fault trending N30°E crosses the towing path at a small ravine 100 ft. northeast of the cave. The cliffs to the north are massive, gray Conococheague Limestone with the beds striking N30°E and dipping 60°NW at 86.85 (86.80). A low ledge of Conococheague Limestone is on the towing path at 87.01. The limestone is dark gray on the west (riverside) amd buff colored on the east (landward side). The beds strike N30°E and dip 60°-70°SE. Buff, fine grained limestone is exposed along the towing path to 87.41. Joints are in three planes with angles of 60° between the planes and vertical to the beds at 87.10 Ravines scoured to limestone bedrock are at 87.19 and 87.25. From 87.26 to 87.33 there are high bluffs of Conococheague Limestone. The limestone is massive with prominent calcite gashes. The beds strike N40°E and are vertical. A V-shaped ravine cut to limestone bedrock is at 87.34. It has a channel 4 ft. deep developed along a joint

trending east and dipping 60°N. Bluffs of Conococheague Limestone up to 80 ft. high are along the towing path from 87.35 to 87.65. Calcite veins are numerous and some beds are fractured. The beds strike N40°E and are vertical.

87.68-88.04 BREAK IN CLIFFS (Berkson Run) At the north end of the break there are bluffs of Conococheague Limestone up to 100 ft. high. The limestone is light gray on weathered surfaces and dark gray, microcrystalline on fresh surfaces. Calcite veins are common. The beds strike N10°E to N20°E and dip 75° to 80°WNW. The fault cited at 86.80 recrosses the towing path at 87.76. On north side of the fault there is dark gray Stonehange Limestone with irregular slabby beds to massive. There is solution opening, 4 ft. wide, 8 ft. high, 6 ft. long at level of towing path at 87.99. Jointing in the Stonehenge Limestone strikes N75°W and dips 58°N; E-W, dips 64°S at 88.01. Along the northern part of the cliffs, Stonehenge limestone strikes N20°E and dips 70°SE

at north end.

88.12 - 446.57 MACMAHONS (Cedar Grove, Shanks, Avis, Shaffers, Galloway, Charles) Mill The mill was built in the early 1800's. A steel wheel was installed shortly before the mill ceased operations in 1922. The machinery was dismantled and stored in the mill. The foundation of the mill is limestone and the superstructure is wooden. The inlet and dock at the mill are lined with limestone rubble.

88.12 - Boat basin 40 ft. square, landing ramps. Masonry limestone walls. Concrete slab bridge over Downey Run and basin entrance.

Ledges MacMahon's Mill to Lock 41 sketched.

88.11-88.22 OUTCROP Ledges and bluffs of Stonehenge
446.57 - 446.66

Limestone are up to 100 ft. high. The limestone is thin bedded, gray with siliceous beds, 1/8 inch apart. These beds stand in relief on white and light gray weathered surfaces. Fractures are normal to the bedding, 1 to 6 inches apart. The strike of the beds is N10°E and the dip is 76°E increasing to vertical at the west end of the outcrop. Joints strike N70°W and dip 70°SSW to vertical. Solution

openings are in the middle part of the outcrop.

88.22-88.24 <u>OUTCROP</u> Low ledges and bluffs along towing path. A fault cuts the rocks near the east end of the exposure. The fault plane dips east and Stonehenge Limestone on the east has been thrust westward over Rock~~land~~dale Run Formation on west. Bluffs of massive gray limestone, Rock~~land~~dale Run Formation, continue along the towing path on the west side of a small ravine. Small, fine solution lines are etched on the bedding planes at the level of towing path. The limestone beds strike N30°E and dip 36°NW decreasing westward to nearly horizontal.

Diagram of geologic section MacMahons Mill to Lock 41
Original 3 lines on 10"x14", reproduced at 3"hx4"W

446.80 Cliff 40 ft high x 50 ft. long extends to waters edge.

88.26 446.75 <u>HOWELL CAVE</u> The cave is a large alcove-like opening at the head of a ravine, 50 ft. north of the river. It is the remains of a domepit 30 ft. high and is the face of a bluff 60 ft. high. A gravel-strewn crawlway

at the base of the cliff trends northwest and connects with single passage cave 1 to 10 ft. high. Small rooms are developed along the passage. A stream flows out the entrance in spring and early summer (Franz and Slifer 1971, p. 80-81). The cave is in a dark gray limestone, Rockdale Run Formation which is massive on fresh surfaces but on weathered faces beds are 1/2 inch thick are discernible. Fractures striking N60°W and N30°E, vertical, are prominent on the northwest side of the alcove. Joints trend N50°E, N80°W, and N-S; all are vertical.

88.26-88.40 OUTCROP Thick-bedded, dark gray to black dense limestone, Rockdale Run Formation is exposed along the towing path. On weathered surfaces the limestone is blue-gray. Beds are 1/2 to 6 ft. thick and the bedding planes are wavy. Subangular breccia and contorted layers are indicative of slump in many beds. A dense net of calcite veins, 1/32 inch wide, is present locally. Strike

of the beds is N10° to N30°E and the dip is nearly horizontal except for small flexures with dips up to 12°E. The dip at the west end of the outcrop is 24°E. Prominent vertical joints strike N80°W and N30°E.

447.00 Cliff to water's edge 40 ft. high x 40 ft. long.

88.40 LITTLE HOWELL CAVE This cave is an overhang, 30 ft. deep, 80 ft. high and 80 ft. long, in limestone of the Rockdale Run Formation. The cave opening is 10 ft. high x 3 ft. wide at the east end where it is 20 ft. above the towing path. A gravel-floored crawlway and fissure extend about 20 ft. NE from the entrance (Franz and Slifer, 1971, p. 80).

88.40-88.66 OUTCROP Dark gray limestone, Rockdale Run Formation is in ledges along the towing path. The weathered surface of the limestone is dark blue. Beds are over 10 ft. thick and some strata are distinctly cross-bedded. The strike of the beds is N30°E; dip is 30° to 52°SE.

Cleavage fractures, spaced 2 to 4 inches, are prominent in places. The cleavage strikes N50°W and dips 70°SW. Prominent joints trend due east and are vertical. A cave opening, 10 ft. high x 6 ft. wide, is in an alcove in a bluff 100 ft. high near the east end of the section. The cave is a narrow fissure beyond entrance.

88.68 447.15 FORD Limestone blocks and rubble are in creek to provide a ford on the towing path.

88.70-88.90 ← end 447.35 OUTCROP BLUFFS Along the towing path are dark gray limestone, Rockdale Run Formation. Beds are 1/2 to 2 ft. thick and strike N30°E with dip 52° to 68SE. A prominent joint trends E-W and dips 60°S. Spine-like ridges jut towards the towing path at the west end of the exposure. A high flood plain is on the West Virginia side of the river.

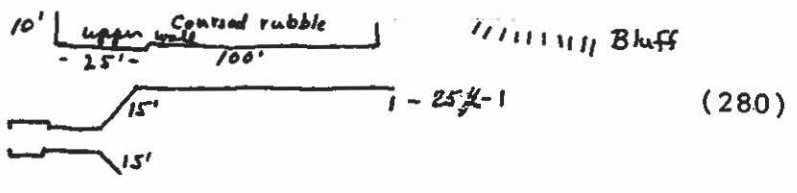
88.90 447.40 LOCK 41 10 ft. lift, constructed 1833-35,

rebuilt 1869. This lock was originally planned as a composite lock in 1832 but was constructed of hammer-dressed wavy banded limestone. The limestone blocks are mainly irregularly bedded and knobbly. Some of the blocks are massive. The wall on the river side of the chamber is concrete. The pile of limestone blocks on the southwest side of the lock were removed from the lock chamber at the time the concrete was placed. Revetment of limestone rubble is on the north side of the lock. Lock 41 which connected the canal to the west with the pool behind Dam no. 4 was originally planned to be built about 4 miles west near the present site of Lock 43. The upper part of the lock is partially buried in silt from floods. Limestone of the Rockdale Run Formation is exposed at lock. The beds strike N30°E and dip 72°SE.

Concrete in recess in upper berm.

Lower end of Lock 41 - wall 180 ft. long on river; 20 ft. flared wings on lower end of lock; No flume.
Lower end Lock 41 - wall 75 ft. long; 8 ft. above towing path
447.48 85 paces east of Lock 42; bedrock foundation; 0.10 mi. west of lock.
Stone foundation along towpath 125 east of Lock 42; stone wall 35 ft. long x 2 ft. high (Barron).

39.00 447.55 Lock 42 9 ft. lift, constructed 1833-35, rebuilt 1861. The river side of the chamber is dark gray,



finely crystalline limestone. Some blocks in the chamber have wavy banding. The berm wall of the chamber is concrete. A pile of blocks removed from the chamber is on the river side of the towing path. A crossover bridge for the towing path is at the lower end of the lock. Lockhouse no. 33, was formerly on berm but only the brick foundation remains. No flume

89.00-90.40 447.62 MP89 In 1833-34 two sections of canal, section 167-168, were constructed too close to river in this stretch and were insecure. These sections were reconstructed in 1835 with the towing path inside the line of the old berm.

89.21 447.69 CULVERT 113 1/2 Constructed 1834-35.

The arch is hammer-dressed limestone with a 4 ft. span and a 2 ft. rise. 8 ringstones and a keystone are in the arch. The abutment is 4 ft. high and the parapet and coping are 2 2 ft. high. All are coursed limestone rubble. Same on towpath.

89.25-90.00 TERRACES ON BERM A high flood plain adjacent to the canal grades to terraces inland. The first terrace is at the fence and the tree line on the spurs of hills. The second is at the top of hills. Numerous cobbles of sandstone in sandy silt soil cover the terraces. Limestone ledges are on the spurs of the hills in form of large humps at 89.60. Limestone cliffs (Rockdale Run Formation) are on the West Virginia side of the river at Whitings Neck.

447.72 - Two springs on river side of towpath; 300 cu. in./sec.
89.63 447.80 - Begin Dellinger underwater
90.36 - First of four dams between island and mainland
448.03 - overfall, 88 paces long; 30 p. on east has no revetment; revetment of cobbles & lms. blocks, 2ft. high to 448.10 Towpath depressed 1 ft. along overfall

90.75 448.35 - 448.45 BLUFF Stonehenge Limestone is exposed on the West Virginia shore. This is the site of Foremans Ferry.

MP 90 = 448.61
90.94 (Prentice) 449.35 Opequon Jct. HBO

90.90 449.45 at beginning of cut. OUTCROP ON BERM A ledge of Conococheague Limestone is in front of the cottage on the berm. Sketched 90.90 - 91.03 The beds strike N40°E and are vertical. 50 ft. west the beds are 1 to 4 ft. thick with a strike of N80°W and a dip of 10°N along a fault. A ledge of Stonehenge Limestone is west of fault and near the west end of the exposure with beds

striking N20°E and dipping 75°NNW.

448.75 end of Dellingers wide water.

Diagram of structure Original 4"h x 8"w. final 2"h x 4"w.

448.91 - 449.00 Cliff on W.Va. side of river.

90.96 OUTCROP ON BERM A ledge of Stonehenge Limestone, with beds up to 4 ft. thick is on the berm. The strike of beds is N30°E and the dip is 40 to 57°SE.

91.00 MP91 449.58 OUTCROP ON BERM A ~~ledge~~ cliff 40ft high is formed of massive Stonehenge Limestone with beds striking N40°E and dipping 26°NW. Meadow terrace on W.Va. side of river.

91.00 - Site of Foreman's Ferry.

91.03 OUTCROP ON BERM A ledge contains massive Stonehenge Limestone.

91.09-91.13 OUTCROP ON BERM A cliff, 50 ft. high, is formed of thick bedded to massive limestone of the Rockdale Run Formation. The strike of beds is N40°E and the dip is 26°NW. Near the north end of the cliff the beds are nearly horizontal and contain solution tubes, 1 to 2 ft. in dia-

meter, filled with orang brown clayey silt.

91.23 OUTCROP ON BERM A cliff, 50 ft. high, is formed of limestone of the Rockdale Run Formation. It is thick bedded to massive and the beds strike N40°E and dip 50°NW. Outcrop ends 449.90

91.33-91.36 OUTCROP ON BERM Limestone of the Rockdale Run Formation forms ledges. The beds are 2 to 4 ft. thick except at the upstream end of exposure where they are massive. They strike N40°E and dip 50°NW.

91.66 450.10 CULVERT 119 Constructed 1835. The semi-circular arch is of cut limestone and has a 4 ft. span and 2 1/2 ft. rise. 8 ringstones and a keystone are in the face of the arch. The parapet is 1 ft. high. Wings at right angles to face. 6 ft. long; downstream side of wing + parapet fallen

91.60 450.10-450.30 Sketched to 92.55 OUTCROP ON BERM At the power line crossing there is a cliff 40 ft. high formed of limestone of the Rockdale Run Formation. The beds are 1 to 4 ft. thick and

Dip 20° down stream on east; 30° d.s. on west; 2-4 ft. Limestone beds. Strike at right angle to canal = 290°. Cave at east end 30 ft. abov canal; 3 ft. entrance, 1 ft. high 10 ft. in. Solution cave just north of center of outcrop.

strike ~~N10°W~~ 340° and dip 18°W at base of cliff. The strike is N20°E, dip 15°WNW in upper part of cliff. A high flood plain and terrace are on top of the hill on the West Virginia side of the river.

Diagram of structure. Original 4"h x 8"w, final 2"h x 4"w.

91.78 OUTCROP ON BERM Massive limestone with beds over 10 ft. thick, Rockdale Run Formation, form ledges. The beds strike N10°W and dip 30°W.

91.87 OUTCROP ON BERM Ledges of limestone, Rockdale Run Formation are on the berm. The beds are 1/2 to 3 ft. thick and strike N10°W and dip 35°W. A solution tube, 3 ft. in diameter, is 30 ft. above level of towing path in the ledges.

MP92 450.38

92.00 450.38 OUTCROP ON BERM A bluff is formed of Chambersburg Limestone. The beds are 2 inches to a foot thick and strike N30°W, dip 55°NE.

92.05 450.38 OUTCROP ON BERM Chambersburg Limestone at the south end of a bluff. A cave entrance, 10 ft. wide x 6 ft. high, is in the bluff. The cave pinches down to 2 small solution tubes 6 ft. from the entrance. A spring issues from a solution tube, 2 ft. in diameter, at canal level, 50 ft. north of cave. Strike of beds 320°, dip 54° upstream.

92.14 OUTCROP ON BERM Bluffs 50 ft. high, cut by a ravine, are formed by Chambersburg Limestone. The beds are 1 inch to 1 ft. thick and hackly. The strike of the beds at the ravine is arcuate trending N40°W with a dip of 45°NE at the south. The strike is N10°E, dip 80°E at the north. The entrance to Dellingers Cave is at the top of bluff on the side of the ravine. The entrance is small hole opening into a room 35 ft. long, 19 ft. wide. A passage from the room trends southwest for 160 ft. where it pinches out (Davies, 1961 p. 41-42; Franz and Slifer 1971, p. 76-77). High flood plain terrace in W. Va.

92.23 proposed site of Dam no. 4 in 1824.

92.42-92.55 450.76± OUTCROPS ON BERM Ledges 30 to 50 ft. high are formed of Chambersburg Limestone. The beds strike N20°E and dip 30°ESE at south end of exposures; the dip is 45°ESE at 92.48. A ravine scoured to limestone bedrock is at 92.46. A fault cuts the limestone at 92.48 with beds of shiny, dense gray limestone on the downstream side of the fault. The strike of these beds is N-S and the dip is 80°E to vertical. Dull black, dense, calcite-veined limestone is on the upstream side of the fault where the strike is N10°W and the dip is 45°E. The fault trends N55°E, dips 45°NW. A breccia zone, 1 to 2 ft. wide, is on the upstream side of the fault. Drag fold on the downstream side of the fault indicates the downstream block moved upwards relative to the upstream block. A revetment of limestone rubble is along the river side of the towing path.

92.5 - spring from pipe in rock.

Diagram of fault zone 4"h x 8"w → 2"h x 4"w

450.85 - limestone revetment on riverside of towpath; 60° slant; blocks up to 2 in. thick x 4 ft. long x 2 ft. wide - to 450.90.

92.59-92.63 OUTCROP ON BERM Chambersburg Limestone crops out in low ledges with beds 1 to over 10 ft. thick. The beds strike N10°E and dip 70°W. A ravine cut to limestone bedrock is at the south end of the exposure. A spring with a concrete basin is on the berm of the canal 100 ft. north of the outcrop. 2 in. pipe at top of basin = 450.95.

Canal
149.98 Smooth faced ledge of limestone, 7 ft. high, on berm. ||/ face of ledge / joint, dip 70° towards canal

92.67 OUTCROP ON BERM A low ledge of Chambersburg Limestone is 100 ft. east of the canal berm.

All along the bluff area there is a rock riverward at the toe of the towpath to 450.00

92.76 451.10 WASTE WEIR This is a concrete frame structure with 3 gates and insert boards. No paddles Concrete wing 20 ft. long at right angle to canal on riverside of towpath.

92.97 451.31 LOCK 43 9 ft. lift, constructed 1833-34. The facing is hammer-dressed limestone. The limestone blocks have clay seams 2 to 4 inches apart and prominent calcite veins. Concrete patch on berm coping. Canal Company records indicate that lock 43 was extended downstream to form a double lock in 1881. No evidence of such an extension remains. The lockhouse is on

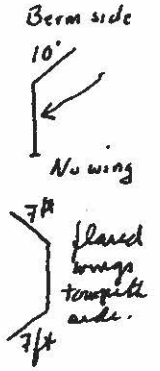
Flume on berm, 20 ft. long, tapers out to meadow.

10' 15' upper lock
10' 20'

Stop plank notch in upper end of lock, extends to within 2 ft. of top of lock; notch 3 in. wide & 5 in. deep.

Towpath grade elongated for 100 ft. downstream.
the berm and is whitewashed brick on a limestone rubble
40 ft. from lock
foundation. It was constructed in 1836. An embankment on
the berm extends upstream from the lock. Lock 43 is at
Berm side, middle of lock, vertical timber with 3 bolts, 6 ft. up from floor; insert of lock stone x 2 in.
the lower end of the Four-mile Level.
Stop plank insert openings 14 in. wide x 10 in. deep at head of concrete. Flume 15 ft. in berm from lock. Concrete culvert at head 5 ft. x 5 ft.; Concrete on inner wall of lock; flared wings at upper + lower ends.

93.00 MP93 451.36 CULVERT 120 Constructed 1833, lengthened
1834. The arch face is cut limestone. The span is 8 ft.
with a 4 ft. rise. 10 ringstones and a keystone are in the
face of the arch. The abutment, 5 ft. high, and the parapet
and coping, 2 ft. high, are coursed limestone rubble. A
Towpath face pushing out; slump in embankment above.
12 ft. embankment is above the coping.



93.58 451.95 CULVERT 121 Constructed 1833-34. The semi-
circular arch is cut limestone and has a span of 6 ft. and
a rise of 3 ft. 10 ringstones and a large keystone are in
the face of the arch. The springing line is at water level.
The parapet and coping are 3 1/2 ft. high. Wings, spandrels
and parapet are coursed limestone rubble. Wings at right angle to
culvert face, each 5 ft. long on towpath side, no wings on berm. 12 ft. embankment
above coping. Sink 10 ft. long x 5 ft. wide in prism.

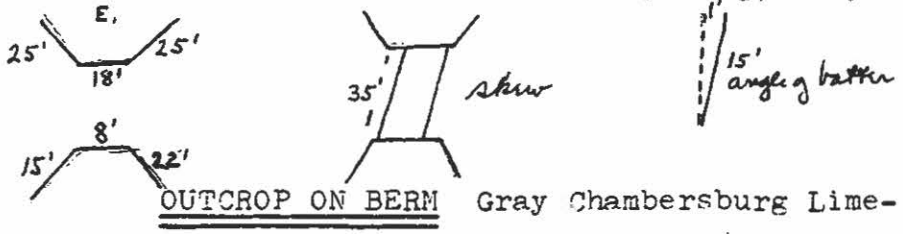
Embankment on berm to 451.71

93.80 452.25 A prominent bluff of Chambersburg Limestone on the West Virginia side of the river. The beds strike N10°W and dip 45°E.

93.9 Potomac Fish + Game Club. Road crosses canal at 452.25

MP 94 452.42

94.44 452.85 FALLING WATERS BRIDGE Constructed 1833-34. All that remains are the abutments built of hammer dressed, dark gray to black, dense limestone. The blocks in the abutment are up to 4 ft. long and 3 ft. high. The abutment is 13 ft. high above the towing path and 18 ft. high above the canal on the berm. The original bridge was a timber, lattice truss. The superstructure was replaced with a timber, Warren truss and the berm abutment rebuilt in 1869. The superstructure was rebuilt in 1886 and the bridge was carried off in the flood of 1936. Some of Lee's Confederate Army crossed here on its retreat from Gettysburg, July 14, 1863.



94.92 OUTCROP ON BERM Gray Chambersburg Lime-

stone in beds 1 ft. thick forms low ledges. The strike is N37°E and the dip is 35°NW.

94.98 OUTCROP ON BERM A low, densely vegetated bluff is formed of Chambersburg Limestone.

MP 95 453.41

95.05 453.48 CULVERT 122 Constructed 1833-34. The semicircular arch of cut limestone has a span of 6 ft. and a rise of 3 ft. There are 10 ringstones and a keystone in the face of the arch. The springing line is at water level. Parapet and coping are 3 ft. high. The wings, spandrels and parapet are coursed limestone rubble.

95.20 453.65 - Cumberland Valley H.B.O.

95.40 453.95 OUTCROP ON BERM A steep bank rising 80 ft. above canal is formed of Martinsburg Shale. At the base of the bluff is an outcrop of black, thin bedded, slabby, highly cleaved shale in beds 2 ft. thick. The strike is N40°E and the dip is 75°SE.

453.40 outcrop - shale?

95.54-95.68 OUTCROP ON BERM Extensive exposures

of Martinsburg Shale are in low bluffs. The shale is black, thin-bedded, platy, with some beds up to a foot thick. The strike is N35°E and the dip 50°NW. Cleavage strikes N40°E and dips 85°SE to vertical. At 95.57 the strike of the beds is N40°E, with the dip vertical. At 95.59 there is a false syncline formed by sinuous fractures that give the appearance of a folded bedding plane. At 95.68 there is a small exposure of shale on the upstream side of a ravine; strike is N35°E and dip 40°NW. There are occasional outcrops to 95.88.

Diagram of section - original 5"h x 10"w; printing 2"h x 4"w.

95.70 (95.55) 453.99 CULVERT 123? Constructed 1833-34. The semicircular arch is cut limestone with a span of 6 ft. and a rise of 3 ft. 12 ringstones and a keystone are in the face of the arch. The abutment is 3 ft. high. The parapet and coping are 3 ft. high. The spandrels, parapet and wings are trimmed and coursed limestone rubble. A high flood

95.70 End of sketch.

flared wings at 45°, 6 ft. long. No wings on berm.

incl. skewbacks

10 ft. Embankment above coping

MP61 454.55

plain is at canal level on the river side for a mile up-

stream.

96.1(96.23) Underwater, 125 ft. × 200 ft. long east of culvert 124. Cliffs along east side of underwater. Underwater ends at culvert 124. Foundation of section formed on berm, west side of underwater, 16'×28'

96.24 (96.07) 454.65 CULVERT ~~124~~ 123. Constructed 1833-34. The semicircular arch is cut limestone with a ~~8~~ 6 ft. span and a ~~2 1/2~~ 3 ft. rise. 8 ringstones, +shewbacks and a keystone are in the face of the arch. The springing line is at the foundation. Rock revetment from culvert 124 upstream.

The parapet and coping are 1 1/2 ft. high. The spandrels and parapet are coursed limestone rubble. The center part of the arch under the bed of the canal has collapsed (1971). Upstream wing fallen × No wings Berm face collapsed; collapse of prism over arch; arch exposed.

Stables 15'×20' on west side of culvert 124 on towpath

96.4 footbridge over canal = access.

455.00 - Riprap of towpath, ravine 20 ft. wide × 5 ft. deep; 455.10 - overfall? 52 paces long stone revetment and pavement on towpath. ??

96.72 (96.52) 455.13 CULVERT 125 Constructed 1833. The semicircular arch is cut limestone with a 4 ft. span and a 2 ft. rise. 8 ✓ ringstones and a keystone are in the face of the arch. The abutment is 6 ✓ ft. high. The parapet and coping are 2 ft. high. The spandrels and parapet are coursed limestone rubble. Road comes in here. same on berm. No wings 8 ft. embankment above coping. Outcrop at berm face in stream valley.

96.80 (96.59) V-shaped barrage in river. This is

possibly the remnant of an old sluice structure used in fishing or navigation.

96.91 (96.66) CULVERT 126? Constructed 1833. The semicircular arch is cut limestone with a span of 4 ft., and a rise of 3 ft. 10 ø ringstones and a keystone are in the face of the arch. barrel partly silted up. The abutment is X ft. high and is coursed limestone rubble. The culvert was undermined and washed out in September, 1927. Rubble from the culvert now forms a bar in the river.

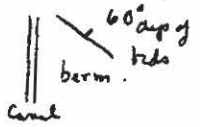
No wings?, same on berm. No collapse. Parapet 1 tier, coping 1 tier: 2 ft. in all. Coping and Parapet dimensioned limestone.

Revetment wall at top of towpath, 2'-4', extends west to Culvert 125. No collapse in piers, outcrop in stream on berm.

97.02 (96.77) 455.45 CULVERT 126A? Constructed 1833-34. The arch was semicircular with a ø 4 ft. span and a 2 ft. rise. The abutment was 3 ft. high. The culvert is completely washed out (1971).

4 arch stones incl. Skewback + keystone. Wings on upstream side, turn 16'.

all but berm collapsed and carried off; outcrop on berm in creek



97.03 (96.78) 455.50 OUTCROP ON BERM Low ledge is formed of limestone of the Rockdale Run Formation. The strike is N32°E and the dip is 70°SE.

MP 97 455.69

~~97.49~~ (97.25) 455.92 POWELLS BEND Piers of the old Cumberland Valley Railroad bridge are in the river. The abutment of the bridge on the berm is built of limestone blocks. 25' high x 34' wide The pier on the side of the towing path has 4 tiers of wavy-banded limestone with 13 tiers of Seneca red sandstone above the limestone. The 5 piers in the river are limestone blocks capped by concrete. 15' long, 4' wide, 25' high Slightly curved wing on downstream of abutment. The original timber truss bridge was built in 1871-72 by the Keystone Bridge Company for the Franklin Railroad and it was 840 ft. long. It was opened, October 1, 1872 and 5 spans carried away in flood of November 25, 1877. One other span was damaged in the flood. The piers were raised and an iron superstructure with Pratt deck trusses was completed by the Delaware Bridge Company on March 20, 1878 at a cost of $42,897.55. The flood of June 1, 1889 swept 6 spans away. In rebuilding the piers were raised again and a new steel superstructure of Warren through trusses was erected by the Union Bridge

Pipe, 2 ft. diam. into canal through wall on downstream side of abutment; 20 ft. downstream from abutment. Abutment = curved wings on north.

Company of New York. This bridge was 862 ft. long with 7 spans each 50 ft. above low water. It cost $72,131.40 including $13,414 for the raising piers. Some of the old bridge was salvaged and used in an iron bridge, 149 ft. long, at Martinsburg, W. Va. The piers repaired again in 1904. In 1913, after completion of a new bridge upstream, this bridge was cut up and dropped into river for salvage (Cumberland Valley RR, Annual Reports, and Engineering Record). There was a small basin with a dock on the berm between this bridge and the present bridge to the west. It was built in 1870 by the Franklin RR to transfer coal from the canal. 2 tracks were on the berm side of the basin, one for railroad cars, the other for a loading crane. A switchback to south provided connection from the main line of the railroad to the wharf.

Wall ends at pier.

Wall 100 pacers long at pier; coursed and trimmed limestone rubble. Stone wall 5 ft. high x 200 ft. long - red sandstone on berm. At east end concrete foundation for scales.

97.58 (97.35) POWELLS BEND Penn Central Railroad bridge no. 82/13. This bridge was fabricated by the Pennsylvania

97.58 456.60
Steel Company in 1914 and constructed in 1913 to 1916. It has deck, plate girder spans, each 100 ft. long with a concrete deck. The 12 concrete piers are each 13 ft. wide with the neat work 11 ft. wide tapering to 6 ft. at the top. The piers are 56 1/2 ft. high.
97.59 Narrow entrance through berm dike to basin, 200' long, × 175' wide

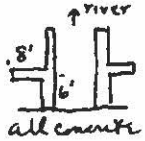
97.88 (97.65) 456.40 CULVERT 127 WILLIAMS CULVERT Constructed 1833-34. The semicircular arch is cut limestone (on berm) and has a span of 6 ft and a rise of 3 ft. The
Culvert had no wings
abutment is 5 ft. high. This culvert was breached on April 21, 1863 and a crib 142 ft. long was placed in it. The culvert was rebuilt in the Fall of 1863. It was destroyed in a flood in August 1926. Only the limestone rubble of the inner arch and the berm facing remain (1971).
Towpath washed out, embankment gone. Outcrop at base of towpath + farm.
MP 98: 456.65
456.89 - 6 tiers of slope stone work 6' wide × 6' high; large of flow with 2'×6'×2'/sec.; collapsed culvert. all stone fallen = limestone; similar to surround. May be spring
98.63 (98.45) 457.10 INTERSTATE HIGHWAY 81 BRIDGE Two parallel continuous, deck, plate girder bridges were built 1965-67 to carry I81 over the Potomac. The cut for the

98.27 Stone breakwater 50ft. long, towpath to river. Not seen 1975
98.38± Culvert +0.5 from Culv. 127
98.44 French drain culvert drains spring under canal; drain of fitted stone.

abutment is in a 75 ft. bluff of Stonehenge Limestone. The limestone is dark gray, finely banded, dense to finely crystalline and weathers white. The strike of the beds is N40°E and the dip is 60°SE.

Revetment walls on towpath I8 to 457.25

92.92 (98.74) 457.38 WASTE WEIR This is a concrete frame structure with 3 gates with insert for boards.



No paddles - concrete wings at right angles to spillway.
457.42 to culvert 128 There is a pile of cinders 10-12 ft. high

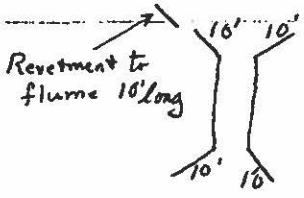
99.12 (98.98) 457.42 CULVERT 128 Constructed 1833-34. The semicircular arch has a span of 4 ft. and a rise of 2 ft. The culvert is filled to the level of the coping. A sewerage plant is on the river side of the towing path west of no wings.

the culvert at MP 99 457.65

99.16 Old quarry on berm

99.25 (99.10) 457.77 LOCK 44 10 ft. lift, constructed 1832-34. The facing is white and gray limestone blocks. Wavy, clayey bedding planes are on the gray limestone. The white limestone has smooth faces. Many of the blocks have shallow lifting holes. The embankment in the canalbed at the

Footbridge over lock



Williamsport Car odometer 93853

lower end of the lock may be the remnant of cribs for a lower extension under constructed in 1881. However, records of the Canal Company indicate that Lock 43 had an extension and that the extension for Lock 44 was not completed. A tumble flume with no weir or overfall is on the berm. A snubbing post is near the uppergate. The wall of the chamber was thrown in by Confederate troops on April 4, 1863. It was rebuilt later. The lockhouse is on the towing path and is a 2-story clapboard structure with a cellar.

flume 6-15 ft. wide: boat repair. 20 ft. from lock - flared wing around wing on upper berm; right angle wings at lower end.

457.82

99.35 (99.20) POWER PLANT This plant of the Potomac Edison Company was built 1922-23. A low dam across the Potomac River impounds water for cooling.

R. Paul Smith plant.

457.82

99.44 (99.32) WHARF The limestone wall on the berm side of the canal formerly was the front of a wharf on which there was a transfer crane for unloading barges. This is also the site of Darby Mill, which was destroyed by fire in

Steffey & Findley Coal Co. drain into canal from berm at east end of wall. Wall continues 200 ft. west of road to power plant.

a warehouse - on east side of street on berm

Lykens Valley Coal & Wagon shed on berm west of street

9.21.75 Falls Church - begin 94,634(Dark) 7647(VW) 286
Shepherdstown 94,697
Licking Creek 7,730
Falls Church - end 94,774 7,827

1920.

99.64 (99.48) 458.10 BRIDGE This bridge carries the road across Limiting east of bridge.
the canal to Riverside Park. The original timber truss was constructed in 1833-34. The abutments are rough dress limestone pier setts of granite. The bridge was destroyed in the Civil War and the timber truss was rebuilt in 1866. 56 ft. long, abutment on towpath 29 ft. wide; pier on berm 30 ft. wide
The present iron truss was built by Wendel Bollman Bridge Co., Baltimore, in 1879. 99.68 458.15 The railroad lift span across the canal, ~~150~~ 80 ft. to the west, was built in 1923. Lift span 40 ft. long, abutments 20 ft. long (wide) Martinsburg shale is exposed on the berm along the railroad siding. The shale is black, crumbly, and weathers brown. The strike of beds is N40°E and the dip is 38°NW.

End 8/16/75; begin 9/21/75 - 474.00 at RR lift Bridge

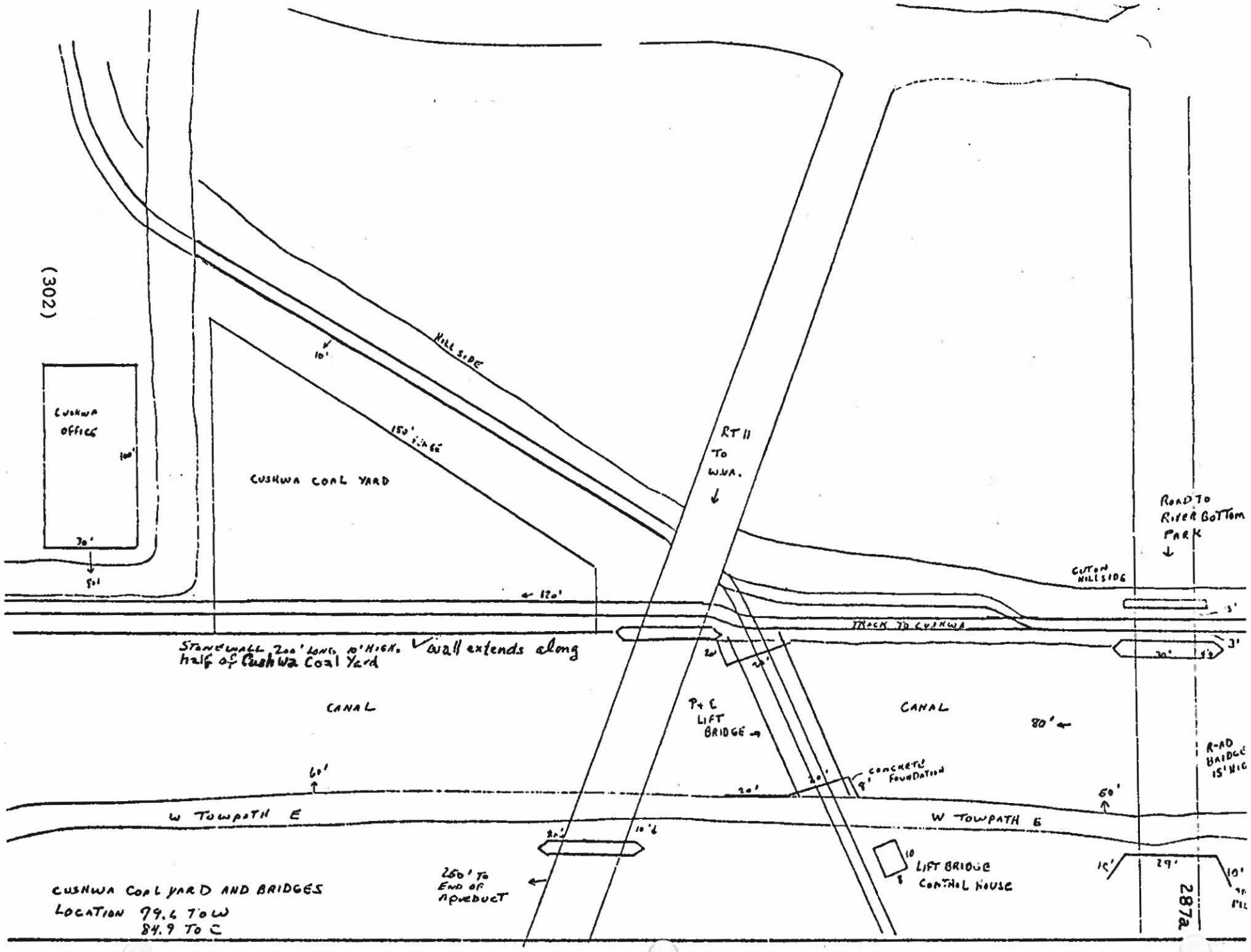
99.66 (99.50) HIGHWAY BRIDGE, U.S.11 This bridge was constructed in 1908-09 by the Washington and Berkeley Bridge Company. It was fabricated by the Pennsylvania Steel Company and opened August 10, 1909. It consists of ~~15~~ 16 spans, piers 30' wide incl. 1 over canal.

each 100 ft. long and 2 spans each 90 ft. long. All are through plate girders, 42 ft. above river. The bridge is 1680 ft. long. Dec. 6, 1908 during construction, at about 9 AM, the top of pier 11 under traveller, gave way and carried 14 men and the traveller into river. 8 men were killed. The concrete piers were recapped 1932 and the bridge was purchased by the Maryland State Roads Commission on December 31, 1953 for $900,000. A ferry and ford were at the site since 1744 and were known as Watkins, Lights, Lemons, and Ordingers Ferry. The town of Williamsport was founded in 1786 by C.H. Williams.

99.73 (99.59) WILLIAMSPORT (CUSHWA) BASIN Constructed 1835-38. The basin is triangular in plan with the apex to the north and is faced with limestone revetment. Coal was formerly transhipped to the Western Maryland Railroad at this point. The railroad was opened from Baltimore to Williamsport on November 27, 1873.

Concrete? wall on berm (stonewall?) 200 ft. long, 10 ft. high, canal 60 ft. wide - west of U.S. 11 Bridge

Cushwa building 100 ft. long x 30 ft. wide on canal, 80 ft. from canal At west end of office canal is 120 ft. wide??

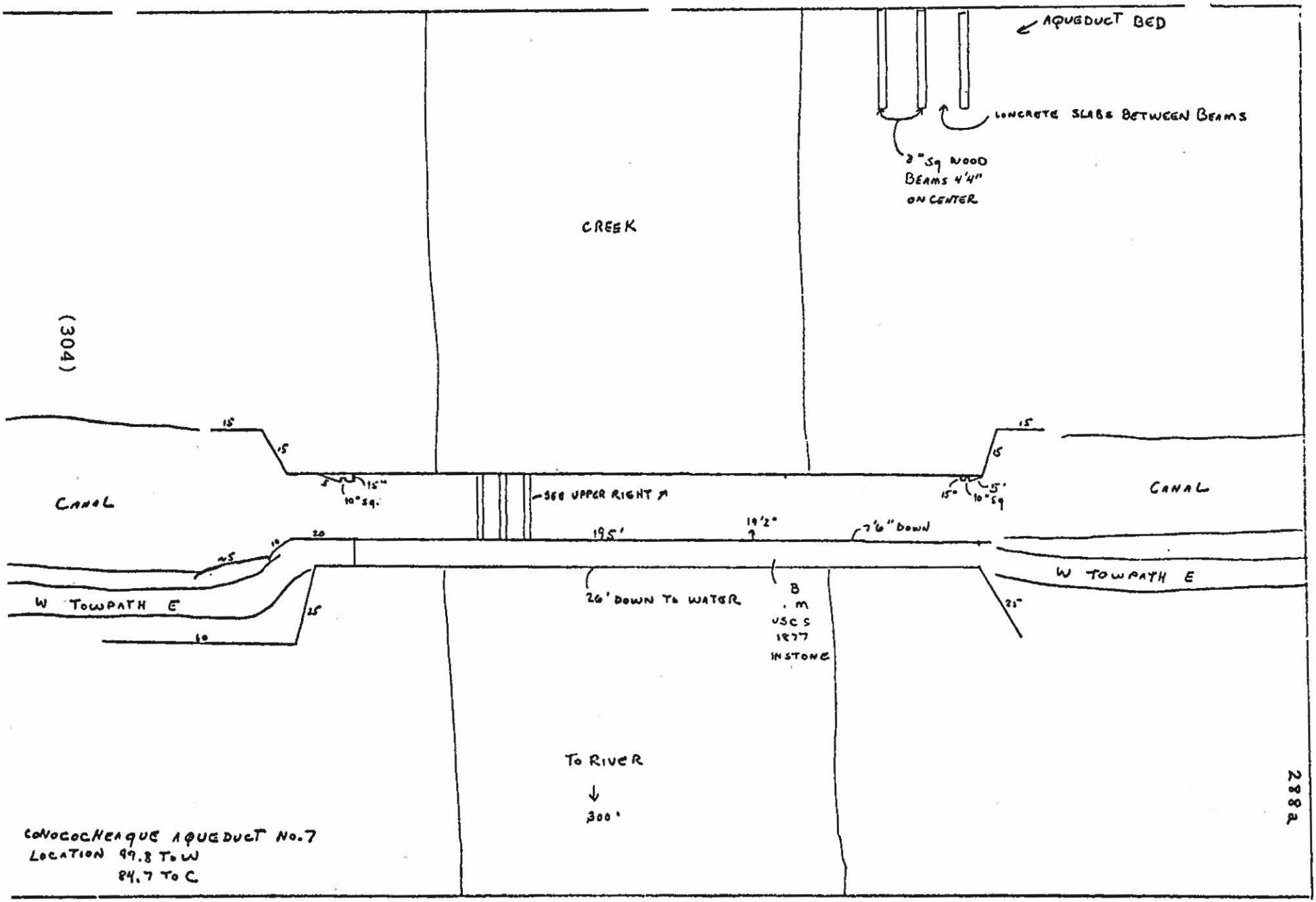

(302)
CUSHWA OFFICE
100'
30'
50'
HILL SIDE
10'
150' RIDGE
CUSHWA COAL YARD
RT 11
TO
W.VA.
ROAD TO
RIVER BOTTOM
PARK
CUT ON HILLSIDE
120'
TRACK TO CUSHWA
STONEWALL 200' LONG 10' HIGH. wall extends along half of Cushwa Coal Yard
CANAL
P+C
LIFT
BRIDGE
CANAL
80'
60'
20'
CONCRETE FOUNDATION
W TOWPATH E
W TOWPATH E
260' TO
END OF
AQUEDUCT
LIFT BRIDGE
CONTROL HOUSE
29'
287a
CUSHWA COAL YARD AND BRIDGES
LOCATION 79.6 TOW
84.9 TO C

99.80 474,42 CONOCOCHEAGUE (No. 5) AQUEDUCT Constructed Sketched

Toll keepers house at towpath just east of aqueduct (not seen 9.21.75)

1832-34, cost $66,759.79. The aqueduct has 3 segmental arches, each 60 ft. long with 15 ft. rises. There are 56 ringstones and a keystone in each arch. The overall length between abutments is 196 ft. and 254 between the ends of the wings. Ringstones and skewbacks are cut limestone with some concrete repairs to the ringstones near the skewbacks on the towing path side. The east arch on the berm is half concrete and the rest of the face of this arch has fallen. The coping and parapet are 7 ft. high on towing path side with the coping 30 ft. above the stream and 33 ft. above foundations of the piers. The parapet is 6 1/2 ft. wide at the top, 7 ft. wide at the bottom on the towing path side. The berm parapet was formerly 4 1/2 ft. wide at the top and 5 ft. wide at bottom. The piers are 16 ft. thick with pilasters (Tuscanian order) on the face of the piers, abutments and ends of wings. The abutments, faces

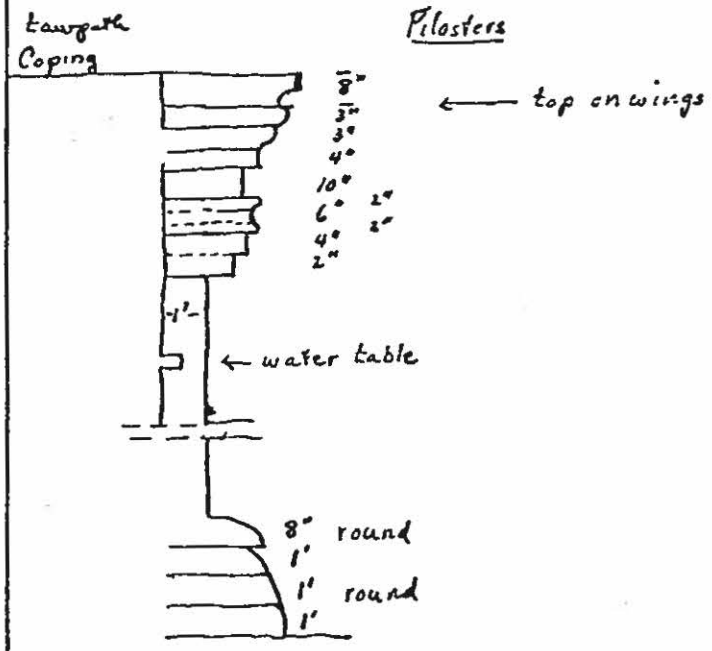
Wings flared \ 25 ft. long on towpath, 15 ft on berm



CONOCOCHEAGUE AQUEDUCT No. 7
LOCATION 99.8 To W
84.7 To C

August 13, 1971
1

Conococheague Aqueduct

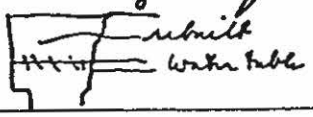


✓ East arch, town side, east ½ concrete
Rest'g arch face on town has fallen.
Centers for trunk: 8"×8", 4/ft. spacing, in cement at water table
West arch intact on town side.

✓ Bridge over canal at Williamsport: open (pony) span.

= 1.65 miles
El Cortez Motel 5.75 speedometer
Canal at Williamsport 7.40 " "

✓ Conococheague Aqueduct - Towpath side west end.



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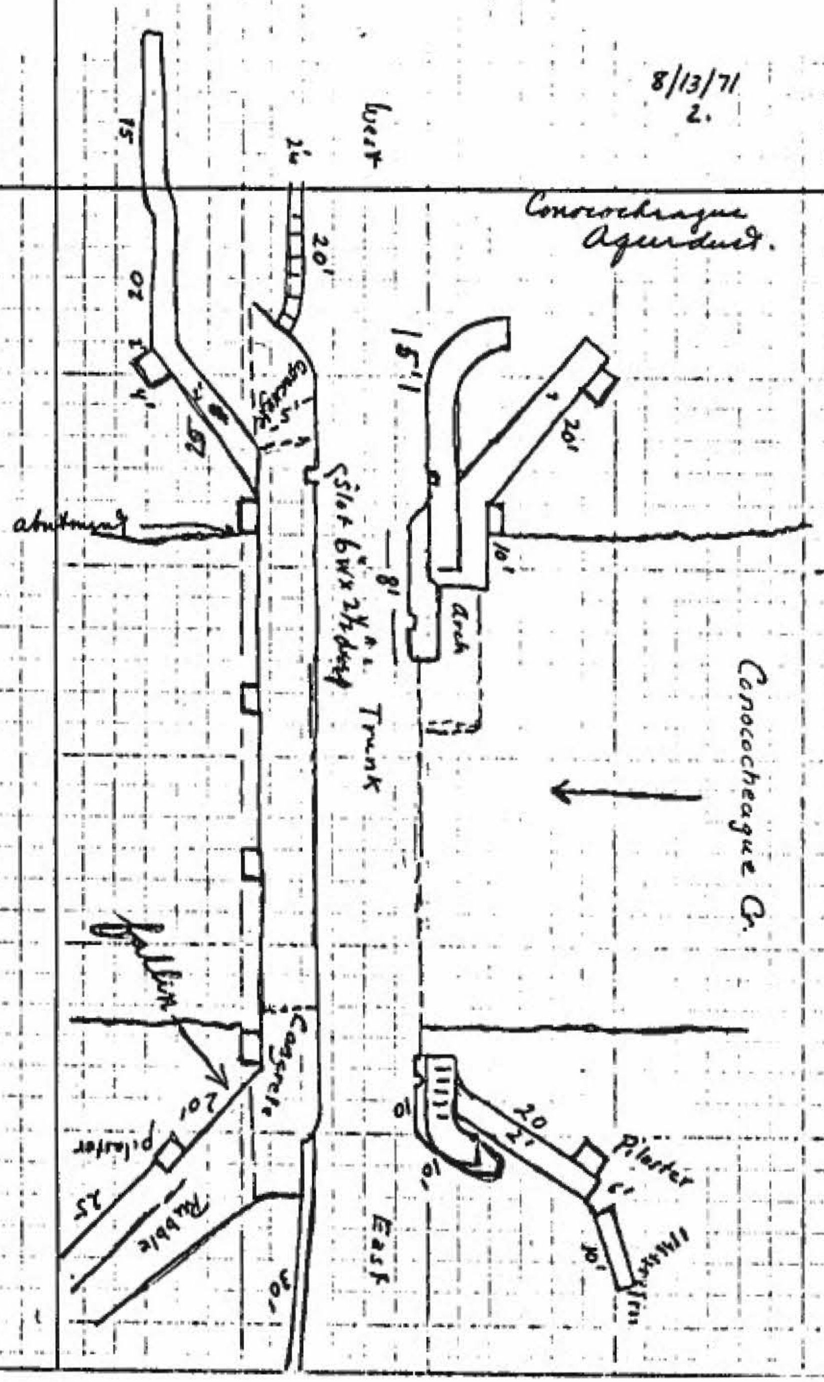

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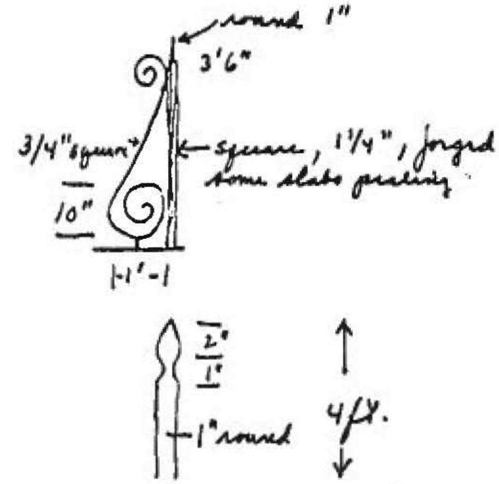
3

Conococheague Aqueduct

Railing –

Main verticals = 8 ft., 9 small rods between



Rails 8" apart. Only center part of railing remains plus a few square posts.

✓ Lock 44 – Swing gate with paddle levers in upper end; rotted. Breast at upper end of upper recess. Swing gate at lower end, intact, rotted. Revetment wall along berm in lower end: extension 52 paces long below lower wing; straight, towpath gradually rises in this distance. Spillway in berm side of revetment wall.

of piers, pilasters, water table and coping are cut limestone. The parapet, spandrels, wings, and piers are hammer-dressed and ranged limestone. Stone for the aqueduct came from a quarry 3 miles away. The iron railing was placed on the towing path side in 1835. It has square posts, 1 1/2 inch on a side, 4 ft. 3 1/2 inches high, and the balusters are 1 inch rounds. Spiral side braces support the railing. The aqueduct leaked seriously after 1851 and the Confederate troops tore down 74 ft. of the aqueduct to canal level on August 4, 1863. All of the coping was thrown down and there was a 6 to 10 ft. opening for the width of the aqueduct in one arch. This damage was repaired in 1863. The top work was torn off again on July 18, 1864. The damaged areas of 1863 and 1864 are noticeable because they now contain areas of undersized stones, especially at the west end on the towing path side. The berm side, except for the ends of the parapet fell on March 5, 1865. The breach

was 115 ft. long and the shattered area 155 ft. long. Spandrels over the center arch also fell. A wooden trunk was put in the aqueduct and stonework was rebuilt 1869-71. The masonry wall on the lower end of theberm side fell March 9, 1887 and rebuilt. On , 1920 the berm parapet collapsed again carrying a barge, mules and crew into the creek. A wooden trunk was placed in the aqueduct with base beams of 8 inch timbers in concrete spaced 4 ft. apart.12 ft. vertical beams formed the side with slanting external timber braces. The aqueduct was the scene of riots in 1834 when several hundred Irish construction workers engaged in a fight and Federal troops were brought in to restore order.

Stonewall, 60 ft. long on towpath upstream at end of wing (Ketcham 1975)

474.50 - Entry on berm : basin? - possibly tanning boat basin cited as 99.86
474.66 - Brick factory buildings to north (also leather company)
MP 100 - 474.80

100.23 474.86 CULVERT 129 Constructed 1833-34. The semi circular arch is cut limestone with a 6 ft. span and a 3 ft. rise. On the face of the arch are 10 ringstones and a keystone Abutments are 2 ft. high and the coping is at the top of the arch. There is a 20 ft. embankment above the

Straight wings

1835 - 2/9 disorders near Lowell - all work stopped. Militia called
Hundreds men who would work

1834 - Jan 20 - Riots above mouth of Pequea
400 rioters, principally discharged men
2 companies of militia from Hagerstown
35 jailed Men injured

1835 - Contracts prohibit liquor on sections.

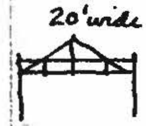
coping.
on Williamsport – Clear Spring Road = Hospital Hill = Cholera Cemetery.

100.69 *475.88* <u>CULVERT 131</u> Constructed 1833-34. The semi-circular arch is cut limestone with a ~~6~~ *4* ft. span and a ~~3~~ *2* ft. rise. 16 ringstones and a keystone are in the face of the arch. The parapet and coping are 4 ft. high. Abutments are 2 ft. high. A 20 ft. embankment is above the coping. *Straight wings; face etc. collapsed on berm.* *Embankment on berm from Conococheague Creek Aq. to Culvert 131.*

MP 101 475.75

101.00 *475.68 (E. end)* <u>HAGERSTOWN RESERVOIR</u> The high embankment to the north contains the reservoir. Water is pumped from the Potomac River. The structure was constructed in 1925 with later enlargements. *Parking, picnic tables.*

20' wide



2 spans, timber, + on river side, 12'

concrete steps

101.04 *475.85* <u>CULVERT ~~133~~ ?</u> *at west end of picnic area.* Original construction 1833-34. The culvert is now a concrete pipe, ~~2 ft.~~ *18 in.* in diameter with an overflow standpipe on the berm.

101.28 475.95 Jordan Jct. HBO 476.22 - sag 50 ft long + steephead gully to river; Two others to 476.30
476.30 - 476.70 = Culvert 134 - berm on embankment. 133?

102.00 *476.70* <u>CULVERT 134</u> Constructed 1833-34. The circular arch is cut limestone with a 6 ft. span and a 3

476.55 steephead ravine, riverside of towpath, large ponding area on berm, 200 ft. along canal. = old culvert? 3 steephead valleys in 150 ft. zone along towpath.

ft. rise. 10 ringstones and a keystone are in the face of the arch. The parapet and coping are 2 to 4 ft. high. The top of the coping sloped down to the west. Wings, parapet and spandrels are coursed limestone rubble. There is a 20 ft. embankment above the coping. Three timbers of the footing are washed out and exposed on the river side of the culvert. The west wing wall is also bulging. Extensive outcrops of Martinsburg Shale are in cuts along the Western Maryland Railway on the hillside to the north.

Embankment on berm to Culvert 134 at 476.70

flared wings, 45° Abutment 3 tiers: 3 ft.

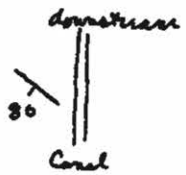
cross timbers show at base

476.72 Small limestone dock wall, beginning of faint S curve in canal
MP 102 476.78

102.00-103.50 1832-33 during construction of the canal, two temporary bridges were placed across the Potomac River in this area to obtain embankment material from Virgina. The bridges were swept away by the flood of January 14, 1834 and were not replaced. Canal Company records indicate that stop-gate was in this section of canal but no evidence remains of it today.

Protection wall on towpath begins at 102 and continues west to Culvert 135½.

476.80 - Omb - Martinsburg shale in low ledges on berm
Bluff 40' high.



102.02 Pinesburg Sta. Boat Basin - 100' x 250' long, indefinite berm in this area

476.85 - overfall ? for 120 ft. (50 paces long).

102.10 OUTCROP A ledge of Chambersburg Limestone is on the berm. The beds strike N15°E and dip 70°ESE. The exposure consists of dark gray cobbly limestone thrust eastward over the Martinsburg shale. Ledges to the west are massive, dark gray to black, dense limestone with some laminated beds. The limestone is part of the New Market Formation.

Diagram of Pinesburg Section original draft 6" x 18", final 2" x 6" from Sands and Neuman- GSA.

102.17 476.92 PINESBURG QUARRY An opening in ledge along the berm connects the quarry and the canal. Water pipes carrying water pumped from the river to the quarry cross the canal here. The ledges on the berm are Row Park Formation, light gray, fine grained to dense interbedded limestone and dolomite. Some of the calcite blebs in the shape of teardrops, other beds are pebbly. The limestone weathers to a light gray, chalky surfaces. The limestone has smooth

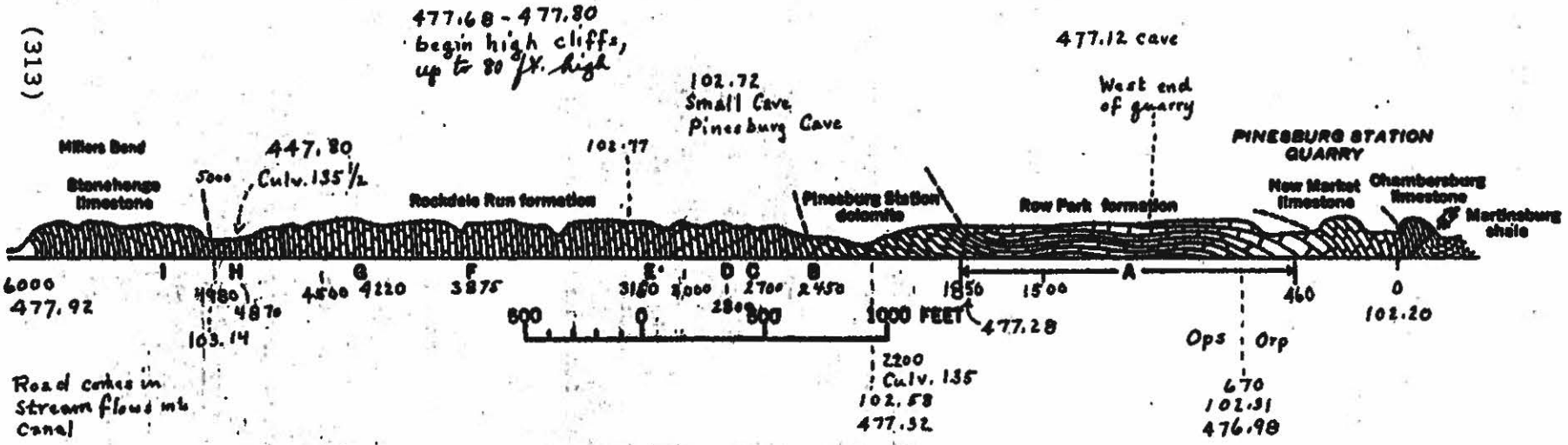


Figure 5. Profile of Ordovician rocks exposed at Stop 1 along Chesapeake and Ohio Canal between Pinesburg Station and Millers Bend, Washington County, Maryland. Thicknesses of formations as shown are not true thicknesses owing to angular relationships between traverse directions and strike of bedding. Localities A to I are approximately located.

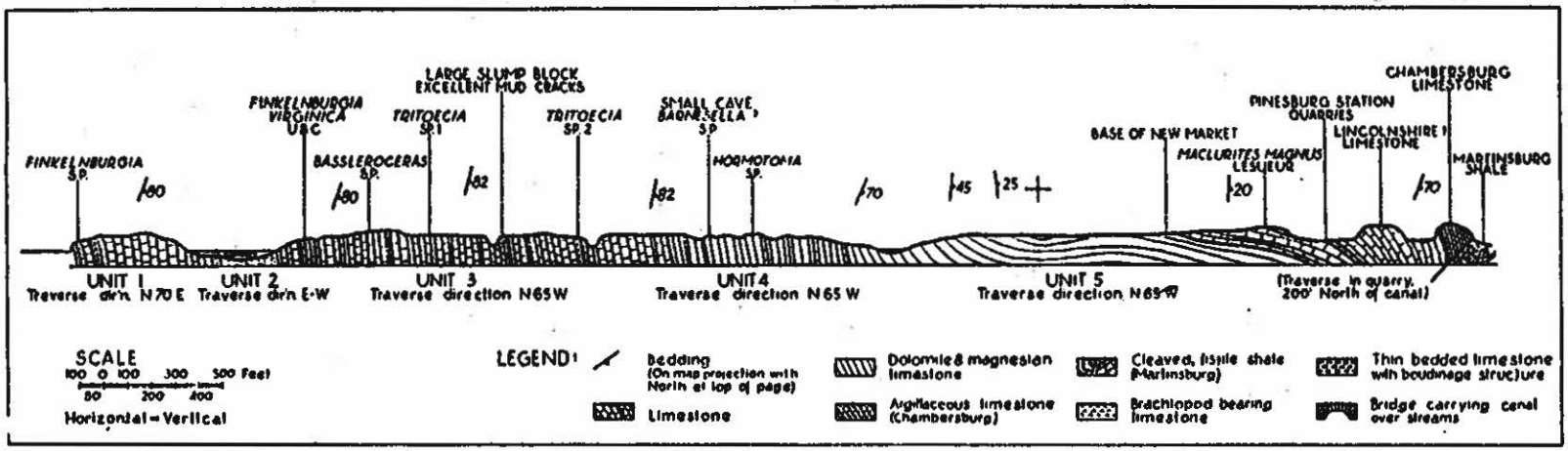
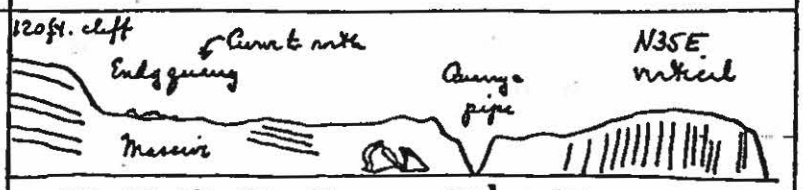


FIGURE 17. Section through Beekmantown along Chesapeake and Ohio Canal at Pinesburg Station (Measured by R. Neuman).

7/5/71 2



Outcrop of Martinsburg slate in cuts along WM Ry on hillside at west end of bottom land near Pinesburg Station.

MP 101 – at west end of Hagerstown Reservoir.

Green Spring Furnace

Slag dump
3 lateral roads + dump on east side of Cow Rd. Extends 0.1 mile along road north from farm road at south end. Edge of slate pit, large chunky gray slag. Sandstone boulders in ravine

McCoys Ferry Campground

Boat ramps, picnic, toilets, water from spring.

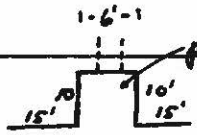
Fort Frederick

Spring, toilets in camp ground
Telephone; refreshments, museum, mail box – seasonal at Headquarters.
Interpretive talks – seasonal. Self guiding trail.
Picnic area – water fountain.

faces along joint surfaces and the dolomite beds highly fractured. The strike of beds is N12°W and the dip 20°E at east decreasing to apparently horizontal to the west (actual dip is 5° to the north)(Neuman, 1951).

102.44 CLIFF ON BERM Pinesburg Station Dolomite, fine to medium grained, gray to dark gray in beds up to 5 ft. thick forms a high cliff on the berm. Beds with laminations are common. White and black chert in bend and nodules is present. The beds strike N5°E to N5°W and dip 25° to 45°E increasing westward.

102.58 477.32 CULVERT 135 134.2 Constructed 1833-34. The semi-circular arch is cut limestone with a 6 ft. span and a 3 ft. rise. 10 ringstones and a keystone are in the face of the arch. Abutment: 3 stones = 3 ft. The parapet and coping are 4 ft. high and the abutment is 6 ft. high. Wing walls 15 ft. long are at right angles to the culvert face. Spandrels, parapet and wings are coursed



parapet + coping 7 stones = 8 ft.

limestone rubble. A 10 ft. embankment is above the coping. Ledges of Pinesburg Station Dolomite are west of the culvert with beds striking N15°E and dipping 70°ESE.

102.64-103.10 OUTCROP 75 to 100 ft. cliffs are on the berm. The eastern third of the outcrop (102.64-102.77) is dominantly light gray, mottled, laminated dolomite with interbedded light gray to blue gray, fine grained limestone (Rockdale Run Formation). Agal masses are common with a prominent one at the east end. Some regular chert is in the limestone. Thick dolomite beds are near the west end. The western part of the outcrop is argillaceous limestone with interbedded dolomite; white and black chert nodules are common. Beds are up to 6 ft. thick, laminated with small folds in the laminae. Some algal masses are present. The beds strike N15°E and dip 80° to 82°ESE (Sando, 1957). The Pinesburg Cave (102.74) is near the top of the cliff on the west side of narrow steep ravine. It is a small

passage about 45 ft. long.

103.16 CULVERT 135 1/2 (135?) Constructed 1834-35. The semicircular arch is cut gray limestone. The span is 4 ft. with a 2 ft. rise. 8 ringstones and a keystone are in the face of the arch. The abutment is 10 ft. high. Wings are at right angles to culvert face. The parapet and coping are 4 ft. high. Spandrels, wings, and parapet are coursed limestone rubble. A 10 ft. embankment is above the coping.

20ft. parapet + coping on berm. 4ft. embankment above coping.

103.1 - Site of Rhodes Warehouse, 20ft. from canal on berm - no longer standing.

103.20-103-32 OUTCROP Low ledges on the berm of Rockdale Run Formation extending to 130.26. To west is Stonehenge Limestone which is light and pebble conglomerate zones are present. The beds are knobby, about 1 ft. thick and strike N40°E, dip 76°SE at east end. 250 ft. west at a small ravine, is an anticline, overturned to the east. Here the strike is N45°E and the dip 75°NW (overturned) on the east limb. The strike is N40°E and the dip is 37°NW on the

at west end of Keumen's geologic section.

Short stone wall on berm at valley at end of geologic section.
West of section, poor outcrop; strike parallel to canal; dip 60° towards canal
Limestone bluffs end at house at 478.10

west limb. Stonehenge Limestone on the west limb crops out to 103.32.

103.32 SITE OF WHARF A wharf was formerly on the berm. A boom is on the towing path side of the canal at this point.

103.48 478.10 Dock + basin, Section Head quarters.

103.50 478.35 OUTCROP A prominent cliff on the West Virginia side of the river is formed of Rockdale Run Limestone. Beds strike N40°E and dip 60°SE. Upstream and to the west of the towing path are 4 levels of gravel-strewn terraces continuing around Millers Bend.

Diagram of terraces 8" x 10 1/2, reduced to 4" x 2"

MP 104 478.78 (clearing)

104.40 479.00 - 479.20 OUTCROP Cliffs 100 to 150 ft. high on West Virginia side are formed of limestone. The Rockdale Run Formation is in the lower part and the Pinesburg Station Dolomite is in upper part of the cliff. The beds are 10 to 20 ft. thick.

Vista of river at 479.10

104.61 479.39 Breakwater, towpath to river - not seen 1975.

2-storey frame house 20' 40'

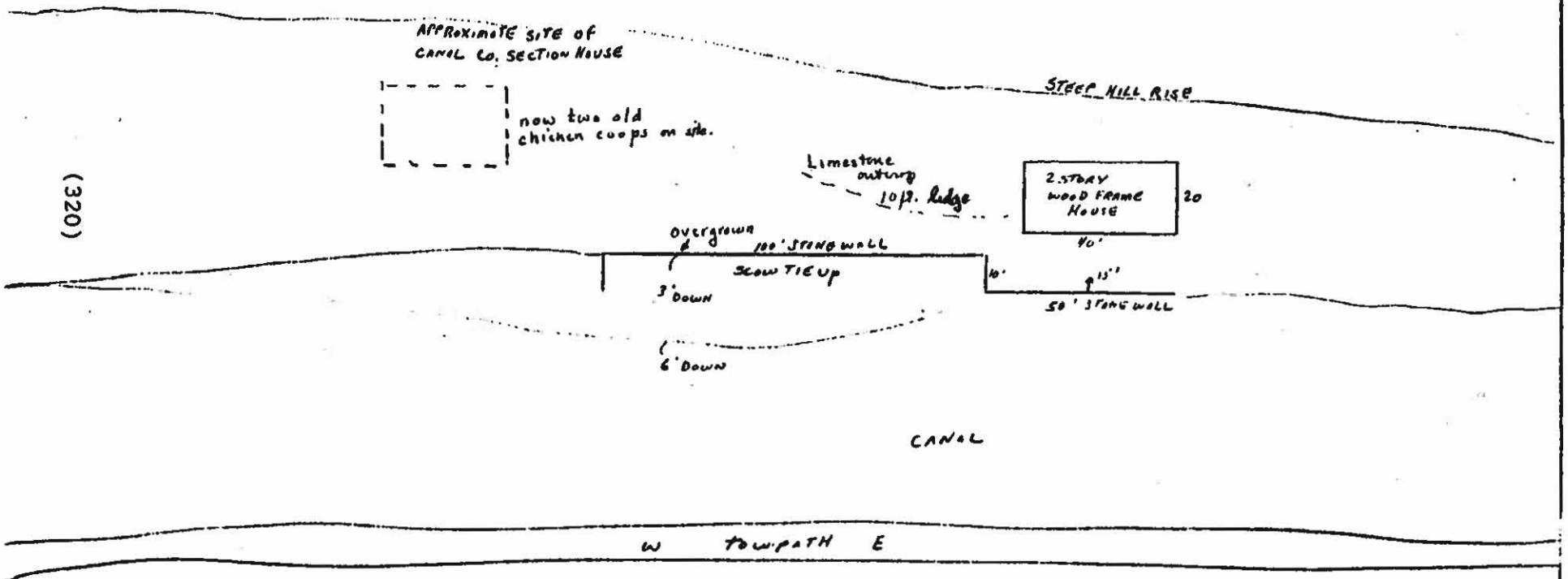
50' long stone wall

10'

Stone wall 3ft. high, 100' long

Canal

Site of old section house



CANAL CO SECTION HOUSE
LOCATION 103.4 TO W
81.1 TO C

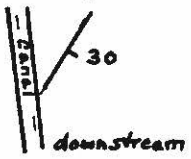
P. 297a.
478.10

479.50 - Pile of stones 15' wide on riverside of towpath; stripped ravine leads to river.

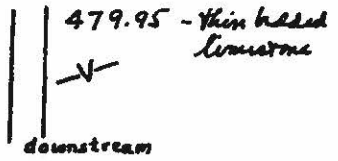
104.90 479.60 PIERS OF RAILROAD BRIDGE The Charlton Branch, Western Maryland Railway formerly crossed bridge here and connected with Nestles Quarry on West Virginia side of river. 11 concrete piers, formerly carried 12 deck plate girder spans, each 100 ft. long. The piers are 42 ft. high above low water level, 23 ft. higher than the towing path. The bridge was built 1912-1913 and dismantled in .

MP 105 479.75

105.05 479.79 OUTCROP ON BERM The ledges are formed of gray limestone, Rockdale Run Formation.



105.25 479.98 OUTCROP ON BERM Ledges of Stonehenge Limestone are on the berm. The beds are 1 ft. thick and strike N42°E, dip 66°SE.

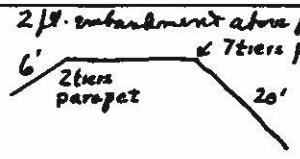


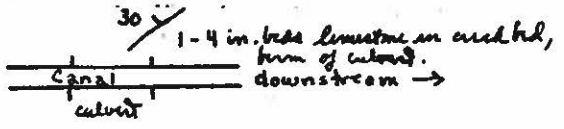
480.18 Low stripped ravine to river, 15 ft. wide.

105.50 X WASTE WEIR This structure is a concrete frame with 3 gates for board inserts. This structure is misplaced; no waste weir in this section. (481.92').

106.04 480.65 CULVERT 136 LITTLE CONOCOCHEAGUE CREEK, constructed 1833-34. The semicircular arch is cut limestone

480.65
482.26





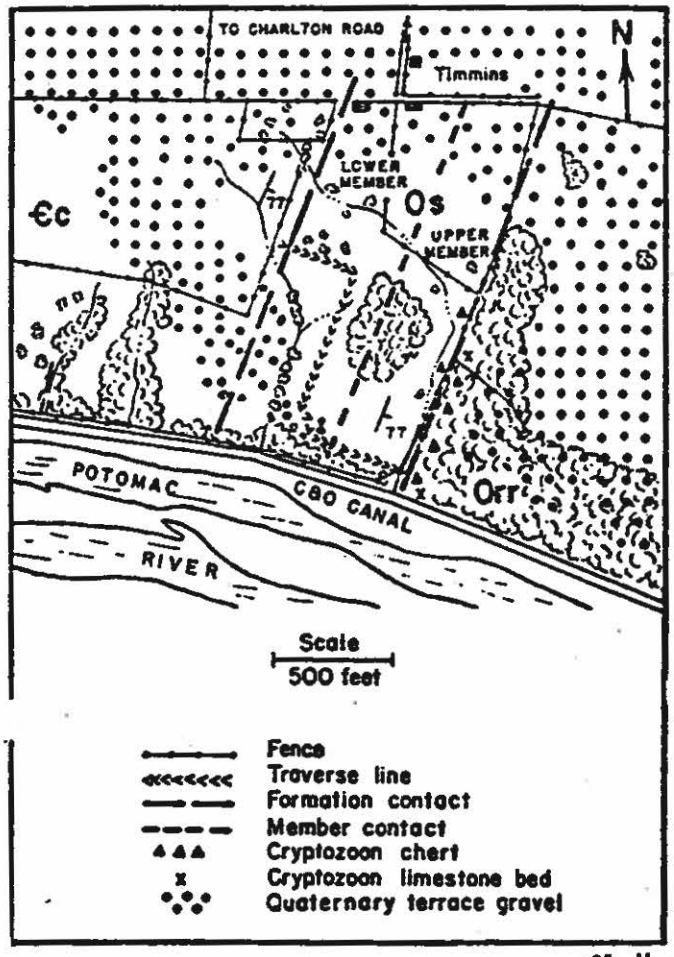


FIGURE 13.—*Sketch Map of Geologic Section 6* Charlton

24 ft. check specs.

with a 20 ft. span and a 10 ft. rise. 30 ringstones and a keystone are in the face above water level. The parapet is up to 8 ft. high. The top of the parapet slopes and there is no coping. The wings on both sides of the culvert are flared. Spandrels, parapet, and wings are coursed limestone rubble. A 4 ft. embankment is above the stonework. The culvert was seriously damaged by a freshet in 1926. Limestone, Conococheague Formation, crops out in the stream bed on the berm. The rock beds are 1 to 5 ft. thick and strike N55°E, dip 45°NW. Musselkauffs (Clarks) Mill was formerly 1,500 ft. up Conocheague Creek. A low gravel-strewn terrace on berm extends for one-half mile to the west of the culvert.

105.64 - Middle Kauf Cemetery, 270 ft. from bdm; on hill 50 ft. abm canal
MP 106 - 482.35
106.17 Loading basin; not seen (1975) access road here
106.20 Charles Mill, house + dam on barn - (Check for correct name).

106.61 482.80 WASTE WEIR This structure is a concrete frame
Concrete wings at right angles, both sides, 10 ft. long on prism side; 20 ft. long on river side
with 3 gates for board inserts.

106.61-106.78 REVETMENT A large pile of river cobbles

Grading of path Earth, rutted

Crushed shale

and boulders, up to 1 ft. diameter, are on the river side of the towing path. Near Dam no. 5 and at the east near the waste weir the revetment is coursed limestone.

106.78 (106.40) 483.00 DAM no. 5 Diagram plan on hand Constructed 1833-35. It was originally a timber crib dam filled with stone, similar to the original Dam no. 4. Concrete wall across head of lock at Dam no. 5; constructed 1956. The remains of the original dam are submerged directly behind the present dam. The original dam was 706 ft. long and 16 ft. high with a front slope 1 ft. vertical to 1 1/2 ft. horizontal and a backslope 1 ft. vertical to 2 ft. horizontal. The dam cost $66,533 and the guard lock $8,428. A temporary lock and culvert on the West Virginia side for water supply to a mill added $6,963 to the cost. The dam was breached in 1840 and the abutment on the West Virginia side was washed out in 1847. The dam was extensively rebuilt in 1854. A freshet in February, 1857 swept away 500 ft. of the dam and repairs were swept away in April and May, 1857. Temporary cribs were set to

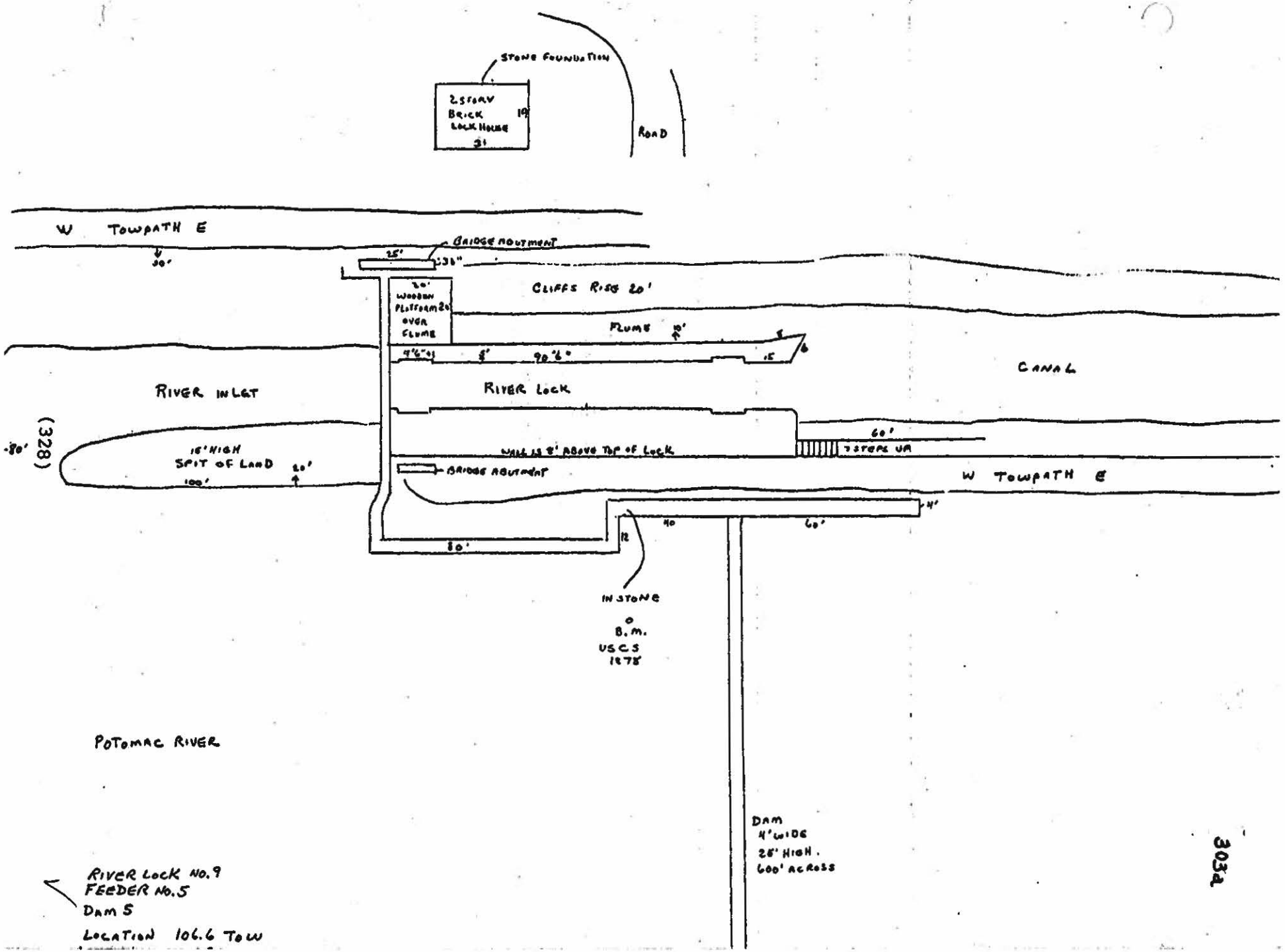
fill the breach. A masonry dam was started in 1857. Limestone for this dam was from a quarry near the West Virginia abutment. The guard lock was washed out in 1859. The West Virginia abutment was carried away in 1860 and rebuilt. The Confederates tried unsuccessfully to breach the dam on December 17 and 20, 1861 by diverting the river around the West Virginia abutment. Floods in 1862 swept away the temporary cribbing in the old dam. Much of the new masonry was swept away in the freshet of 1866 and some masonry was lost in the flood of 1867. The masonry dam was completed in 1873 after delays from the Civil War during which the contractor, William Brown, was arrested and held at Ft. McHenry several months on trumped-up charges of treason. The masonry dam cost $205,000 and is ~~706~~ 711 ft. long, 21 to 22 ft. high with a crest 12 ft. wide. The dam has a curve towards downstream on the West Virginia side. The dam and guard lock are constructed of coursed rubble of Conococheague

limestone, faced with rough, hammer-dressed blocks. The abutments are rubble limestone masonry laid in mortar. The flood of 1877 severely damaged the abutments. The West Virginia abutment was rebuilt in 1891. The power plant on the West Virginia side was installed by the Martinsburg Power Company in 1917 and is now operated by the Potomac Edison Company. The power house is brick on a concrete base. The pool behind dam is 6 miles long. The guard lock is constructed of limestone. For almost 20 years after the canal was opened a ledge of limestone above the upper recess caused boats to ground. It was blasted out in 1856. There is no breast wall in the lock. A pivot bridge was built over the guard lock in 1838. The towing path cross-over bridge was formerly at the head of the lock. The remains of an old crib fender, 15 ft. long, is at the lower end of the lock. The flume is on the berm side of the lock with a concrete stop gate at the head. The lockhouse is

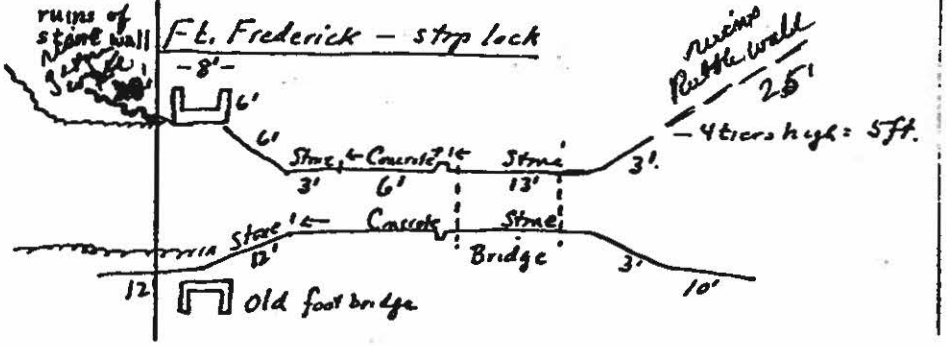
on the hill on the berm side of the guard lock. It is a 1 1/2 story, whitewashed brick structure, on rubble foundation; constructed in 1837. A wall of coursed limestone rubble is on the towing path from the abutment of the dam downstream for 250 ft. The inner and outer faces of the wall slope 45° and the wall has partly collapsed 75 ft. from the dam.

An outcrop of limestone of the Conococheague Formation is on the berm at the guard lock. It is well-bedded and the beds strike N45°E and dip 70°SE.

Above Dam no. 5 boats used the canal formed by an embankment along shore of pool for 1200 ft. and then entered slackwater in the pool for 0.4 miles. The towing path along the bank of the pool was constructed in 1837-38. The canal was opened to Dam no. 5 in April, 1835.

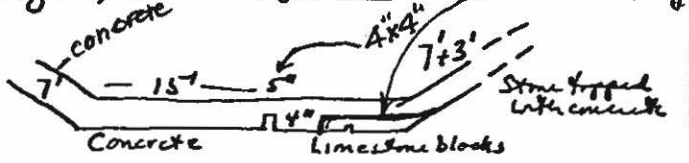

STONE FOUNDATION
2 STORY BRICK LOCK HOUSE
19'
31'
ROAD
W TOWPATH E
30'
BRIDGE ABUTMENT
25'
36"
20' WOODEN PLATFORM 20' OVER FLUME
CLIFFS RISE 20'
FLUME
10'
9'6"
8'
90'6"
15'
CANAL
RIVER INLET
RIVER LOCK
80'
(328)
16' HIGH SPIT OF LAND
100'
20'
WALL IS 8' ABOVE TOP OF LOCK
60'
7 STONE UP
BRIDGE ABUTMENT
W TOWPATH E
4'
40'
60'
12'
80'
IN STONE
O
B.M.
USCS
1875
POTOMAC RIVER
DAM
4' WIDE
25' HIGH.
600' ACROSS
303a
RIVER LOCK NO. 9
FEEDER NO. 5
DAM 5
LOCATION 106.6 TOW

Ft. Frederick – Stop lock

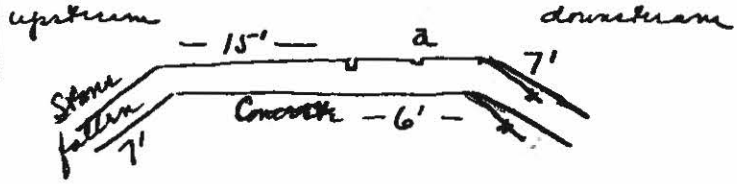


3.

Stop gate, abv Big Pool.



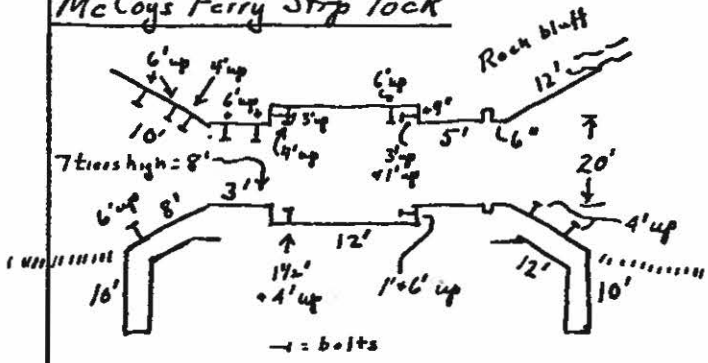
inset for planks 10"h x 4" deep 6'l. just below hole



Masonry is limestone blocks and boulders of sandstone.

a: round hole 6" diameter, for horizontal timber, 1½ ft. below top of coping.

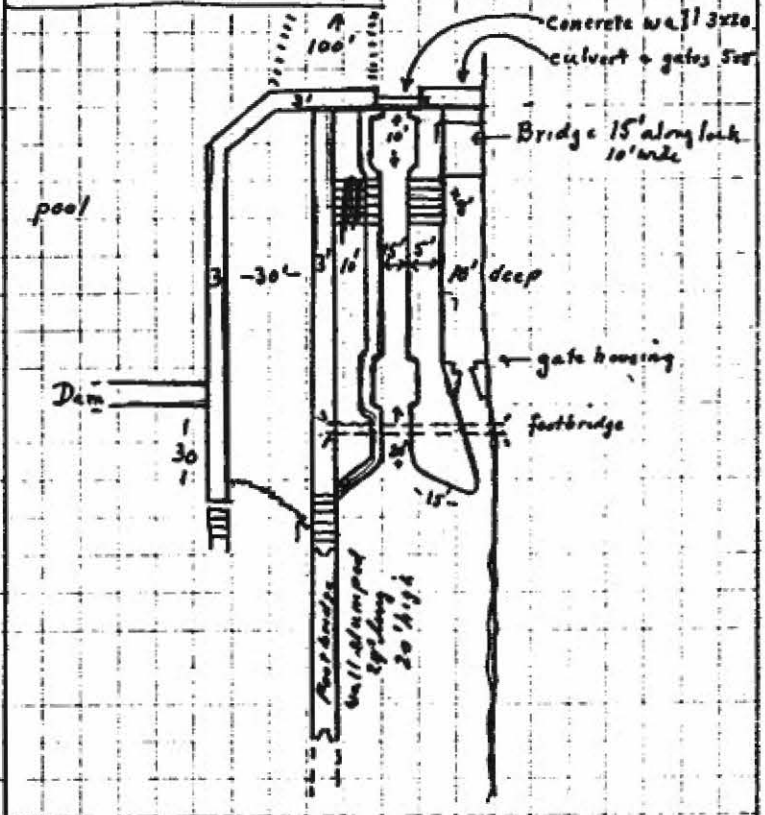
McCoys Ferry Stop lock



Slot: 3½" w x 3" deep in lower 5 ft.;
2" w x 3" deep in upper 2 ft.

8/22/71
2

Dam 5 & Guard Lock 5



No upper or lower extension.
1½ x 12" clamps bind stones.

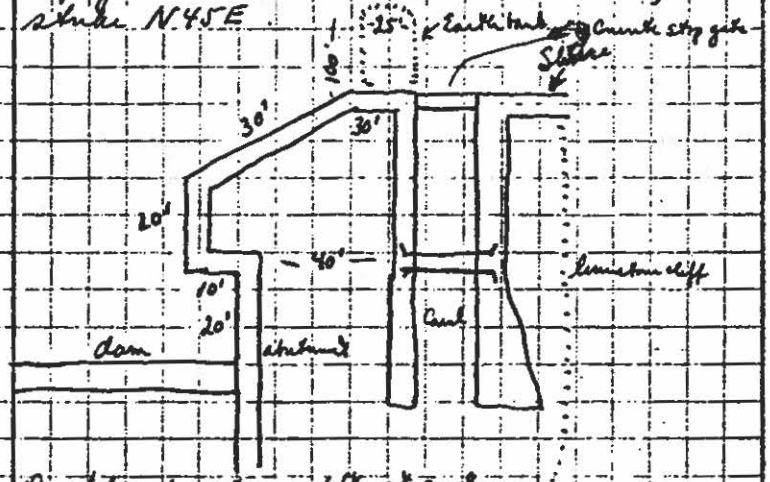
4/28/71
3

✓ 13255 (106.6) Waste weir - concrete frame, trapezoidal

✓ Dam 5 - & guard lock.
Foundation = brick (whitewashed) on rubble limestone on hill on berm.
Parking at dam.
Limestone abutments

line of dam
S N

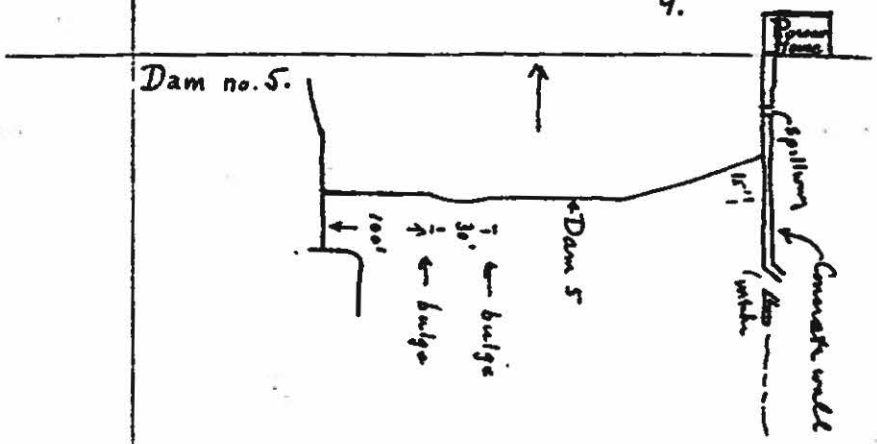
Powerhouse brick on concrete base; concrete cap of dam above.
Dip of limestone at dam = 60° upstream, strike N 45 E



Downhill on downstream 1 ft. at center

✓

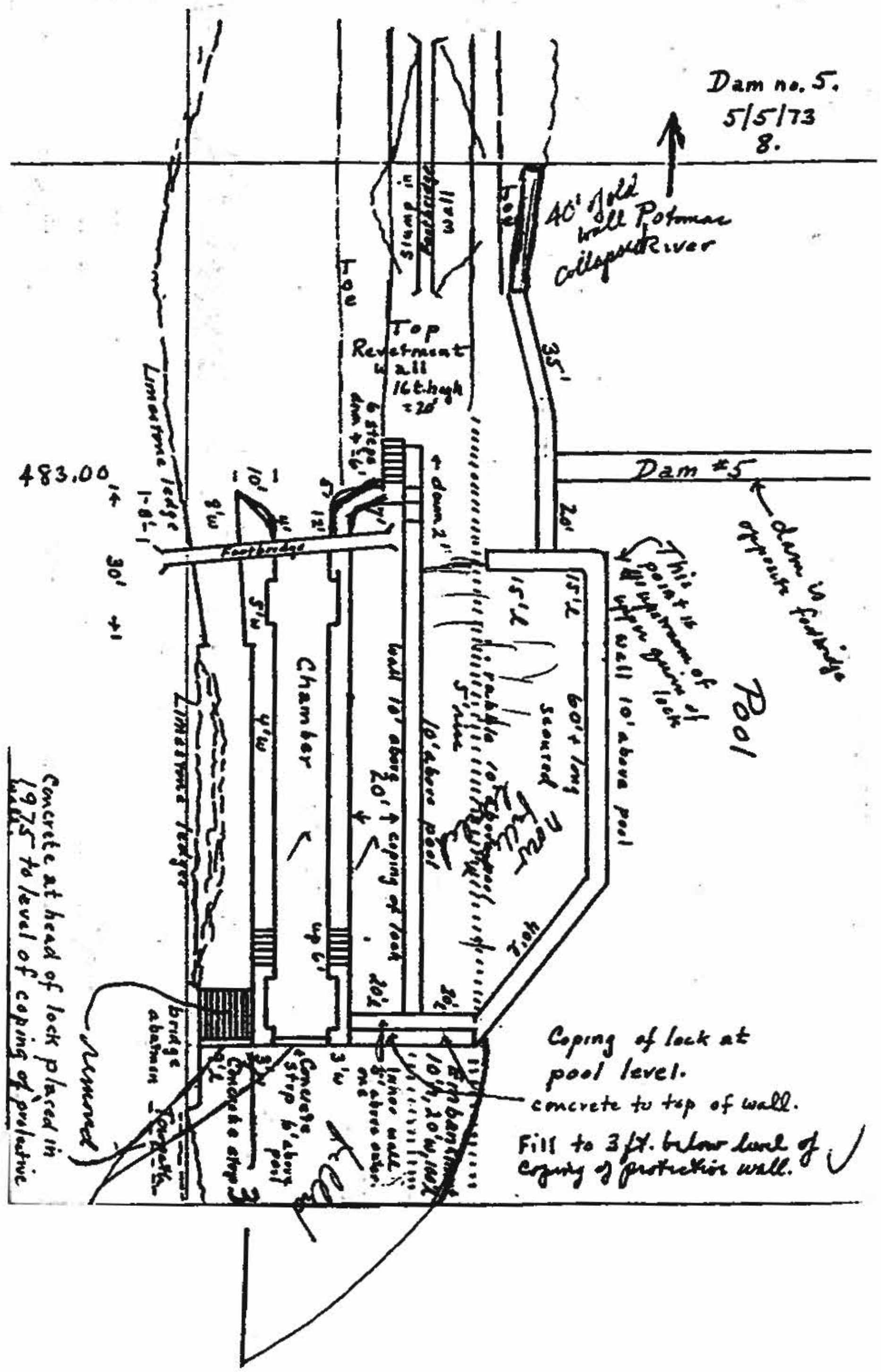
5/5/73
9.



76 paces – dam 5 to lower end of powerhouse.

Lower end lock to footbridge 9 paces
footbridge +40 paces
Lower end footbridge to lower end revetment wall +78 paces
to lower end of boulders and limestone blocks
of loose revetment +150 paces

There are notches for timbers (chingus) across
lower end of flume = old shed.


Dam no. 5.
5/5/73
8.
483.00
Dam #5
Pool
Chamber
Coping of lock at
pool level.
concrete to top of wall.
Fill to 3 ft. below level of
coping of protection wall.

Plan of dam- 8^h x 10^w, 3^h h 4^w final

106.78-106.87 Section of rocks, Ham no. 5 to Charles Hill on hand.
(106.40-106.49) OUTCROP Ledges along the towing path are ~~(106.40-106.49)~~ formed of dark gray to black, dense limestone (Conococheague Formation). A pile of river-worn cobbles and boulders fill a pocket in the limestone at 106.82. A low ledge of limestone with beds 1/2 to 2 ft. thick is at 106.85. The limestone has a prominent slickensided plane indicating that rock on the east side of the plane moved up with respect to that on the west. A small solution cavity is at the level of the towing path in this ledge.

106.90 OUTCROP A prominent cliff is on the river edge. On the downstream side there is an alcove with small solution openings containing orange brown silt; one opening is 10 ft. wide, 3 ft. high andconnects with a small,

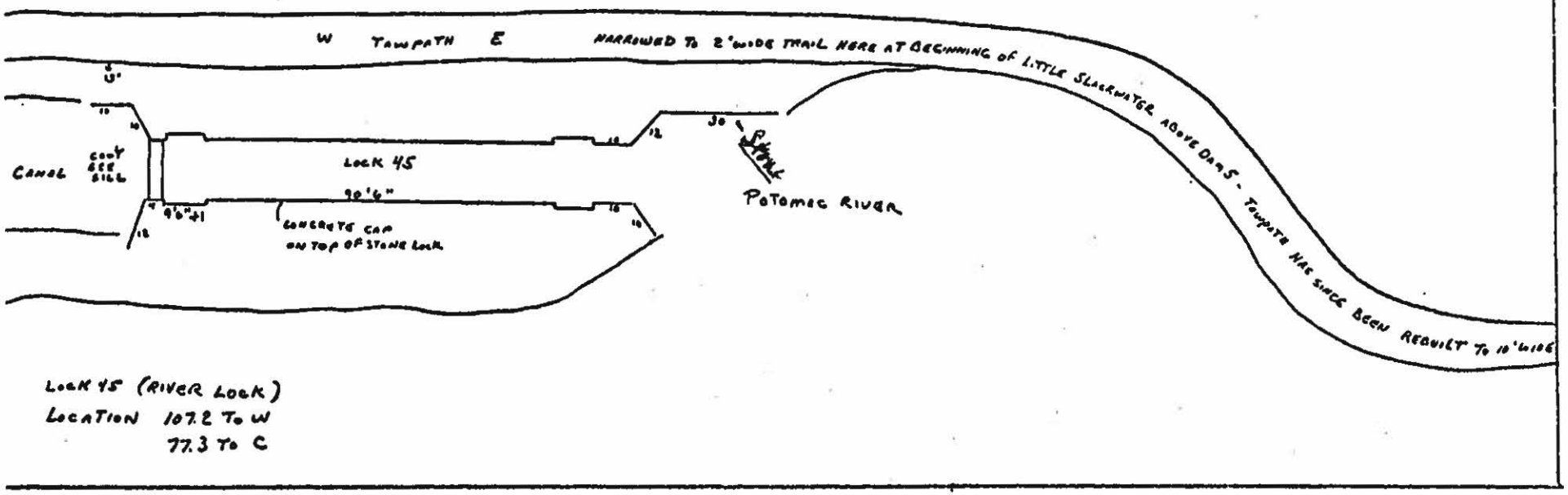
low passage trending northeast for 60 ft. from the entrance. A solution cavity in the face of the cliff, 5 ft. in diameter, 15 ft. long, is connected to a gravel filled fissure sloping upstream. The limestone is dark gray, fine grained with calcite veins, parallel to the beds. Beds are 1/2 to 3 ft. thick and strike N10°W, dip 70-80°E. to vertical. Small solution caves are in the alcove to north of the cliff.

Diagram. Exposures Dam 5→Lock 45→Lock 47.
Field notes 6/27/71-p. 3-10.

106.96-106.99 OUTCROP A cliff 40 ft. high juts out into river at this point. It is formed of limestone of the Rockdale Run Formation on the east (downstream) side of the cliff and Stonehenge Limestone on the upstream side. The limestone is dark gray to black, dense in irregular wavy beds about 1 ft. thick with thin, brown wavy clay layers and calcite streaks. The beds strike N10°E. Joints strike N75°W, dip 85°SW; N50°W, dip 70°SW; N50°W, dip 65°NE; N80°W,

dip 20°SW; N80°W, dip 20°NE. A small solution opening is at towing path level at the south end of the cliff and a fissure cave dipping 60°NW (upstream) is near the center of the cliff. It is 2 to 10 ft. wide, 20 ft. long, with a room 10 ft. in diameter, at the top. The fissure contains orange-brown silt. Dangerous loose rocks are in the room. Red stained slickensides below the fissure show horizontal movement with upstream side of the plane moved north with respect to the downstream side. A small keyhole- shaped solution opening is at the north end of the cliff at the level of the towing path. Caves in this cliff and one to the south are known as Two Locks Caves (Franz-Slifer 1971, p. 100). Small solution openings are along the towing path in the alcove northwest of the cliff.

107.15 483.54 LOCK 45 7 ft. lift, constructed 1833-36. This is an outlet lock connecting the canal with the pool behind Dam no. 5. It is constructed of hammer-dressed limestone



LOCK 45 (RIVER LOCK)
LOCATION 107.2 TO W
77.3 TO C

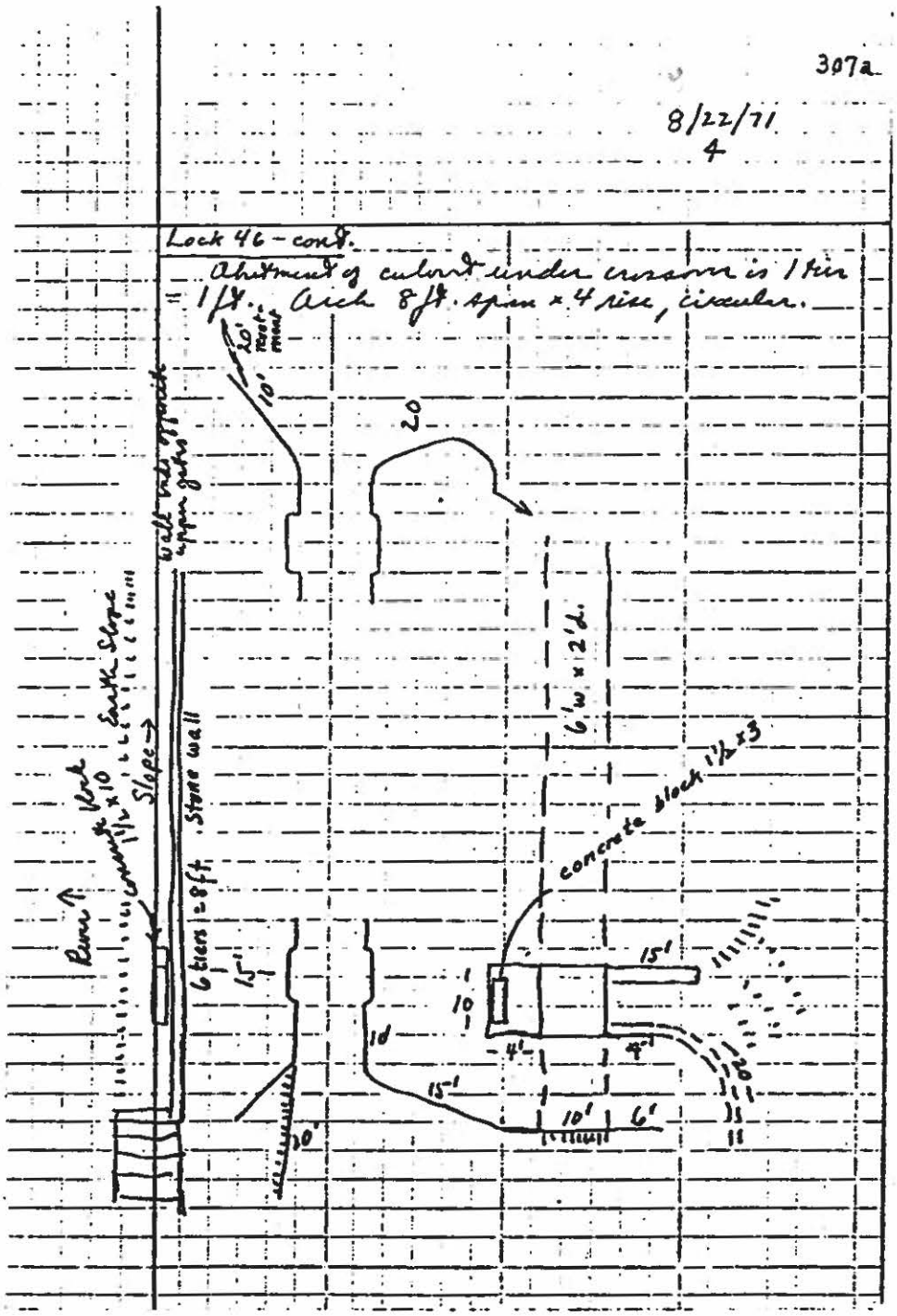
with a concrete coping. Much of the lock is covered by silt deposited from high water. The towing path is on the land side (berm) of lock. Low ledges of Stonehenge Limestone are on berm grading west (between Locks 45 and 46) into limestones of the Conococheague Formation. The beds strike N40°E and dip 45°SE.

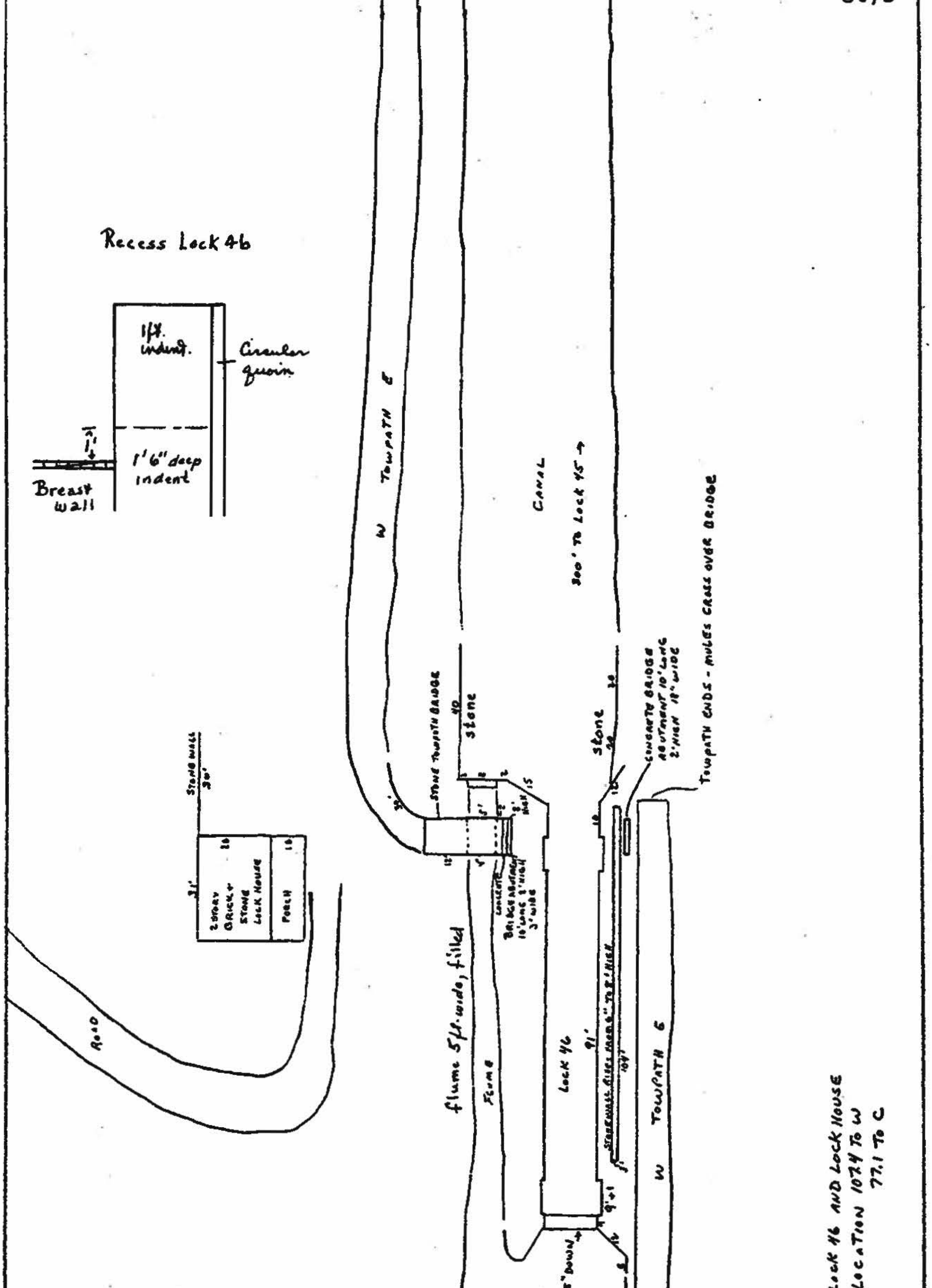
483.68
107.43 ^ LOCK 46 7 ft. lift, Sketch plan on hand constructed 1836-38. The face is hammer-dressed limestone. A culvert with a semi-circular arch with a span of 8 ft. crosses the flume on the berm. It is constructed of limestone and served as an abutment for the towing path crossover bridge. 10 ring-stones and a keystone are in the arch. The abutment is 1 ft. high and the parapet is 3 ft. high. The bridge was 8 ft., 6 inches above the coping of the lock on the berm and 8 ft. on the towing path (river) side of the lock. An inclined approach to the bridge is on the towing path side of Stub's warehouse + Newkirk's store formerly at Lock 46.

8/22/71
4

Lock 46 - cont.

Abutment of culvert under crossover is 1 ft = 1 ft. Arch 8 ft. span × 4 rise, circular.




Recess Lock 46
1 ft. indent.
Circular quoin
1'
1'6" deep indent
Breast wall
TOWPATH E
W
CANAL
300' TO LOCK 45 →
TOWPATH ENDS - MULES CROSS OVER BRIDGE
CONCRETE BRIDGE ABUTMENT 10' LONG 2' HIGH 18" WIDE
stone
STONE TOWPATH BRIDGE
stone
STONE WALL
2 STORY BRICK + STONE LOCK HOUSE
PORCH
ROAD
flume 5 ft. wide, filled
FLUME
LOCK 46
91'
107'
TOWPATH E
W
8'8" DOWN
CANAL
LOCK 46 AND LOCK HOUSE
LOCATION 107.4 TO W
77.1 TO C

the lock. It is90 ft. long. The bridge was a timber, queen-post truss. A pivot bridge, constructed in 1838, also was over lock. The spillway to the flume is on the face of the flume 15 ft. from lock, 5 ft. wide. lock, berm side, and is an overfall 8 ft. high. The lock-house on the berm side is 1 1/2 story brick on a limestone foundation. It was constructed in 1837. Steels Warehouse was formerly on the berm near Lock 46.

107.63 483.90 OVERFALL (WASTE WEIR 51) Diagram on hand Constructed 1837. The walls and spillway are dressed limestone. The abutment of the spillway rises 2 ft. above the spillway. The overfall is 70 ft. long. There is a good view of the flood plain on the West Virginia shore at this point.

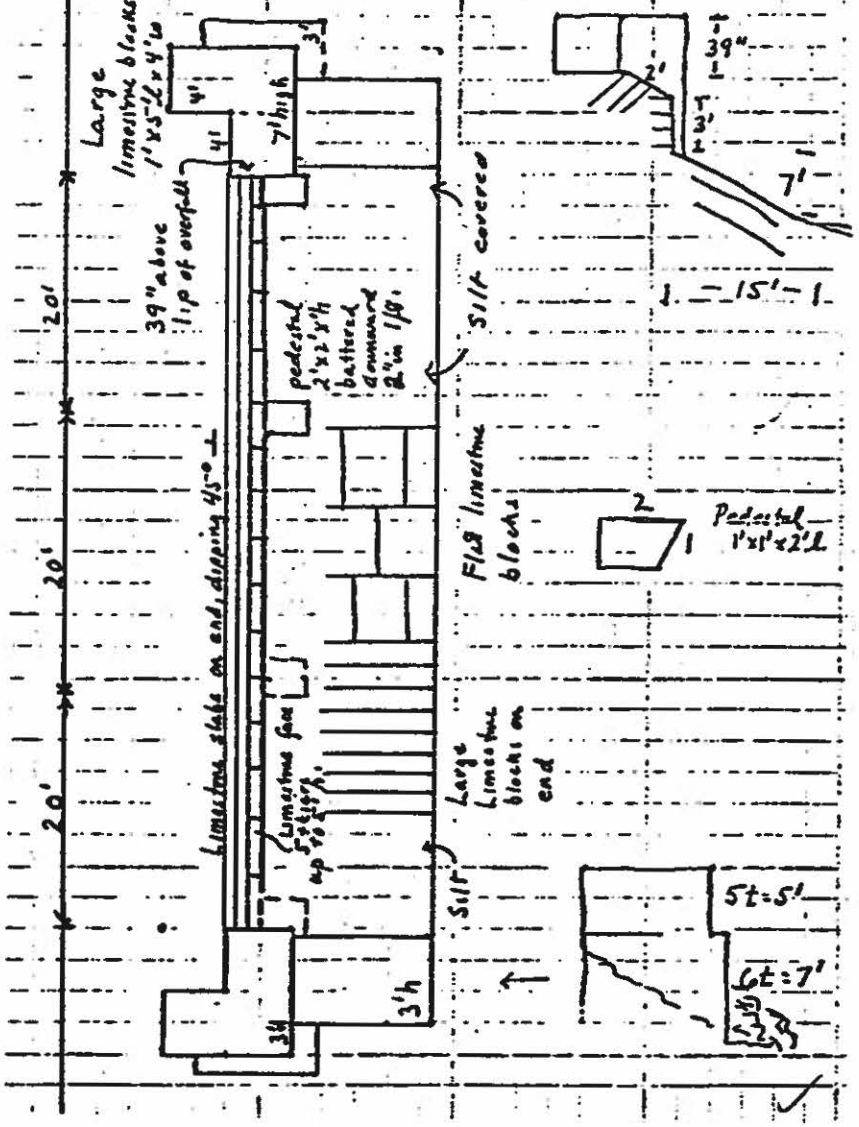
107.64 Boat basin + boat repair facility 50'/100' downstream →

107.75 OUTCROP A limestone bluff on the berm is formed of limestone, Conococheague Formation. The east part is massive and the west part thin-bedded with chert zones up to a foot thick. The beds strike N40°E. and dip 50°SE.

308a

5/5/73
7.

Overfall - 448/458 psia atm (upstream) of Lock 46.



Profile of section 107.75-108.44
8^h x 14^w original = 4^h x 7^w final- arrange sideways on page.

107.78 OUTCROP A small limestone bluff is on the berm. Beds of the Conococheague Formation strike N20°E and dip 80°SE. A prominent joint strikes N70°E and dips 10°N.

Old culvert no. 137 2 terra-cotta
107.93 484.20 CULVERT A 2 ft. ceramic pipe with a limestone rubble collar carries drainage beneath the canal.

Devils Rockpile
107.93-108.13 OUTCROP Low ledges of limestone (Conococheague Formation) are on the berm. The beds are 1/2 to 10 ft. thick and strike N70°E, dip 57° to 70°N. A cave opening 4 ft. high, 3 ft. wide is at 180.03.

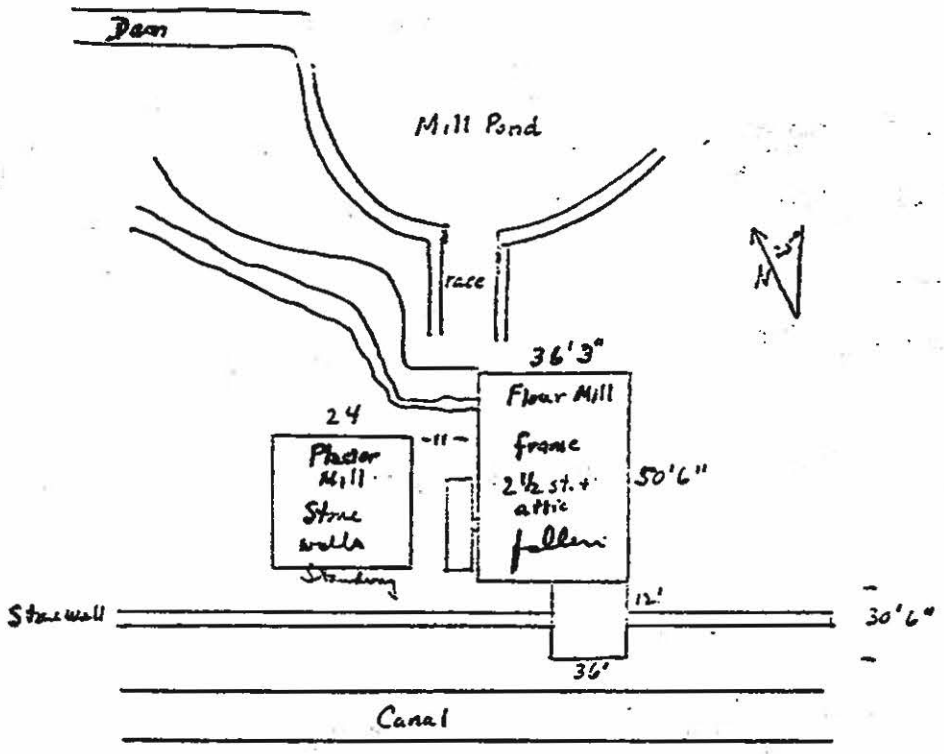
108.19 484.40 CULVERT 138 CAMP SPRING RUN, CHARLES MILL

Need sketch plan.

Constructed 1835-38. The coping and arch of the culvert are cut limestone. The arch has an 8 ft. span with a 4 ft. rise and has 10 ringstones and a keystone on the face

Miscellaneous Engineering
309a

Charles Mill



HAB plan

Charles Mill Study 1955.

484.40

of the arch. The parapet and coping are 3 ft. high. Wing walls are at right angles to the culvert face. 10 ft. long. Spandrels, parapet and wingwalls are wavy-banded, calcite-gashed limestone. A 5 ft. embankment is above the coping. Ruins of Charles Mill are on the berm The mill was constructed 1807 and operated until 1924. The east part was a flour mill originally 2 1/2 stories high. The lower part was built of stone. The timber second story has now fallen. The west part was a plaster mill. It was a two story, masonry building. The roof and walls are now collapsed. A 20 ft. steel water wheel is in place.

108.19-108.44 OUTCROP ON BERM Ledges of limestone (Conocheague Formation) form low bluffs. The limestone is dark gray to black, thick bedded to massive. The beds strike N40°E, dip 45° to 60°NW to center of a syncline at 108.23; dip is 25° to 30°SE on the west limb of the syncline. Orange clay stains the ledges at solution openings

at 108.16. A small cave opening is at 108.08. Prismatic jointing in the beds is prominent at the center and the west end of the outcrop. Rubble masonry walls are along the towing path.

108.49 old boat basin on berm and stone dock 300 ft. long, 80 ft. wide overgrown.

108.71 LOCK 47 8 1/4 ft. lift, constructed 1835-38.

The face is hammer dressed limestone from Prather's quarry, 1 mile south. Some red sandstone slabs are in the limestone revetment wall on the berm below the lock.

sag on towpath; bulge on berm at lock recess (lower).
flume 15 ft. wide, spillway at lower end 5' wide × 2 ft. deep, 30 ft. long.
Wall on towpath at lower: 25 ft. long flare and then 50 ft. long along towpath. 20 ft. long wall on towpath upper end.
Dry dock at lock - upper end of flume -

108.78 LOCK 48 8 1/4 ft. lift, constructed 1835-38.

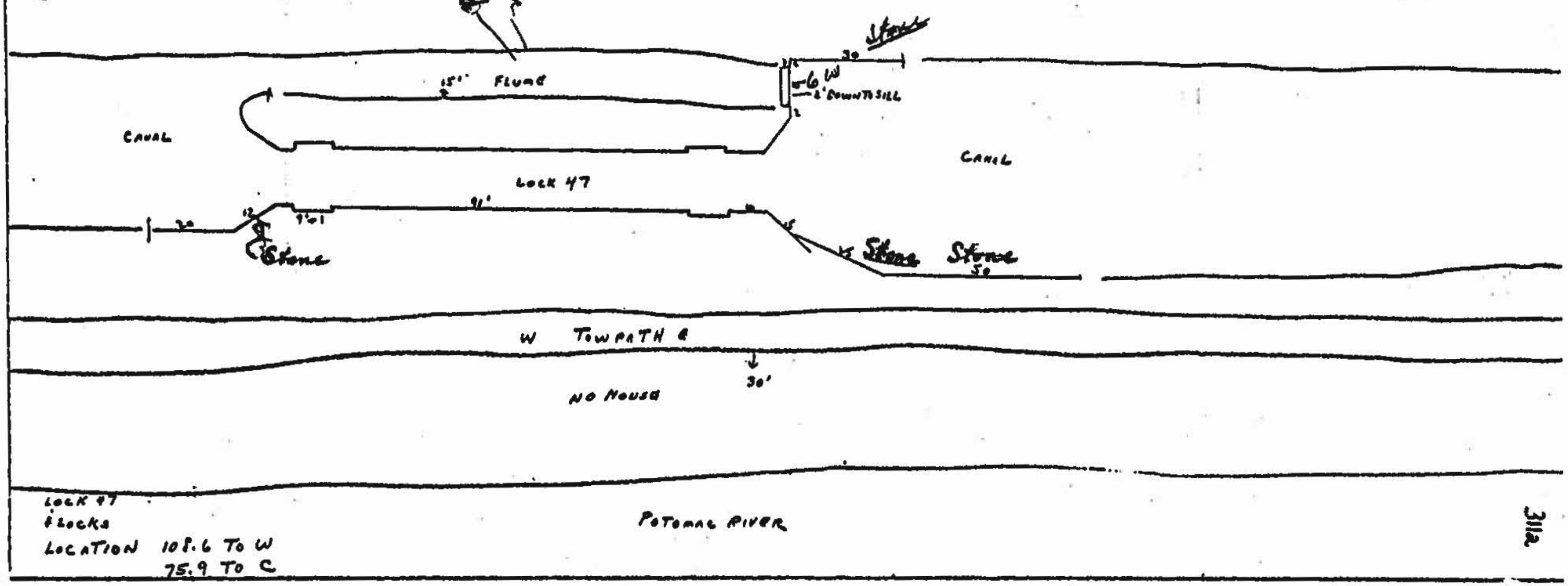
484.95/485.29

The face is hammer-dressed limestone from Prathers quarry. The lock is built over a sinkhole and it began sinking in 1839. The foundations were rebuilt and the face of the chamber trimmed in 1870. The lower half of the chamber now sags inward 2 ft. on each side and is held up by heavy timber bracing in the chamber. The rubble foundations on the berm formerly supported a building built over the flume.

flume 10 ft. on berm; 10 ft. wide; spillway at front 4 ft. wide.

Mileage odometer adjustment for return to boat basin
L47: 484.95
Basin: 485.12
L47: 485.28

(347)

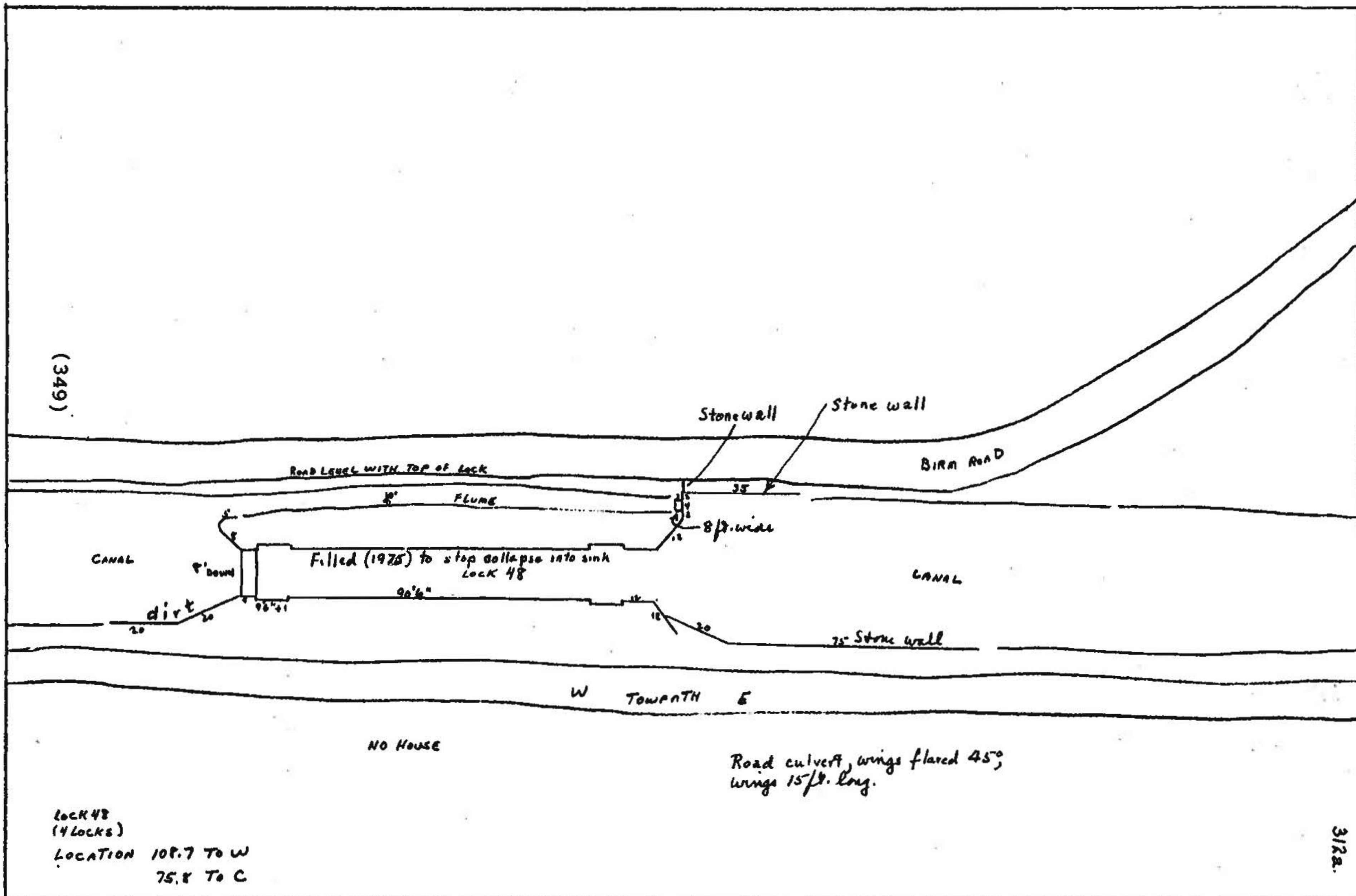

rubble
lined
Stone
30
FLUME
15'
2' DOWN TO SILL
CANAL
CANAL
LOCK 47
91'
30
Stone
Stone
Stone
50
W TOWPATH E
30'
NO HOUSE
POTOMAC RIVER
LOCK 47
8 LOCKS
LOCATION 108.6 TO W
75.9 TO C

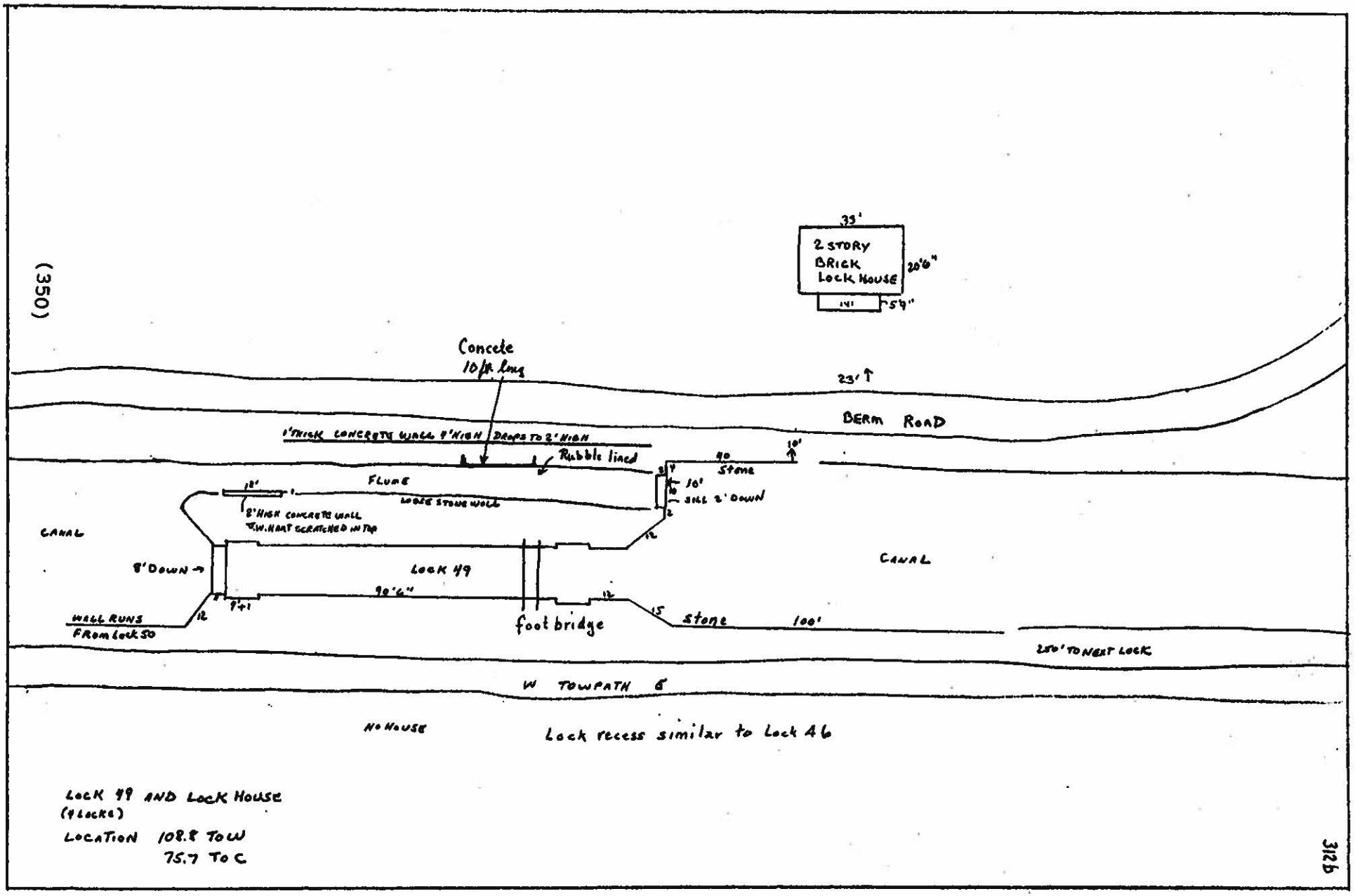
311a

~~Revetment of coursed limestone is on the berm and towing~~ 35 ft.
20 ft. flare on towing path, = 75 ft. along towpath edge.
path between Locks 48 and 49.

108.82 CULVERT 139 Constructed 1835-38, road culvert. This culvert carries Neck Road under the canal. The coping and segmental arch is cut, wavy-banded limestone with a 12 ft. span and a 4 ft. rise. 14 ringstones and a keystone are in the face of the arch. The abutments and skewbacks are 6 ft. high and the parapet and coping are 5 ft. high. Wing walls are flared. Spandrels, wingwalls and parapet are coursed limestone rubble masonry. A 12 ft. embankment is above coping. Lockhouse on berm ? no evidence.

108.86 LOCK 49 8 1/4 ft. lift, constructed 1836-38. The face is hammer-dressed, wavy-banded limestone from Prather's quarry. There is limestone pavement in the canal bed for 30 ft. below lock with the blocks laid vertically across the prism. The flume is on the berm 15 ft. from the lock. The spillway of the flume is at the front of

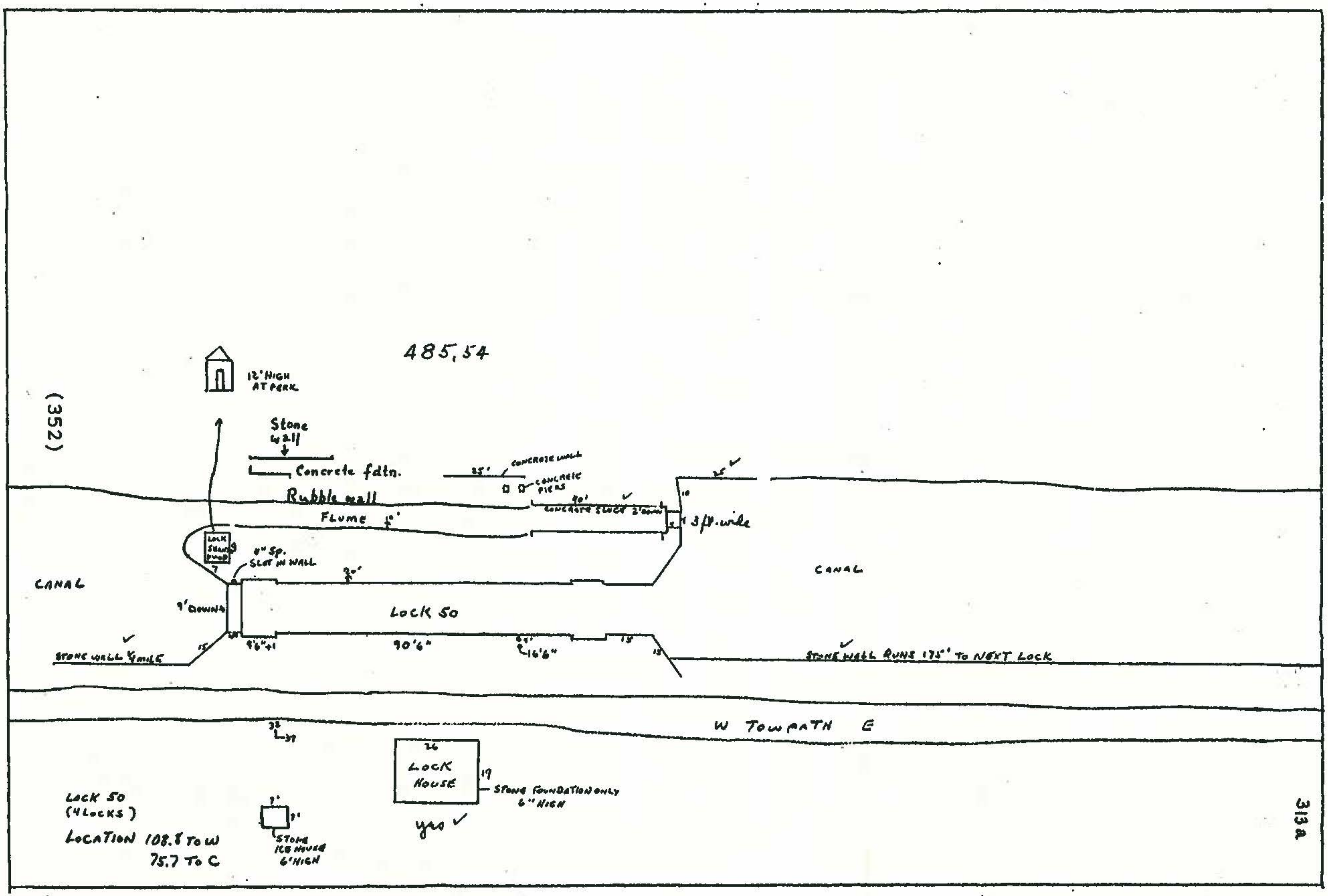

Stone wall
Stonewall
BIRM ROAD
ROAD LEVEL WITH TOP OF LOCK
FLUME
10'
35
8 ft. wide
12
CANAL
8' DOWN
Filled (1975) to stop collapse into sink
LOCK 48
90'6"
dirt
20
20
12
20
75' Stone wall
CANAL
W TOWPATH E
NO HOUSE
Road culvert, wings flared 45°; wings 15 ft. long.
LOCK 48
(4 LOCKS)
LOCATION 108.7 TO W
75.8 TO C


(350)
33'
2 STORY
BRICK
LOCK HOUSE
20'6"
14'
5'9"
Concete
10 ft. long
23'
BERM ROAD
1' THICK CONCRETE WING 9' HIGH DROPS TO 2' HIGH
Rubble lined
40
Stone
10'
FLUME
10'
SILL 2' DOWN
LOOSE STONE WALL
8' HIGH CONCRETE WALL
W.W.MAT SCRATCHED IN TOP
CANAL
CANAL
8' DOWN
LOCK 49
90'6"
WALL RUNS
FROM LOCK 50
foot bridge
15
stone
100'
250' TO NEXT LOCK
W TOWPATH
NO HOUSE
Lock recess similar to Lock 46
LOCK 49 AND LOCK HOUSE
(4 LOCKS)
LOCATION 108.8 TOW
75.7 TO C
312b

the lock. It is 2 ft. deep, 10 ft. wide, with a 15 ft. drop. The recesses have prominent subrecesses, 6 inches deep and 6 ft. high. Rotted 1 ft. x 1 ft. cross timber footing spaced 2 ft., and a wooden base are exposed in the chamber for 15 ft. down from the upper recess. At the end of the timber is a 1 ft. drop to a rubble stone base. The foundations on the berm adjacent to the flume are possibly from a former dry dock. The lockhouse for Four Locks is on the road on berm side. It is a 2 story brick structure constructed in 1837-39. A Section House is 100 ft. east of the towing path. It is 2 stories, frame and shingle covered. A 2 story supply house, granary and barn were maintained near Lock 49 until 1924 by the Canal Towage Company. Wall 40 ft. long on lower berm; 15 ft. flared wall + 100 ft. wall along towpath at lower end of level. 175 ft. long wall to lock 50 on upper end of towpath. 2 ft. high + 16 ft. long wall on upper end of flume, lock side. 1 ft. thick concrete wall on berm, 4 ft. high. On encroach - "J. W. Hart"

108.91 LOCK 50 8 1/4 ft. lift, constructed 1836-38.
(108.69) 485.54

The facing is hammer-dressed limestone from Prather's quarry. Some limestone in the breast wall has polygonal


313a
(352)
485,54
12' HIGH AT PEAK
Stone wall
Concrete fdtn.
Rubble wall
Flume
35'
CONCRETE WALL
CONCRETE PIERS
40'
CONCRETE SLUCE 2' DOWN
3 ft. wide
35'
LOCK SHANTY SHOP
4" SP. SLOT IN WALL
CANAL
9' DOWN
LOCK 50
90'6"
9'6"+1
16'6"
STONE WALL ¼ MILE
CANAL
STONE WALL RUNS 175' TO NEXT LOCK
W TOWPATH E
LOCK HOUSE
STONE FOUNDATION ONLY 6" HIGH
yes
STONE ICE HOUSE 6' HIGH
LOCK 50 (4 LOCKS)
LOCATION 108.8 TO W
75.7 TO C

joints. Slots for a stop gate are above the breast wall. The flume on the berm is 20 ft. from the lock. The lower 40 ~~30~~ ft. of the flume is in a concrete trough 4 ft. wide and 3 to 6 ft. deep with a spillway 6 ft. wide, 4 ft. deep, and a 6 ft. drop at the lower face of the lock. A revetment wall of limestone and some shale blocks is on the berm between Locks 49 and 50. The lockhouse for lock 50 is a 1 1/2 story, clapboard structure on the berm across the road from the lock. A white-washed frame lock shanty is at the upper end of the lock on the berm. A timber and clapboard mule barn is on the berm 100 ft. upstream from the lock. The pivot bridge over the lock was burned by the Confederates in July, 1864. The lock was the scene of riots in January, 1836. Other bloody riots occurred at Locks 48 to 50 in mid-May 1838. The laborers seized and threatened to blow up the works unless back wages were paid. The militia was called in and blasting powder re-

Stone wall, upper towpath side of prism, 1/4 mile long to waste weir
Concrete wall, 25 ft. long at berm at middle of lock - with 2 concrete piers.
Frame berm wall 25 ft. long.

moved to and stored in the public square of Hagerstown much to the annoyance of the citizens of that town.

108.97 OUTCROP ON TOWING PATH The thick bedded limestone is part of the Conococheague Formation. Irregular chert zones up to an inch thick are present. Joints strike N50°W, dip 70°SW; N40°E, dip 70°NW. Sinkholes are a problem in this area. In the early days of the canal, engineers planned to line the prism with timber above Lock 50 to reduce leakage into the sinkholes and limestone fissures.

485.60 108.75 Mule barn
Stone wall 50 ft. long beyond upper end of lock 50 on berm, continues upstream.

MP 109 = 485.85

109 OUTCROP ALONG TOWING PATH A low ledge is formed of gray, thick bedded limestone, Conococheague Formation. The surface of the outcrop is pitted by solution. Irregular bedding occurs around chert nodules The strike of beds is N50°E, dip 15°NW; joints strike N65°W, dip 70°NNE; N40°E, dip 70°NW. Limestone also forms a ledge 10 ft. above the towing path and solution grooves up to a foot deep and 2 ft.

wide are prominent in this outcrop.

109.32 (109.15) WASTE WEIR ~~58~~ 53 Original overfall constructed 1836-37. 485.96 The present structure, on east side of towing path, is a concrete frame with 3 gates; 2iron paddles, each 3 x 4 ft. are in the frame. Slot openings for boards are above the paddles and in the third gate. The channel south of the weir is lined with coursed limestone rubble for ~~a~~ 100 ft. A concrete slab bridge with limestone abutments carries the towing path over the waste channel. Solution ribs with up to 1/4 inch relief are on the abutment blocks.

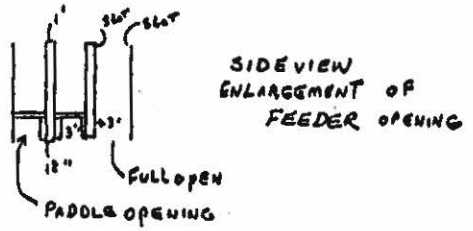
frame 10 ft. wide, flume 15 ft. wide. Wall along both berm and towpath side of prism from lock 50 to weir.

Formerly an informal overflow, not now visible

486.00 Pavement on riverside of towpath at corner just upstream of south weir.

109.42-109.77 (109.25-109.60) OUTCROP ON BERM Low ledges are formed of limestone of the Conococheague Formation. The limestone is oolitic, dense gray to black, and the beds are 1/2 to 2 ft. There are occasional beds about 1 ft. thick of gray limestone. A zone of black chert 1 ft. thick is in the west part of the outcrop. The beds strike N20°E and dip

486.20-486.35 Limestone outcrop in cut forward on berm.



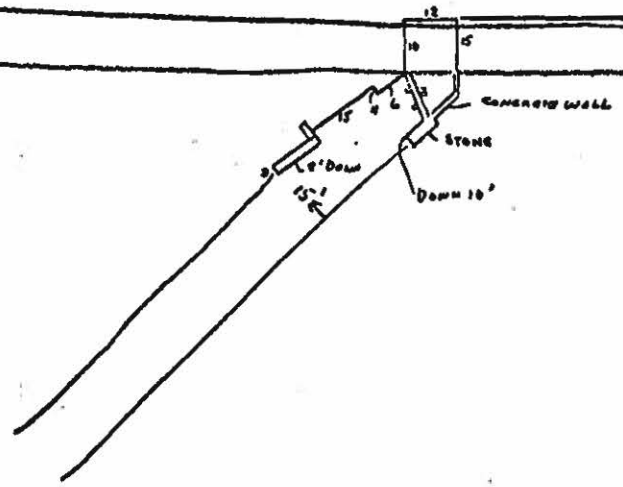
SIDE VIEW
ENLARGEMENT OF
FEEDER OPENING

(356)

CANAL

STONE WALL BEGINS AT
FEEDER + CONTINUES
EAST TO LOCK 50

W TOWPATH E



This is a waste weir, not a feeder.
FOUR LOCKS FEEDER No. 6
LOCATION 109.3 TOW
75.2 TO C

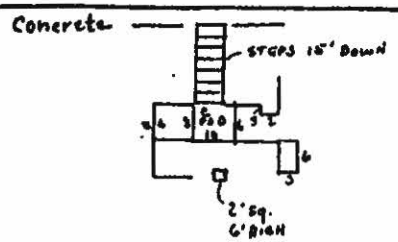
TO RIVER

3 162

(357)

CANAL

W TOWPATH E



4864.31

STONE FOUNDATION - BOATMANS HOUSE
LOCATION .109.4 TO W
75.1 TO C

3166

vertical on the east and 60° ESE on west end. From here to McCoys Ferry limestone sinkholes in the bed of the canal are serious problems. Several recent subsidences are on the berm. A flood plain and terraces rising to 160 ft. above river are prominent on the West Virginia side of the river. Outcrop at 486.18 80° Canal, downstream →

(109.5) 486.45 North Mountain H.B.O.

109.83 (109.66) 486.52? or CULVERT 140 Constructed 1835-37. This is a road culvert 106 ft. long. The coping and arch are cut limestone. The semicircular arch has 10 ft. span and a 5 ft. rise. 14 ringstones and a keystone are in the face of the arch. The keystone is 1 1/2 ft. wide at top and 1 ft. wide at the base. The abutments are 5 ft. high. The parapet and coping are also 5 ft. high. Wing walls are flared and the downstream wing has collapsed. Pavement in the culvert is 3 tiers high at the face and consists of 7 blocks, 3 x 3 x 1 1/2 ft. laid on end. The pavement 4 ft. thick at the front of theculvert with a drop of 3 ft. at

Same on berm.

East side of
North Mountain H.B.O.:

CANAL

W TOWPATH ℄

DOWN 4'

RIVER
100'

STONE FOUNDATION - CANAL WORKERS HOUSE
LOCATION 109.6 TO W
71.9 TO C

(359)

the face of the culvert. The parapet, spandrels and wing-walls are dark gray to black, dense, coursed limestone rubble. An embankment 5 ft. high is above the coping.

109.91 (109.74) OUTCROP ON BERM A ledge is made of limestone of the Conococheague Formation. The beds strike N40°E and dip 74°SE.

110.00 (109.81) 486.72 CULVERT 141 at east end of McCoys Ferry Campground Constructed 1835-37. The coping and arch are cut limestone. The arch has a 4 ft. span and 2 ~~1/2~~ ft. rise. Same on berm 8 ringstones and keystone are in the face of the arch. The abutments are 2 ft. high. The parapet and coping are 15 ft. high. Wing walls are slightly flared. Spandrels, parapet and wing walls are coursed rubble of dense gray limestone. An 8 ft. embankment is above the coping. The east end of the McCoys Ferry Recreation area is at the culvert.

2. 20 20 towpath

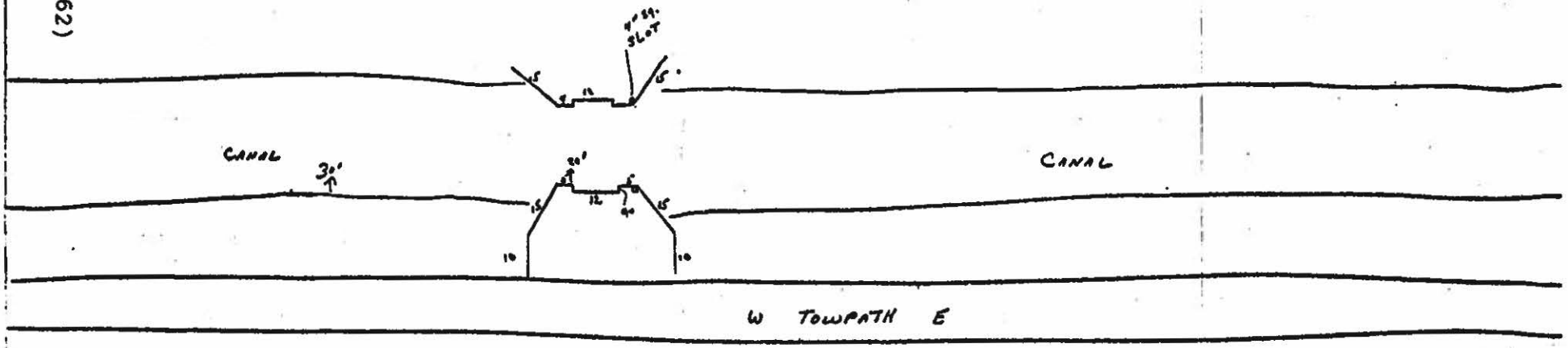
110.20 (110.01) Four sinkholes are in the canal bed, each

10 to 15 ft. in diameter and 8 ft. deep.
Sinkholes at 486.75

110.24 (110.05) **STOP GATE** Diagram on hand Constructed 1838. The stop
~486.92 MP 110 at 486.78 Sinkhole also at MP 110 in prism.
gate is faced with hammer-dressed limestone. The structure is 20 ft. long and 17 ft. wide with a recess ~~11~~ 12 ft. long. There is a notch, 2 inches wide, 5 inches deep, for planks at the lower end. An outcrop of Tuscarora Quartzite with shale partings forms a low ledge on the berm. The rock is highly cleaved and fractured. Beds strike N35°E and dip 45°SE. The structure is overturned towards the west. Olive-gray shale, Rose Hill Formation is at the west end of the ledge. The North Mountain Fault is just east of the outcrop. The Tuscarora Quartzite also exposed in the Western Maryland Railway cut above the ledge. Here, 20 ft. of brown sandy shale is underlain by red iron shaly sandstone, 10 ft. thick, and olive shale of which 10 ft. is exposed.

DO NOT TRESPASS ON THE RAILROAD, IT IS DANGEROUS AND ILLEGAL. WESTERN MARYLAND TRAINS APPROACH QUIETLY AND FAST, VISIBILITY IS LIMITED BY CURVES AND CUTS.

(362)



3192

STOP LOCK NO. 3
LOCATION 110.1 TO W
74.4 TO C

Sketch plan of buttresses on land

110.36 (110.17) CULVERT 142 McCOYS FERRY ROAD Constructed
487.05

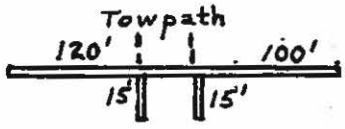
1837, partly rebuilt 1839. The coping and segmental arch are cut wavy-banded limestone. The arch has a 12 ft. span and a 4 ft. rise. 14 ringstones and a keystone are in the face of the arch. The abutments are 8 ft. high. Buttresses on the berm side, 12 ft. long, 8 ft. thick, flank the culvert and extend to the coping. The face of the buttresses is battered 1 on 3. Spandrels, parapet and butresses are hammer-dressed limestone except for concrete repairs in the arch and spandrel on the towing path side. Old blocks from the repaired area are now on the side of the road. A 10 ft. embankment is above the coping.

Towpath: cracked stone from lock 45 (Dam no. 5) to McCoys Ferry; south to west.

During constructi on of canal in 1835-36, a warehouse for storage of cement was at McCoys Ferry. On July 29, 1864, Confederate troops under the command of McCausland and Johnson crossed the Potomac River at McCoys Ferry enroute to a raid on Chambersburg, Pa. The Western Maryland Railway

trestle (Bridge no. 1018) to the north of the culvert is a 2 track, deck, plate girder trestle on two bents and 4 towers. It was built in 1929 by the McClintic Marshall Company, Pittsburgh, Pa., to replace an older structure. A prominent cliff of Tuscarora Quartzite is on the West Virginia shore of the river.

110.39 (110.20) CULVERT 143 GREEN SPRING RUN Constructed 487.08 1835-37. The coping and semicircular arch are cut, wavy-banded limestone. The arch has an 6/8 ft. span and a 3/4 ft. rise. There are 8 ringstones and a prominent keystone in the face of the arch. The abutments are 6 ft. high and the parapet and coping are 2 ft. high. 20 ft. embankment above coping on towpath side. Wing walls are at right angles to the face of the culvert. Spandrels, parapet and wing walls are hammer-dressed, gray, wavy-banded limestone. A coursed limestone rubble wall, 8 ft. high, is above the culvert on the towing path side. A limestone retaining wall extends from culvert 142 to culvert 143 on the berm.

Culvt 143 

wall 5/ft. high

487.45 Stripheaded ravine at riverside of towpath. 10 ft. wide.

110.80 (110.62) 487.48 CULVERT 144 Constructed 1836-38. The coping and semicircular arch are cut limestone. The arch has an 8 6 ft. span and a 4 3 ft. rise. 10 ringstones and keystone are in the face of the arch. The abutments are 1 ft. high and the parapet and coping are 15 ft. high. Spandrels and parapet are dressed black limestone. A 10 ft. embankment is above the coping.

10 ft. embankment above coping. same on berm. 20' 25' towpath.

Towpath 487.80 begin crushed stone to wall. 488.20 begin earth & crushed stone; puddled.

MP III 487.89

110.90-111.12 (110.70-110.92) TERRACE ON BERM A gravel covered bench is 40 ft. above river. The canal was built along the front of this terrace, 20 to 30 ft. above low flood plain on the river side.

111.20 (111.00) The canal is on a high flood plain from here to west of Big Pool.

Ft Frederick in this area of flood plain.

111.25 Boat basin on berm; now grown over.

111.34 (111.14) 488.01 CULVERT 145 Constructed 1837-38. The semicircular arch has a 6 ft. span and 3 ft. rise. 10 ringstones and a keystone are in the face of the arch. The

coping and arch are cut black, dense limestone. The abutments are 1 ft. high and the parapet and coping are 5 ft. high. Spandrels, wings and parapet are banded limestone, trimmed rubble. 10' ___ / 10' wings.

112.10 (11.90) 488.72 **CULVERT 147** Constructed 1837-38. The semicircular arch has a 4 ft. span and 2 ~~ft~~ ft. rise. The 8 ringstones and a keystone in the face of the arch are cut dark limestone. The abutments are 3 ft. high and the parapet and coping are 6 ft. high. same on berm ^ They are coursed limestone rubble. 8 ft. embankment above coping. The wings are limestone and pebbly sandstone rubble. Large rounded, sandstone boulders, up to 3 ft. in diameter, are in flood plain deposits below the mouth of the culvert.

Embankment and box culvert 1½ ft. wide × 3 ft. high on berm, flare wings 5 ft. long; 20 ft. from canal on WM Ry.?

112.20 (112.04) 488.85 **CULVERT 148** Constructed 1837-38 The semicircular arch has a 6 ft. span and 3 ft. rise. 10 ringstones and a keystone in the arch are cut, dark gray, medium grained limestone. The parapet and coping are 2 ft. high. A 10 ft. embankment is above the coping. The parapet and wings

are hammer-dressed limestone. The culvert is silted to the springing line (1971).

wings at right angles on towpath 10 ft. long.

112.37 (112.22) FT. FREDERICK STOP LOCK AND BRIDGES The stop lock is built of hammer-dressed blocks of Ridgley (Oriskany) sandstone and concrete. The lock is ~~20~~ 22 ft. long, 17 ft. wide and 7 ft. deep. A plank bridge now carries a road across the lock. A pivot bridge formerly crossed the lock. The stone and concrete piers and anchors with slabs of iron at the west end of lock, are remnants of a fixed timber bridge. The bridge was a queen-post truss on timber bents, 17 ft. above the canal. Some red sandstone rubble revetment is along the canal west of the stop lock.

Diagram on hand.

489.02

Curved wings on towpath side, 25 ft. long; flared wings, 45°, on berm, 16 ft. long downstream 12 ft. long upstream.

Ft. Frederick, 1,500 ft. north of canal, was built in 1756 during the French and Indian Wars following the defeat of General Braddock near Pittsburgh, Pennsylvania. The stone walls are 20 ft. high and are 240 feet square. It was abandoned in 1791 but was reoccupied in 1861 during the Civil War.

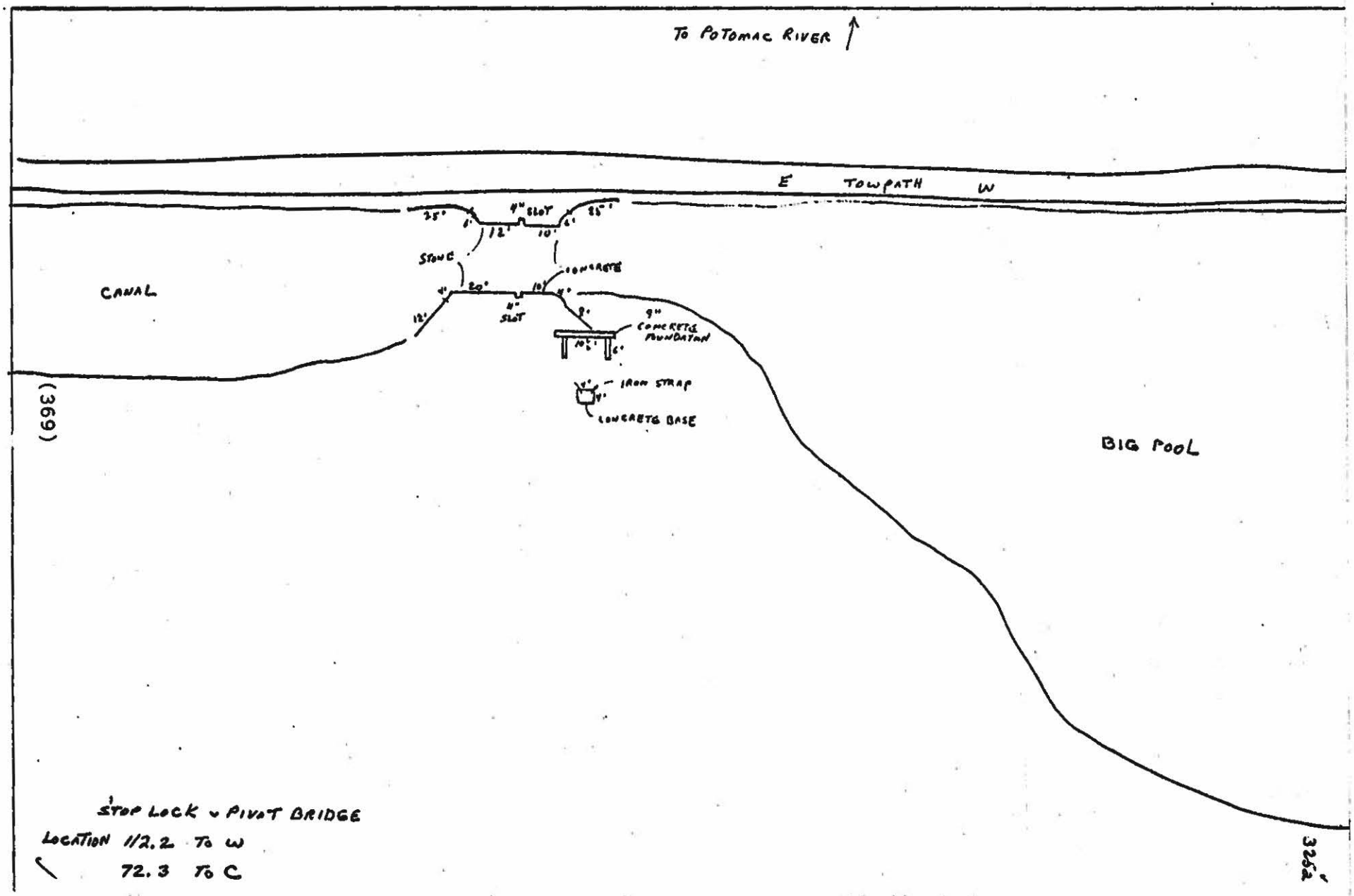
489.02 Stop gate

In 1922 it was purchased by the State of Maryland at which time the walls were a pile of rubble. The walls and bastion were restored in 1934 and the State Park now covers 279 acres.

112.50 (112.32) SOUTHEAST END OF BIG POOL 489.12 This is an area of widewater, 1 1/2 miles long and up to 700 ft. wide. It was formed by placing the towing path embankment across low swampy ground. The rubble revetment along the towing path contains red sandstone from the (Jennings) Formation and Ridgley (Oriskany) sandstone. After 1900 Big Pool was a popular place for summer cabins, swimming and pleasure boats.

112.75 (112.60) MEADOW ON RIVER SIDE OF CANAL A high flood plain about 20 ft. above the Potomac River is between the canal and river.

113.15 (113.00) OVERFALL (WASTE WEIR 55) Sketch plan? 489.90 = MP 113. The spillway is 121? ~~130~~ ft. long with a crest 16 ft. wide. The spillway drops


To Potomac River
E
Towpath
W
4" Slot
25°
1'
12'
10'
6'
Stone
Concrete
Canal
4"
20°
10'
12'
4" Slot
9"
9" Concrete Foundation
Iron Strap
Concrete Base
(369)
Big Pool
3253'
Stop Lock & Pivot Bridge
Location 112.2 To W
72.3 To C

10 ft. on the river side of the towing path. It is faced with hammer-dressed blocks of Ridgely (Oriskany) Sandstone. 5 concrete piers formerly supported a towing path bridge across the spillway. The spillway controlled the level of water in Big Pool. Outlet on downstream end, 10 ft. wide × 8 ft. from to bed, with abutment on the downstream end. Wing wall at right angle to towpath at upstream end, 10 ft. long.

113.86 (113.64) Upper end of Big Pool
490.72

Profile of trusses on hand.

114.10 (113.90) WESTERN MARYLAND RAILWAY (CHERRY RUN) BRIDGE NO.
490.80

The original bridge was built in 1892 by the Potomac Valley RR, a subsidiary of the Western Maryland Railway to connect with the Baltimore and Ohio RR at Cherry Run, W. Va. The span was through Pratt truss with a timber trestle connecting with the bridge across the Potomac River. The present bridge was built by the American Bridge Company, in 1927. It is a skew, modified Baltimore truss over the canal. 5 similar trusses on concrete piers are over the river with 2 deck plate girder spans on the Maryland

approach.

490.82
A gray to black limestone rubble revetment is west of bridge. A terrace with rounded cobbles is on the berm side of the canal and it rises to 20 ft. above the towing path west of the bridge.

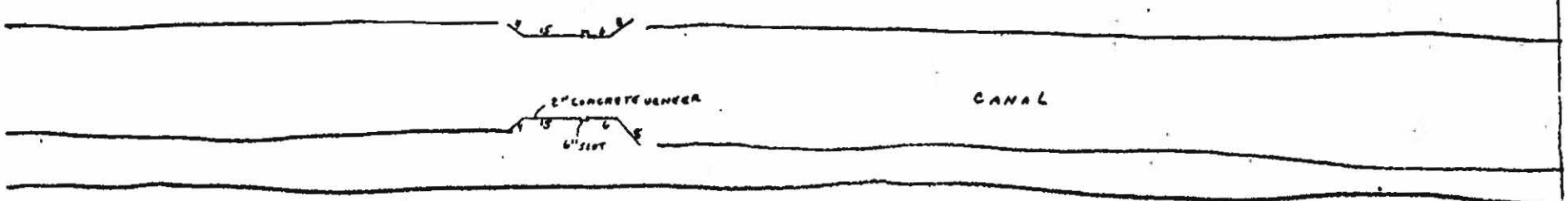
MP 114: 490.90

Diagram of stop gate on hand
114.18 (114.01) STOP GATE 50 ft. west of milepost 114 (NPS), originally constructed 1838. The structure is concrete with some blocks of cut dark gray, fine grained limestone. The gate chamber is 17 ft. wide and 21 ~~17~~ ft. long. The gate was so arranged that it could drop to the bottom of the canal and would be pulled into position by excess current flow in either direction. - also slot 6 in., 6 ft. from downstream end. Wings flared 45°; extending 8 ft. downstream on towpath side and 4 ft. upstream; same on berm.

114.27 (114.10) CULVERT 149 Constructed 1837. The coping and semicircular arch are cut, dark gray, fine grained limestone. The arch has a 6 ft. span and a 3 ft. rise. 10 ringstones and a keystone are in the face of the arch.
490.98

wings \15 /15 - stepped.

(372)



STOP LOCK NO. 5
LOCATION 114.0 To W
70.5 To C

327A

Coarse rubble is on the inside of arch in the barrel of the culvert. The abutments are 4 ft. high and the parapet and coping are also 4 ft. high. They are built of hammer-dressed limestone. A 6 ft. embankment is above the coping. Wing walls are coursed limestone rubble.

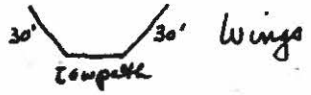
same on berm.

114.35-114.10-114.30) TERRACE ON BERM Water-worn sandstone boulders up to 5 ft. in diameter are on this terrace. The top of the terrace is near the level of the towing path 40 ft. above the river.

114.49 (114.32) CULVERT 150 DRY RUN This road culvert
491.22
was constructed in 1836-37. The coping and segmental arch are cut dark gray, fine grained limestone. The arch has a 12 ft. span and a 4 ft. rise with 14 ringstones and a keystone in the face. The keystone and several ringstones are cracked. Coarse rubble is in the arch in the barrel of the culvert. The abutments and skewbacks are 8 ft. high. The

same on berm

Road through culvert



parapet and coping are 6 ft. high. Wings, spandrels and parapet are rough, hammer-dressed limestone. A 10 ft. embankment is above the coping.

114.59 (114.42) ERNSTVILLE A terrace is on the berm at the towing path level, 35 to 40 ft. above the river. The terrace rises to 50 and 70 ft. north of canal and extends west to (114.70). The terrace on the river side of the canal is in a low saddle along the terrace. The terrace soil is brown, pebbly-cobbly, silty sand. Berm on embankment from Culvert 150 to 491.32

114.96 (114.80) CULVERT 151 Constructed 1836-37. The coping and semicircular arch are cut dark gray, fine grained limestone. The arch has a 6 ft. span and 3 ft. rise. There are 10 ringstones and a keystone in the face of the arch. The abutments are 4 1/2 ft. high. 5 ft. embankment above coping The parapet and coping are 3 ft. high. Spandrels, wings and parapet are rough-trimmed limestone. Fossils are prominent on the faces of Two sinks on berm, 4' × 12' in all.

(374)

10 \ /20 Wings. Towpath Wings on berm flared, each 10 ft. long.

the limestone blocks. Some chert is in the limestone in the spandrels. A ~~10~~ 5 ft. embankment is above coping.

115.12 (115.02) 491.89 CULVERT 152 Constructed 1836-37. The coping and semicircular arch are cut gray, medium grained limestone. ~~6~~ 4 ft. span and a 2 ~~1/2~~ ft. rise with 8 ringstones and a keystone in the face of the arch. The parapet and coping are 3 ft. high. Spandrels and parapet are coursed, trimmed limestone rubble containing black chert lenses up to 8 inches long and 3 to 5 inches thick. A 10 ft. embankment is above the coping The culvert is silted to the springing line (1971). ✓

Wings – Fallen – towpath 10', similar wings on berm.

Sinks in prism between center and towpath, 2 @ 4'x4'. Berm side y barrel filled.

MP 115 491.90

115.52 (115.48) 492.40 CULVERT 153 Constructed 1837. The coping and semicircular arch are cut limestone. The arch has a ~~6~~ 4 ft. span and a ~~3~~ 2 ft. rise. Only 4 ringstones and a keystone are visible in the face of the arch (1971). The parapet and coping are 6 ft. high and are coursed limestone rubble. An 10 ft. embankment above coping.

towpath 10'

~~embankment 10 ft. high is above the coping. The culvert is~~ silted to the top of the arch (1971). Gravel beds are exposed in the railroad cuts in the terrace to the north of the canal. Dam no. 5 was originally planned in vicinity of the culvert but was relocated downstream in 18 .

MP116 • Licking Creek H.B.O. 492.90 (9.21.75) 348.20 (5/26/75)

348.20
348.10
348.30

116.27 (116.08) LICKING CREEK, No. 6 AQUEDUCT Con-
493.00 (9.21.75)

structed 1835-38, cost $55,220. This is a single arch with a 90 ft. span and 15 ft. rise. There are 58 ringstones and a keystone in the arch. The aqueduct is 180 ft. long between the ends of the wings. The abutment are 7 ft. high. The parapet is 6 ft. high and is made of two tiers of stone with blocks up to 6 ft. long and 2 1/2 ft. high. The coping is 1 ft. high and is 34 ft. above stream and 37.6 ft. above the foundation. The waterway is 21 ft. wide and 7 ft. deep. The parapet on the towing path side is 7 ft. thick at the top and 7 1/2 ft. thick at the base. The parapet on the berm side collapsed but was originally 5 ft.

thick at the top and 5 1/2 ft. thick at the base. The aqueduct is constructed of Tonoloway Limestone from Bains quarry, on Licking Creek, 3/4 mile NNE of the aqueduct. Some limestone is from Prathers Neck. The limestone is gray, knobbly with some wavy bands. Arch stones, skewbacks, water table, coping and the inside of parapet are cut, the rest of the stone is coursed, trimmed rubble work. The skewbacks and 5 to 7 ringstones adjacent to the skewbacks are failing from pressure exceeding the compressive strength of the stone. They are highly fractured and crushed. Timber for the old trunk and berm wall are imbedded in the water table. The 10-inch timbers are spaced 3 ft. and set in concrete with coarse limestone aggregate. The timber trunk was placed about 1874 when the masonry berm parapet was removed. The towing path side of the parapet and arch are shoved out of line by 8 inches and iron stay rods are in a tier of blocks below water table to stabilize the faces. The Aqueduct was

grouted in 1838 with bituminous "American" cement to stop leaks. There is a slot in the concrete at the west end of the aqueduct for a stop gate. Cut faces on the arch stones above normal high water level are deeply etched by solution leaving the less soluble, silicic veins standing 1/8 to 1/2 inch above the weathered surface. Below normal high water level, hammer-dressed and cut faces are scalloped by solution to a depth of an inch. Etching of the cut faces in the waterway are similar to those of the arch stones. The remains of an iron railing are on the lower and upper wings. Western Maryland Railway bridge no. 1076 is 300 ft. north of the Aqueduct. It has 3 deck plate girder spans.

348.62 · drain enters canal at berm. 200 ft. long bank of debris in prism

MP 117 347.50

116.91 (117.04)

347.53

342.8/342.85

(Distance between mileposts 116 and 117 is only 0.68 mile)

CULVERT 160 Constructed 1836-37. The coping and segmental arch are cut limestone. The arch has a 6 ft. span and a 2 ft. rise with 6 ringstones and a keystone in the face. The parapet and coping are 2 1/2 ft. high. The spandrels and parapet are trimmed, coursed lime-

347.53

348.85

Berm embankment to 343.23

Towpath earth, good, some ruts

No wing walls

Stone rubble. The culvert is silted and flooded to the top of the arch. The meadow to the south of the canal, extending west to 117.64 (118.0), is a terrace 20 to 25 ft. above river level. Large sink over trunk on towpath side of prism, 3 ft. deep, 10 ft. diameter; small sinks across canal over barrel of culvert. (1975)

116.96 (117.09) CULVERT This is a circular concrete culvert, built ~~about~~ in 1965, to carry drainage from Interstate Highway 70. 6 ft span, springs at water level, no wings.

117.40-118.25 (117.55-118.40) OUTCROP A highway cut on Interstate Highway 70 is in the Chemung Formation. Red shale and interbedded sandstone are exposed near the top of the cut with gray sandstone and shale below. At the west end of the exposure the beds are mainly chocolate brown shale. The cut is in a syncline with the strike N5°E and the dip 14°W on east limb. The strike is N40°E, dip 15° to 28°SE on the west limb.

Outcrop visible in summer.

117.45 (117.61) CULVERT 162 Constructed 1837. The semi

~~circular arch had a 3 ft. span but is now buried. A amall~~ ravine leads to the river and water surges at the head of the ravine at the base of the towing path embankment during heavy rain.

100 ft east of MP118 - the trunk (1975)
MP118 343.78 (346.55 5/26/75)

Sketch on hand?

118.00-118.15 (118.15-118.30) MILLSTONE POINT The Chemung formation is exposed in the Western Maryland Railway cut where ~~It is~~ dark gray sandstone, in beds 2 ft. thick, ~~with~~ a strike N40°E and dip 22° to 35°SE. A quarry at 118.14 (118.29), on the hillside 0.1 mile to north of the canal, in red sandstone of the Chemung Formation was the source of stone used in culverts 162, 164 and 166.

partially visible in summer

118.35 (118.50) CULVERT 164 The original culvert 4 ft. span was constructed in 1837 but is now buried beneath an embankment.
346.01 + 344.3

The new culvert, 30 ft. to the west, was constructed to drain I-70 Interstate Highway 70 and is a corrugated steel pipe, 6 ft. in diameter, encased in concrete. No wings. Slabs of gray and dark gray fissile shale (Chemung Formation) ~~are~~ in the embankment below the towing path.

Causeway across prism.

118.36- Site of Red Tavern

118.43 (118.58) OUTCROP A cut on Western Maryland Railway exposes gray shale, Chemung Formation. The beds strike N40°E and dip 15°SE. partially visible in summer.

118.46 Stone dock on berm: Millstone Point - coursed, smooth faced, gray blocks, 80 ft. long x 8 ft. high above bottom of prism; +100 ft to 5s outcrop in canal

118.64-118.73 (118.79-118.88) OUTCROP A cut on the Western Maryland Railway exposes gray, sandy shale of the Chemung Formation. The beds strike N40°E and dip 28°SE. A ledge 334.49 sandstone in canal at east end of outcrop; beds 4 in. to 2 ft. thick on the berm of the canal at 118.73 is formed of Parkhead Sandstone, which is coarse-grained, pebbly and gray. White quartz pebbles up to 2 inches in diameter, mainly 1/2 inch diameter, are prominent in the sandstone. The beds are 2 to over 10 ft. thick and strike N40°E, dip 50°SE. 3 prominent joints cut the sandstone. Visible in summer Broken rock from the ledge partially fills the canal bed. A V-shaped barrage in the river is ~~probably~~ the remains of an old ~~timber~~ fish weir in existence at the time of the Potomac Company.

118.49 fish weir in river.

One-half mile of the Cumberland (National) Road was

moved upslope in 1836-38 to provide room for the canal. It was moved further upslope in 1903-06 when the Western Railway was constructed between Big Pool and Cumberland. In the early 1960's the position of the road, then U.S.40, was usurped by Interstate Highway 70. During construction of the canal, on August 8, 1837, a stage coach plunged 40 ft. off the new road into the canal at Millstone Point. A woman passenger, her daughter and a man were killed. 4 others were injured. The accident occurred because the driver fell asleep.

118.61 (118.76) 345.75 • 344.55 CULVERT 166 AND WASTE WEIR Constructed 1837-38. The semicircular arch is cut limestone with an 8 ft. span and a 4 ft. rise. 12 ringstones and a keystone are in the face of the arch. The abutments are 1 ft. high on the river side. Spandrels and parapet are coursed limestone rubble with 1 cut block of red sandstone from the Chemung Formation included. Curved wing on west, slightly curved wing on east W 20' 2' 6' 40' E On the berm side, abutments are 6 ft. high and built of [redacted]e and limestone. A well

between the canal and railroad culverts is lined with coursed gray and red sandstone rubble. A concrete frame waste weir with 3 gates for drop boards is on the berm side of the culvert. 2 inset paddles; wall adjacent to each weir, 15ft on east end; 15 ft. wings, each gray limestone and fine grained limestone.

118.64 (118.79) OUTCROP A ledge on the berm is formed of Parkhead Sandstone, Harrell Formation. The beds strike N40°E and dip 15°SE at the east end of the outcrop. The sandstone is up to 20 ft. thick with beds 2 to 10 ft. thick with beds 2 to 10 ft. thick. It is underlain by olive gray shale. On the west the sandstone is gray, dense, forming a ledge 20 ft. high. The strike at the ledge is N50°E. A prominent strike joint dips 60°NW and a transverse joint dips 70°SW. visible in summer.

118.69-118.70 (118.84-118.85) OUTCROP The Chemung Formation, gray shale, strikes N40°E and dips 30°SE on the berm. Pink-brown shale of the Chemung Formation is exposed in a cut on the Western Maryland Railway where it is overlain visible in summer.

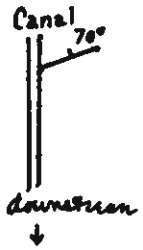
by terrace deposit of cobbly silt.

MP 119 345.52 - 344.30 = Millstone Basin
119.3 stone foundations on berm (.58)
118.96-119.34 (119.12-119.^ TERRACE The meadow on the river side of the towing path is a high flood plain grading westward into a terrace 25-30 ft. above the river. Wash fills canal to within 2 ft. of towing path (1972) at this
345.48 ; similar wash at 345.30
point.^ The millstone basin was formerly on berm side of canal here. Old NPS Campground on meadow (1975).
Campsite had 5 tables, outhouse, 4 trash barrels
Canal full of water, 3 ft. below top of towpath, at low point in towpath at campground. Water 1½ ft. from top.
119.69 (119.85) CULVERT 170 AND WASTE WEIR Constructed
353.52
1835-38. The semicircular arch is cut limestone with a span of 8 ft. and a rise of 4 ft, 12 ringstones and a key-
straight wings; rebuilt 1975
stone are in the face of the arch. Coursed rubble masonry is in the arch in the barrel of the culvert. The parapet and coping are 4 ft. high. The coping is coursed, trimmed limestone rubble; spandrels and parapet are coursed limestone and red sandstone rubble. The waste weir on the berm side of the culvert is a concrete [redacted]ure with 3 gates for board inserts. The walls of the weir are red

sandstone and limestone. Pavement at the base of the waste weir is limestone blocks 2 ft. high, 8 inches wide and 2 to 4 ft. long laid on their side. A well between the railroad and the canal culverts is 12 ft. square and 16 ft. deep. The arch on the berm side of the culvert at the well is on abutments 4 ft. high. Just east of the culvert, a cut on the WMRy shows gravel over shale.

119.84 (120.00) OUTCROP ON BERM Chemung Formation, olive gray, fissile sandy shale and sandstone is exposed in a low ledge. The beds strike N10°E and dip 60°W to vertical. outcrop continues to stop gate.
MP 120 - 353,39

119.87 (120.03) STOP GATE Constructed 1838. The walls 353,32 are limestone, red ss with concrete in the middle part. 2 sets of Grooves for the planks of the stop gate are 5 inches wide and 5 inches deep. one at center, one at west end of gate. 20 ft. embankment above coping. Olive gray shale, Chemung Formation, in beds 2 inches thick are exposed at the stop gate. They strike N40°E and dip 85°NW. The outcrop extends 300 ft. west where the dip is 45°NW. Outcrop, Little Pool east; has vertical, highly fractured red shale; strike normal to canal 70°W at end of Little Pool



Deck in concrete, upper end, towpath side of stop gate: March 6, 1917

3.53.20 - footbridge to WM Ry

119.90 (120.05) LOWER END LITTLE POOL For 1 mile to the west canal was formed by placing the towing path embankment across two islands. Extensive seepage developed in the embankment in 1837 and much rebuilding was required in 1839. Serious leakage occurred in 1840-44 and the section was rebuilt in 1844. A revetment of fine grained, dark brown sandstone (Catskill Formation) rubble is along the towing path.

353.85
353.95
begin wide water 354.05

Rise in towpath at west

119.92 - informal overflow?

120.40 (120.54) TERRACE The West Virginia side of the Potomac River is a high flood plain grading into a terrace 25-35 ft. above the river. The front slope on terrace is prominent because of its steepness.

352.70 H.B.O. - at point striking into pool
352.53 ravine on riverside, canal curves to east.

120.56 (120.70) WASTE WEIR An overfall controlling the levels of Little Pool was formerly in this vicinity.

353.05

Catskill red sandstone, 36 paces long on west. Revetment 66 paces long, coursed rubble wall, 100 paces on east into curve where towpath rises 3ft. Wall 2.4ft. high just west of curve to north.

120.64 (120.76) TERRACE Cobbly, pebbly silt deposits are on the berm above the railroad at levels of 50 to 60 ft. and 100 ft. above the river.

120.87 (121.97) HEAD OF LITTLE POOL A causeway on the berm marks the upper end of the pool. It was formerly the site of a basin. A terrace on the berm is 50 ft. above river.

352.35 / 354.72 footbridge waste weir site? : 354.55 on return check
MP 121 - 354.75 water in Little Pool; water in canal 1-2 ft. deep Little Pool to Lock 5[?]

120.96-121.23 (121.06-121.33) REVETMENT ON BERM Catskill red sandstone rubble protects the berm embankment.

121.28 (121.38) CULVERT 172 Constructed 1835-36. The semicircular arch is dressed limestone with a 6 ft. span, and a 3 ft. rise. 10 ringstones and a keystone are in the face of the arch. The abutments are 7 ft. high and the parapet and coping are 2 1/2 ft. high. Spandrels and parapet are Catskill red sandstone from the quarry on Barnett (Ditch) Run. Rubble in inner arch in the barrel of the culvert has collapsed 4 ft. in from the towing path face. A conical hole, 5 ft. in diameter, is in back of the coping. The floodplain on the river side of the canal has brown clay silt soil over 20 ft. thick.

351.92

flared wings; 15 ft. embankment above culvert.

172?

121.60 (121.70) CULVERT 173 BARNETTS (DITCH) RUN Con-
351.58

structed 1836. The semicircular arch is cut limestone with an 8 ft. span and 4 ft. rise. 12 ringstones and a keystone are in the face. The abutments are 2 1/2 ft. high and the parapet and coping are 1 1/2 ft. high. Spandrels, coping and parapet are Catskill red sandstone from the quarry on Straight wings 6' 2' 4'4

Barnetts (Ditch) Run. A ~~15~~ 20 ft. embankment is above the coping. Three quarries in Catskill red sandstone were opened about 1836 along Barnetts Run for stone for culverts 172 to 174 and revetments. The first quarry was about 0.46 of a mile from the canal, the second 0.52 mile and third 0.82 mile.

MP 122 351.30/355.76

173?

122.14 (122.31) CULVERT 174 AND WASTE WEIR Constructed
351.05

1836-38. The culvert on the towing path side is silted over. On the berm side it has an elliptical arch of cut limestone with a span of 6 ft. and a rise of 2 ft. 10 ring-stones and keystone are in the face. ~~The~~ spandrels and wings

are Catskill red sandstone. The waste weir on the berm side of the culvert is a concrete frame with 3 gates for insert boards and walls of limestone and Catskill red sandstone. Red sandstone of the Catskill Formation crops out on the berm at culvert. The beds strike N70°W, dip 20°N in a shallow syncline; two sets of joints are prominent at right angles and vertical to the beds. The berm is on an embankment from this culvert to Lock 51.

Berm on embankment, Little Pool to Culvert 173.
Berm in cut Culv. 173-174.
No wickets in waste weir.; nor flaring, drops directly on culvert. Wings of culvert buried on side of towpath.

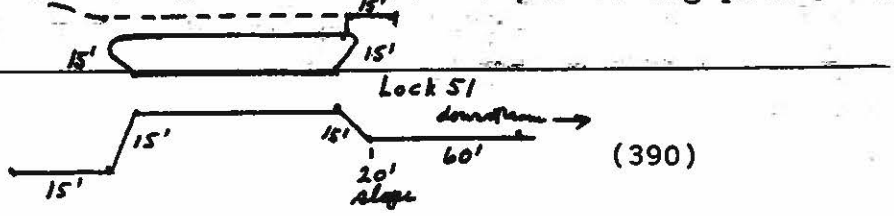
122.51 (122.55) CULVERT 175 Constructed 1836. The culvert is silted to the coping (1972). Limestone rubble is in coping and parapet. Records indicate this structure was built as a 3 x 4 ft. square drain. A quarry in Catskill red sandstone, 0.2 mile north of the canal was for stone in culverts 173, 174 and 175.

350.7

122.62 (122.66) LOCK 51 8 ft. lift, constructed 1836-39. The face is cut limestone (Tonoloway Formation from Hants

356.45

Quarry on Little Tonoloway Creek, 3 miles upstream from the canal. The limestone has wavy bands 1/4 to 1 inch apart. A film of travertine is on the face of some blocks. Limestone blocks 4 tiers below the coping are pitted and crumbled. Limestone and dense gray sandstone are in the wings. and around lock.
The coping is 6 inches higher along the chamber than at the upper recess and in the front of the lock below the lower recess. Subrecesses, 6 ft. high, 4 inches deep, extend the length of the recesses. Vertical slots in the walls above the breast wall are for insert timbers for a stop gate. There are no indication of fenders at the head or tail of the lock. Blocks of cut limestone with circular quoins are on the side of the towing path. The flume 10 ft. wide × 3 ft. deep. is on the berm side and is lined with brown and white Ridgeley (Oriskany) Sandstone and some limestone. The overfall at the front of the flume is 10 ft. wide, 2 ft. deep with a 10 ft. drop. The lockhouse is on the side of the towing path at the lower



(390)

end of the lock. It is constructed of coursed limestone and Catskill red sandstone rubble. A snubbing post is at the lower end of the lock on the towing path. A wall of coursed limestone and Catskill red sandstone rubble is on the berm for 25 ft. below the front of the lock. Lock 51 is the end of the 14-mile level.

122.62-122.89 (122.66-122.93) TERRACE ON BERM Gravel silt soil between Locks 51 and 52 form a terrace that rises inland for 150 ft. north of aanal.

122.89 (122.93) LOCK 52 8 ft. lift, constructed 1836-39. 357.75
The face is cut limestone (Tonoloway Formation) from Harts Quarry on Little Tonoloway Creek, 1.20 miles upstream from the canal. Some cut Catskill red sandstone is on the towing path side at the center of the chamber, the flume, 5 ft. deep, 10 ft. wide, is on the berm side, 20 ft. from the lock. It flume on berm, 3 ft. deep, 15 ft. wide, 15 ft. from canal.
is lined with Catskill red sandstone rubble and ends in an overfall at the front of ~~the lock.~~ 6 ft. wide and 2 ft. deep. part of miter sill remains at upper end.

The subrecesses are similar to Lock 51. Slots for boards of a stop gate are in the walls above the breast wall. A pile of rubble, 20 ft. long, on the berm is at the head of the lock and is probably the remains of a fender crib. A footbridge is over the tail of the lock. The lockhouse is on the towing path side. It was formerly a frame structure only the rubble foundation remains. The foundation is primarily cobbles of sandstone, slabs of red and gray sandstone and some limestone. A retaining wall, ~~150~~ 100 ft. long, is below the lock on the towing path side. It is coursed limestone rubble. A similar wall extends 25 ft. below the lock on the berm and it contains some red sandstone. Limestone walls are also on the towing path and berm, 180 ft. long, connecting Lock 52 and the aqueduct to west.

122.94 (122.98) 350.30 GREAT TONOLOWAY (no. 7) AQUEDUCT Constructed 1835-39, cost $48,423.10 including entrance walls. Arch ~~stones~~ flared wings, facing and coping are limestone from Harts Quarry on

Arch aqueduct being repaired 1975.
Waste weir at aqueduct - 3 gates, no paddles.
MP 123 = 350.25 / 356.78

Little Tonoloway Creek, 1.34 miles upstream from the canal. The limestone backing is from along the canal. The aqueduct is a single, semicircular, irregular arch with a span of 63 ft. 3 inches and a 20 ft. rise. The springing line is at the top of the abutment, 4 ft. above the stream, on the west. On the east it is on a rock ledge 16 ft. above stream. If fully developed the arch would have a span of 80 ft. There are 30 ringstones on the west of the keystone and 16 on the the east. The aqueduct is 152 ft. long between wings. Coping and parapet are 7 ft. high with the coping 36 ft. above the stream and 42.1 ft. above the foundations. An 8-inch belt is at the top of the arch. The parapet was formerly 7 ft. wide at the top and 7 1/2 ft. wide at the base on the towing path side. It was 5 ft. wide at the top and 5 1/2 ft. wide at the base on the berm. The coping and belt are fine dressed limestone. Arches, skewbacks, water table and the inside of the parapet are scabbled limestone. The rest of

Notch at each end of aqueduct 8"x8" for timber of crib.

the structure is masonry rubble. The spandrels and 7 ring-
stones have fallen on the berm on the west part of the aque-
duct. Some ringstones on the towing path side have moved
out 2 to 4 inches, and numerous ringstones are fractured and
crushed. The underside of the arch (intrados) is coated
with travertine up to 1/4-inch thick. The base of the water-
way was covered with hydraulic cement and bituminous "Amer-
ican" cement in 1838 to reduce leakage. A serious break in
the spandrels and parapets occurred in 1865 and iron tie
rods were placed above the arch. The stone work at that
time was in bad condition. The berm parapet was removed
and rebuilt at that time. The berm parapet collapsed in
the 1880's and a wooden trunk was put in. The trunk was
90 ft. long, 21 ft. 9 inches wide, 7 ft. high and had 8
vertical posts in the wall separating trunk into 10 sections;
18 base timbers, 1 x 1 ft., spaced 4 ft. on centers, now
remain in concrete in the waterway. The berm wall of the

trunk was strong by braces anchored to the base timbers and extending about 4 ft. beyond the wall. The towing path was placed on a trestle bridge along side of the trunk. The present footbridge on the towing path at the east end of the aqueduct. Remnants of the iron railing are on the east and west wings of the aqueduct. The lead fill shows in the heads on some of the posts. A waste weir with a concrete frame for 3 gates and board inserts is on the berm at the east end of the aqueduct. An outcrop of the Catskill Formation is beneath the east part of the aqueduct. 24 ft of red sandstone overlain by 5 ft. of gray, fine-grained sandstone is exposed. The beds strike N32°E and dip 42°SE. Western Maryland Railway bridge no. 1144 is 500 ft. to the north. It is a 3 span, deck plate girder bridge on skew piers and was built in 1904 by the Pennsylvania Steel co., Steelton, Pa.

123.05-123.23 (123.08-123.26) OUTCROP Intermittent

exposures of the Chemung Formation, drab gray to brown, irregularly bedded sandstone and crumbly shale are on the berm The beds strike N40°E and dip 45° to 75°SE.

123.27-123.40 (123.30-123.43) TERRACE Deposits of tan to buff gray, pebbly, cobbly, silty, sand are exposed in a cut on the Western Maryland Railway.

123.56 (123.59) CANAL BOAT 57 Planks and iron bolts in the bed of the canal are remains of the abandoned boat.

123.58 (123.61) OUTCROP Gray, fine grained shaly sandstone Chemung Formation is on the berm. The beds strike N40°E and dip 65°SE.

123.82 (123.85) WALL ON BERM This wall is constructed primarily of rounded sandstone cobbles from the terrace deposits.

123.84 (123.88) Taney (P.T. Little) WAREHOUSE A timber frame, clapboard 137 ft. long x 40 ft. wide, 2 storeys. ~~2 buildings~~ ft. long; foundations ~~of~~ ss rubble. structure is on the berm A large iron ring on the front was

used for tying barges.

123.92 (123.96) An entrance to a former basin is on the berm. The basin was cut off by construction of the Western Maryland Railway in 1903. 150 ft. long × 40 ft. wide.

123.94 (123.98) 349.32 CULVERT 179 Road culvert, constructed 1837-38, rebuilt 1868 to replace cumbled rock in the structure. The arch is semicircular and is built of hammer-dressed limestone. The arch has a 12 ft., span 6 ft. rise with 16 ringstones and a keystone. The abutment are 6 ft. high. The parapet and coping are 3 ft. high. The wings, parapet and spandrels are coursed limestone rubble. Pavement in the culvert consists of 3 rows of flat blocks of limestone, 2 ft. wide, 3 1/2 ft. long and 6 inches thick. The coping and parapet have fallen on the west side and some of the canal bed penetrates the arch. There is a limestone revetment on the berm at the culvert. Stone for culvert, Tonoloway Limestone, ~~is from the same quarry as~~ that for

wings at Right angles to prism.

10 ft. embankment above coping.

cut limestone blocks 100 ft. long, up to 5' × 2' blocks. = Dock.

Little Tonoloway Creek Culvert. An outcrop of the Hamilton Formation is adjacent to the culvert. The rock is shaly limestone. At the base of the culvert, on the river side, the beds strike N40°E and dip 30°SE. A road connecting with a bridge across the Potomac passed through culvert until 1923.

First wall 357.72

MP 124 - 357.78 / 349.25

124.15 (124.19) HIGHWAY BRIDGE Constructed 1923. The 357.95 span is a Warren curved chord pony (open)truss. It replaced an older through truss that was built about 1890. Up to then culvert 179 gave access beneath the canal to the river. A footbridge formerly crossed the canal at this point. It was constructed in 1871 and was an iron pony (open) truss, 96 ft. long and 10 ft. wide. From 1839 to 1879 a pivot bridge was over the canal at this point. The bridge over the Potomac River was built about 1890 by the Hancock Bridge Company. It was 4 steel spans, Baltimore truss, ~~each~~ 262 ft. long. ~~This~~ bridge was bought by the

349.10 · 124.26 150 ft. long Oriskany SS rubble dock.

349.63 - Large boulder? of Oriskany ss. = 129.23 Stone dock 150 ft. long.

2d. wall 358.00

3rd. wall 358.05

348.95 124.36 Stone dock - Conrad Oriskany ss rubble 60 ft. long. 200 ft. east of Little Tonoloway Culvert

States of Maryland and West Virginia in 1924 and was destroyed in the flood of March, 1936. Temporary spans placed on the old piers and were removed in 1939 on opening of new bridge 1 mile west. The limestone from the piers was used for a jail and community hall in Hancock after the bridge was removed. There is the old abutment for the bridge on the riverside of the towing path. It was constructed of sandstone rubble. A stream gauging station of the U.S. Geological Survey is also on the side of the towing path and is connected to the path by a steel Pratt truss footbridge. A revetment of limestone and red sandstone is along the canal side of the towing path.

358.20- Turning basin at west. Third dock, west end of which is at east end of turning basin. Extends 200 ft. long to bridge to recreation area.

124.36 (124.40) CULVERT 182 LITTLE TONOLOWAY CREEK
348.90 / 358.20

Constructed 1835-37, cost $15,474.31. The segmented arch is cut limestone and has a ~~40~~ 36 ft. span and a 16 ft. rise. 42 ringstones and a keystone are in the face of the arch. The parapet and coping are 3 ft. high. The spandrels,

Little Tonoloway Recreation area, bridge at west end near culvert = 358.18
Toilets, water, boat ramp, tables; no camping.
Parking.

parapet and coping are coursed gray, wavy-banded limestone rubble. The top of the parapet and coping slope down to the east on the berm and slope to the west on the towing path side. The skewback and 10 ringstones on the east half of the arch and the lower 3 ringstones on the west on the towing path side have been replaced with concrete. A concrete liner is on the inside of the arch on the towing path side. Stone for culvert, Tonoloway Limestone, was quarried along Little Tonoloway Creek, 1.60 miles above the culvert.

The site of Cohill Mill is in the recreation area along Little Tonoloway Creek between the canal and the river. The mill was operated by Rinehart and Cohill in the late 1800's.

124.57 (124.61) 511.70 HIGHWAY BRIDGE, U.S. 522 Constructed by Maryland State Roads Commission 1938-39. This bridge was opened October 5, 1939. It consists of 20 Wickert type

512,00 = 125.0 MP.

truss and girder spans. There are 7 deck girder spans on the north approach and 4 deck girder spans over the railroad at the north end. The roadway is 24 ft. wide; the bridge cost $972,462.30.

125.11 (125.15) 512.18 CULVERT 184? ~~BRENTS ROAD CULVERT~~ Constructed 1835-37. wings / \ 10' cut stone. Culvert in good condition. The semicircular arch is cut limestone with a 4 ft. span and a 2 ft. rise. 8 incl. skewback ~~10~~ ringstones and a keystone are in the face of the arch. Abutments are 1 ft. high and the parapet and coping are 4 ft. high. Spandrels, parapet and coping are coursed rubble of Ridgeley (Oriskany) Sandstone. A 10 ft. embankment is above coping.

125.28 (125.34) 512.35 CULVERT 184? BRENTS ~~185~~ Road culvert, constructed 1836-37. wings / \ 10 ft., coursed rubble. The semicircular arch is cut limestone with an 8 ft. span and a 4 ft. rise. 14 ringstones and a keystone are in the face of the arch. The parapet and coping are 2 1/2 ft. high. Spandrels, parapet and coping are coursed lime-

Culvert in good condition; barrel OK. Spring line at water level.

stone and sandstone rubble. A 15 ft. embankment is above coping. A low flood plain is on the riverside of the towing path.

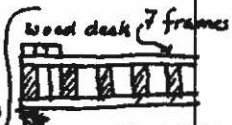
125.66 (125.72) CLIFFS OF RIDGELEY (Oriskany) Sandstone are along the ridge in West Virginia to the south.

Poorly visible in summer.

126 MP: 513.01

126.17 Box elder on towpath, 3ft. diam. - on left (u.s.) (513.25)

126.36 513.45 Steel-wood bridge over canal - I beam - farm br., 1 ms. - 5s, rubble, 5ft. high.



126.42 (126.48) CULVERT ~~186~~ 185 JOHNSONS CULVERT Constructed 1836-37. The semicircular arch, with a 10 ft. span and 5 ft. rise, has 14 ringstones and a keystone. The abutments are 5 ft. high and the parapet and coping are 2 1/2 ft. high. Spandrels, wings and parapet are coursed Ridgeley (Oriskany) Sandstone rubble. A waste weir, constructed in 1839, was formerly at the culvert.

513.50

wings / 15' ~ 4' drop ~ coursed rubble

+ skewbacks

Coping slopes 6 in. towards downstream.

Flood debris (vegetation) to within 5 ft. of towpath (1972)

10 ft. embankment over culvert.

Berm embankment for 500 ft.

126.43 White Rock HBo OK.

126.50-126.63 (126.52-126.65) LOW FLOOD PLAIN The meadow on the river side of the towing path is a low flood plain.

126.92 (126.93) CULVERT ~~187~~ 186 Constructed 1836-38. The semicircular arch is cut limestone, with a ~~5~~ 4 ft. span and

513.92

10 ft / 14 ft. wings

with a 2 ft. rise. There are 8 ringstones (incl. skewbacks) and a key-
stone in the face of the arch. The abutments are 3 ft.
high and are founded on bedrock. The parapet and coping
are 1 ft. high and built of coursed Ridgeley (Oriskany)
Sandstone rubble. Spandrels and wings are rough, hammer-
dressed limestone. A 15 ft. embankment is above the coping.
The base of the culvert is on a flat exposure of Keefer
gray sandstone. The beds are 1 ft. thick and strike N15°E,
dipping 10°ESE. Vertical joints strike N35°E, N75°E and
Outcrop also on berm; beds up to 2 ft. thick
N75°W. Culvert in good condition; canal prism was full in last fieldtrip (1972).
Waste weir formerly in upstream headwall of culvert; outcrop in ravine on berm side of culvert.

126.97 (126.97) OUTCROP A ledge, 10 ft. high on the berm,
513.95
is formed of brown-stained Keefer sandstone. Beds are 1 to
2 ft. thick and strike N40°E, dipping 8°NW and up to 8°E - gentle syncline; jointed
80 joint — Canal

127.00 (127.00) WASTE WEIR This is the approximate site
of an old waste weir constructed in 1837-38.
513.98 = Informal overfall, 100 paces long. — Rock revetment on river side of towpath & ravine which extends from o.f. to river; cobbles in revetment & on towpath pavement; o.f. discharges to 2 ravines
127.0 MP = 514.00

127.03 (127.03) OUTCROP A ledge of white Keefer sand-
on berm

stone is on the berm. Small crinoid joints (fossils) are common in the sandstone. Some shale is in the outcrop. Beds are 1/2 to 2 ft. thick and strike N35°E, dip 25°NW. The thicker beds are cut by joints that strike N 20°W and N70°W and dipping at right angles to the bedding.
514.10 - 514.20 canal widens on hum; up to 80 ft. wide.

127.20-127.23 (127.20-127.23) OUTCROP A ledge ~~30~~ 50 ft. high is on the berm, just below the Western Maryland Railway. It is formed by the Bloomsburg Formation, red hackly sandstone, in beds up to 4 ft. thick. Massive olive gray, sandstone is exposed at the base of the red sandstone. The beds strike N45°E and dip ~~35°NW~~ 73° to SE (downstream) on west end of ledge. WM Ry cut above ledge has a prominent vertical, transverse joint on downstream side.
514.20 - 514.23

Silurian

Have sketch of Devils Eyebrow

DEVILS EYE BROW

127.28 (127.28) OUTCROP A prominent anticline in a ledge on the berm, is famous from many photos of published in text books, scenic pamphlets and similar documents. The Bloomsburg formation, red sandstone, red shale, and some green shale forms the anticline. Strike N40E, dip 40°NW on west, 65°SE on east. (Strike N60E?). Syncline at east end of outcrop, strike N60E, dip 45°NW on east; 65°SE on west.
514.35

Blacksmit + forge shop for cement works located near here.

Diagram from field notes and photo in Pawpaw-Hancock folio
8 x 8 drawing 4 x 4 final

127.42 (127.42) Shafers Mill
~~124.42~~ ~~(124.42)~~ ROUND TOP CEMENT MILL Old cement kilns consisting of 8 arch openings with each arch having an 8 ft. span, 4 ft. rise and 4 ft. abutments. It is 10 ft. to the 21 ft. long (high) back wall in the kilns. 5 arches on the west and the eastern-most arch and walls are made of blocks of Ridgeley (Oriskany) sandstone bound with mortar. 2 other arches on the east are dry masonry. The kilns were covered by a wooden roof and front. The mill burnt in 1903, rebuilt, and closed about 1909. Its capacity was 300 barrels per day. 200 ft. to the west is a brick chimney. An old warehouse and mill formerly stood between the kilns and the chimney. on the berm side of the canal. It was a frame building, 4 stories high. The cement mill was built by James Hook in 1835 and supplied the canal with cement used in its construction. From 1868

16 ft. water wheel with water from canal via flume, operated grinding burrs : 4 French burrs @ 5 ft. diam.

Cable from crossed river to B.O to deliver cement to RR, Ruins of warehouse along RR.

Original mill 1837
Wall along towpath opposite 2d. & 3d kiln from east; wall extends west to west end of kilns.
Wall of Cursed sandstone and limestone rubble
Kilns = 8 ft. wide x 8 ft. high, semicircular arch; wall above arch = 18 ft. high. Two western kilns have rubble arch; group of 3 have cut ringstones, next two to east = rubble ringstones; 1st. kiln on east end has cut ringstones.

to 46 it was operated by George Shafer. In 1868, Robert Bridges and, Charles W. Henderson operated the mill and marketed Round Top Hydraulic Cement. The kilns are on an anticline of Bloomsburg red sandstone which dip 30° on the west and 45° on the east. Gray shaly limestone (Wills Creek Formation) is exposed in the ledge at the west side of the kilns. The beds strike N40°E, dip 30°NW. A revetment wall on the berm at the site of the old warehouse is mainly limestone and sandstone rubble. West of the kilns, in cuts on the Western Maryland Railway, are ledges of Wills Creek gray limy shale. The beds strike N60°E and dip 70°SE. Just east of the old brick chimney is a syncline exposed in the railroad cut with the dip 30°WNW on the east and 70°ESE on the west. The strike is N35°E, beds vertical. At the old chimney the rock beds are vertical and in the railroad cut 50 ft. west they dip 30°ESE. 6 cement rock mines are in the vicinity, 2 are along the canal. A mine entry is 400 ft. west of the mill,

35 ft. above canal. The opening is 200 ft. long and there are old wooden tracks in the mine. The tunnel follows the strike of the beds (Franz and Slifer, 1971, p. 90-93).
514.45 opposite chimney Stone wall 30 ft. above canal on berm.

127.55 (127.55) OUTCROP A ledge 30 ft. high on berm is formed by Wills Creek gray shaly limestone with thin wavy beds that strike N30°E and dip 70°ESE. A small cave opening (514.65) is 200 ft. to the west and 20 ft. above the towing path. It is a 3 x 3 ft. entrance with a passage triangular in section, 6 ft. high, 10 ft. wide, trending N40°E for 30 ft. where it narrows to a small slit (Franz and Slifer 1971, p 92).

514.68-514.76 Ledge, 50 ft. high, gray limestone + limy shale; strike parallel to canal (strike 0°), dip 15°-40° W.

127.66 (127.66) CEMENT MINE The entrance is 20 ft. square and has partly slimped. It is 20 ft. above the towing path level. A tunnel trends N30°E for more than 400 ft. Just inside the entrance are old brick and stone structures. Shoring timbers are near the rear of the mine (Franz and Slifer 1971, p. 92). The mine is in Wills Creek limy shale

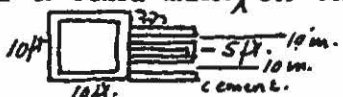
at an anticline that strikes N40°E and dips 60°ESE on east, 30°NNW on west. 300 ft. west the beds are horizontal for 200 ft., then the dip is 15°NNW to the end of the outcrop. at 127.78. STAY OUT OF MINE TUNNELS, THEY ARE UNSTABLE AND ROCKFALLS MAY OCCUR.

127.87 (127.87) OUTCROP A ledge on the berm, 30 ft. high, 40 ft. long, is formed by thick bedded limy shales (Wills Creek Formation). Poor outcrop, discontinuous

127.9 + High concrete wall between WM Ry + canal, 20 ft. high
514.90-514.96 Towpath on towpath = debris from flood, mud + branches.

128.00 (128.00) PUMP HOUSE Square concrete pits, one 10 x 12 ft. in plan, the other 10 x 6 ft., each 20 ft. deep, are on the river side of the towing path. These were foundations for a pump house for wash water for a sand mine on the berm.
515.00 now filled
of the Round Top Sand Co, 600 ft. upstream

515.05 - west end of WM Ry. cut.



128.20-128.90 (128.20-129.00) A high flood plain is on the berm side of the canal.
515.20

128.56 (128.60) CULVERT 188 Constructed 1836-37. The semicircular arch is cut limestone, 4 ft. span, 2 ft. rise,
515.62

with 8 ringstones and keystone in the face. The parapet and coping are 2 ft. high. The spandrels and parapet are coursed limestone and sandstone rubble. (The coping is cut limestone and sandstone rubble). (The coping is cut limestone.) An 8 ft. revetment is above the coping and a 3 ft. embankment is above the revetment. The culvert is silted to within 1 ft. of the top of the arch.

128.96 (129.05) TERRACE Broad flat areas on berm, 70 and 95 ft. above river, are terraces. There is also a low terrace mound 30 ft. above the river on the river side of the canal.

MP 129 515.95

129.06 (129.15) TERRACE There is a gravel covered flat, 40 to 65 ft. above the towing path (70 to 95 ft. above river) on the berm.

129.14-129.23 (129.22-129.31) OUTCROP Low ledges on the berm are formed by Rose Hill olive gray to brown shaly

516.25 - 516.35

sandstone and shale. Nearly horizontal beds

129.30-129.40 (129.35-129.44) OUTCROP A ledge on the berm is formed by Rose Hill olive gray to brown shaly **sandstone and shale.** The beds are nearly horizontal. A V shaped weir is in the river at 129.40 (129.44).

Slight apparent dip downstream at 5°.

129.60 (129.61) OUTCROP A low ledge on the berm is formed by Rose Hill brown sandy shale. The beds strike N30°E and dip 18°NW.

Continues to wash weir.

129.81 (129.80) WASTE WEIR 63 This is a concrete frame structure with 3 gates for insert boards. The two end gates formerly had paddles but these were replaced by insert boards. Dressed limestone blocks, up to 1 x 2 x 3 ft., are in the walls and wings. The original overfall at this site was constructed in 1837-38.

Wings at right angles, 10 ft. long on prism side, 8 ft. long on river side. Towpath on flatter bridge over wash weir.

Sketch p. 365a.

516.90 Leopards Mill HBO.

130.04 (130.00) LOCK 53 8 ft. lift, constructed 1835-37. **The faces** are hammer-dressed, white sugary sandstone, Ridge-

129.81 (129.80)

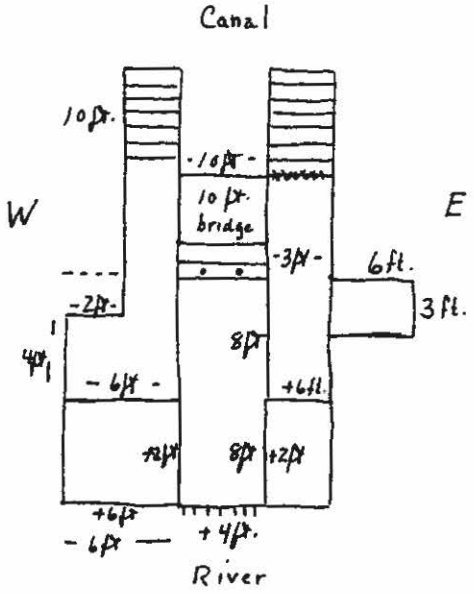
516.85

263.7 (19 Sept. 1971)

Waste weir 63

Waste weir below Lock 53:

Limestone wings + paving. Concrete frame, 3 gates, 2 end ones were paddled gates replaced by boards.



ley (Oriskany) Formation. The stone was quarried at the end of Tonoloway Ridge, 3 miles southwest near Dam no.6. A few limestone blocks are in the coping and in the lower part of the chamber on the towing path side. The upstream end of the chamber at the bottom has blocks of black limestone with prominent calcite streaks 1/16 to 1/2 inch wide. Slots for a stop gate are in the walls above the breast wall. A revetment 10 ft. long on the upper berm wing is probably the remnant of a crib fender. Bolts in the upper and lower towing path wings are probable remnants of timber fenders, Pile of stone 10ft. long is also remnant of fender (upper one). The flume is on the berm, 26 to 30 ft. from the lock. Limestone and sandstone rubble revetment are along the flume. An overfall spillway for the flume is at the front of the lock and has a 6 x 10 ft. concrete frame for insert boards. The lockhouse was constructed in 1839 and is on the side of the towing pat. Foundation of limestone rubble and concrete are all that remain of the lockhouse. Revetment along towpath at lower end of lock 100ft. long; 10ft. long at upper end of lock. Foundation on berm at tail of lock, (west) north of flume - stone walls 2ft. high 20x25ft. Rubble wall 35ft. long on berm downstream of flume. (see Barnes sketch map).

MP 130 516.98

130.09 (130.05) CULVERT 192 Road culvert, constructed 517.05
1835-38. The segmented arch is cut black, dense limestone
with a 10 ft. span and 4 ft. rise. 14 ringstones and key-
+ skewbacks
stone are in the face of the arch. The abutments and skew-
backs are 4 ft. high on the towing path side and 8 ft. high
on the berm. The parapet and coping are 3 ft. high. The
berm parapet slopes up towards the upstream end where it is
1 to 2 ft. higher. The spandrels and parapet are coursed
limestone rubble. There is a wing wall on the lower towing
wing wall at right angles to facing, 4 ft. drop at end
path side. On the berm the wing wall is splayed. A 4 ft.
revetment and a 10 ft. embankment are above the coping.
of the culvert
Four 10 x 10 inch timbers (logs) that form the footing have
been washed 30 ft. downstream on the towing path side.
Embankment on berm for 100 yds. upstream of culvert.
130.66 Indian fish trap in river.
Road culvert (Deneen Rd.)
130.68 (130.74) CULVERT 193 Constructed 1835-38. The
517.70
segmental arch is cut limestone, ~~12~~ 10 ft. span, 4 ft. rise,
(mal. skewbacks
with 16 ringstones and a keystone in the face. The abut-
ments are 5 ft. high. The parapet and coping are 2 ft. high.
Berm Embankment at culvert · 517.50 +

Spandrels and parapet are coursed limestone rubble. The coping is dressed limestone. Coursed limestone rubble is in the wing walls. A 10 ft. embankment is above coping.

wings - 6ft. / 6ft. / 10ft / -4ft

The site of Leopards Mill is on the river side of the canal at the culvert. It operated until 1835 as a grist mill and from 1835 to 41 it was used by George Shafer as a cement mill to supply cement to the canal.

130.93 517.90 Informal overfall - 2 low spots along 100ft. of towpath; east one: 15ft. long, MP 131 - 517.95 west one 20ft. long.

131.32 (131.30) CULVERT 194 Road culvert, constructed 518.21 ↑ Swimming Doe

1836-38. The semicircular arch, 4 ft. span, 3 ft. rise, has Access across canal by embankment with steel culvert

8 rings stones, and a keystone in the face. The abutments are ↑ incl. skewbacks

5 ft. high. The parapet and coping are 2 ft. high. Wings

10ft. long, 3 tiers high = 6ft. high

are at right angles to the culvert face. Spandrels, parapet and wings are coursed limestone rubble. A 15 ft. embankment is above the coping. Boat launch ramp, access Road across canal.

131.5 Footbridge over canal (not seen)

518.60+ revetment on riverside 2-4ft.+ high.

131.81 Indian fish trap in river just below outcrop at 131.82

131.82 (131.77) OUTCROP A low ledge on the berm beneath 518.72 the railroad, is formed by the Bloomsburg Formation, hackly

beds of red shaly sandstone, some green shale at base. The beds strike N40°E and dip 10°NW.

131.86-131.95 (131.81-131.90) OUTCROP A cut along the 518.76 Western Maryland Railway exposes McKenzie gray, limy shale. The beds strike N20°E, dip 60°ESE. A vertical joint strikes N70°W.

131.95 (131.90) OUTCROP A ledge 30 ft. high is on the 518.85 berm. It is formed by red, massive sandstone, Bloomsburg Formation. Strike at Right angle to canal, dip 5° downstream (apparent).

132 MP: 518.95

132.08 (132.03) CULVERT ~~196~~ 195 Sick Coon Constructed 1836. The semi-518.96 circular arch is cut, gray, brown stained, sugary, fine-grained limestone. The arch has a 4 ft. span and 2 ~~1~~ ft. rise with 8 ringstones (including skewback) and a keystone in the face. The abutments are 2 ft. high. The parapet and coping are also 2 ft. high. The spandrels and parapet are coursed sandstone rubble. A 15 ft. embankment is above

the coping. The arch has partially fallen on the upstream side of the towing path. The parapet and part of the arch and upstream wing wall has fallen in the center and upstream side of the towing path. Canal is on river terrace

Collapsed | Culv. | wing

132.19 Canal workers cemetery between canal and WM Ry – unmarked graves – on terrace flat?

132.29 Indian fish trap in river.

132.37 (132.40) <u>WASTE WEIR</u> The ravine on the river side of the towing path 20-25 ft. wide, 15 ft. deep is the site of **Waste Weir** 64, **constructed 1837.**

519.30

132.42 (132.45) <u>CULVERT 197</u> Constructed 1835-38. **The** coping and semicircular **arch** are cut **limestone.** The arch has a 4 ft. span and 2 ft. rise **with 8 ringstones** incl. skewbacks and a keystone in the face. The parapet and coping **are** 15 ft. high. Spandrels, wings and parapet are coursed rubble of medium grain limestone. The wing walls are at right **angles** to the face of the culvert. Only a short remnant of upstream wing wall Some limestone rubble is on the **towing path** west of the **culvert.**

519.36 probable informal overflow – 200 ft. to east to 60 ft. west of culvert.

519.40 begin curve to west.

519.48 - 519.52 overfall? – revetted on riverside; stone paving revetted in freshet scour 200 ft. long (in curve).

132.56 (132.59) A terrace is on the berm at the level of **the towing path.**

300 paces east from 519.55, revetment 6 ft. high on canal side of towpath.
211 p. east from 519.55, revetment 2 ft. high on riverside of towpath
519.62 200 ft. long revetment on riverside, up to 2 ft. high (upper end at 519.62.
519.65 - 519.68 200 ft. long revetment on riverside

132.88 (132.94) OUTCROP A low ledge on berm contains a symmetrical anticline in Keefer Sandstone, known as the Devils Eyebrow. The lower 6 ft. of beds in the anticline are 2 to 6 inches thick. Above this the beds are up to 1 ft. thick. The rocks are gray, quartzitic sandstone tinted brown. 40 ft. of the formation are exposed. The beds strike N20°E, dip 45°SE on the downstream side and strike N40°E, dip 48°NW on the upstream side.

plotted on profile 10/31/76

downstream →

Outcrop on towpath at 519.75

Diagram from field notes 8/30/69
Draft 8 x 8, final 4 x 4.

132.92 Indian fish trap in river.

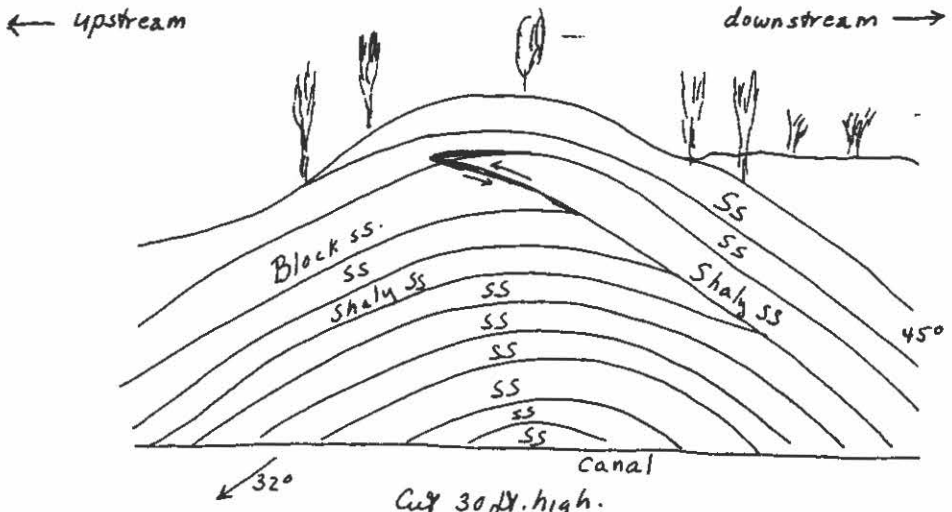
132.94 (133.00) OUTCROP Cuts along Western Maryland Railway are in Bloomsburg red sandstone and interbedded shale. The beds strike N40°E and dip 45°NW.

MP 133.00 (76.38) - railroad cuts in Swc.?
519.85?

133.04-133.30 (133.10-133.36) OUTCROP Cuts along Western Maryland Railway expose a syncline, an anticline and a syncline developed in the Wills Creek shale in center part of section and Bloomsburg red beds in eastern and western parts.
519.82?

Have sketch

132.88 Anticline in Kuju Ss.
519.75
(76.3 distance 8.30.69)



Cut 30 ft. high.
view NNW

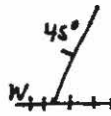
The Wills Creek is primarily green to gray, clayey and limy shale. The Bloomsburg is mainly red shaly sandstone and red, green and bluish shale.
At 133.09 (76.48) Red beds in cuts on WMRy - 

Diagram- field notes 8/30/69 p 10-11. draft 4 x 8, final 2 x 4.

133.24 (133.30) 520.10 **WASTE WEIR 65** The original overfall was constructed 1838. The waste is now a concrete frame with 3 gates for insert boards. Concrete wings, 15 ft. long are on the canal and river side of the waste weir.

133.49-133.58 (133.56-133.65) **OUTCROP** An exposure of Wills Creek Shale is along the Western Maryland Railway. There is a broad anticline on the west and a tight anticline and shear folds on the east. Small thrust planes are common. The rock is dominantly gray shale and sandstone. Red sandstone of the Bloomsburg Formation is at the west end of the exposure.
133.53 Indian field Hop in river
133.60 520.45 Cacapon Junction HBO

Diagram- p 154 Md GS- Wash. Co. and field notes 4/29/71 p.3
8"x 8"draft, 4" x 4" final.

MP134 520.85

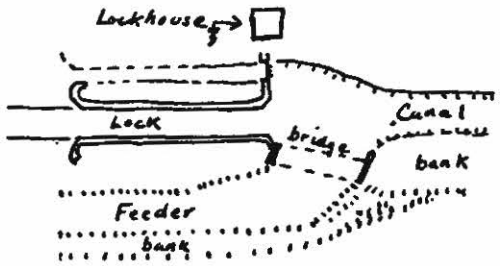
133.93 (134.00) LOCK 54 7.8 ft. lift, constructed 1836-
Lock chamber filled with earth.
40 and 1848-50. The facing is Ridgeley (Oriskany) sandstone from a quarry at the end of Tonoloway Ridge, 3/4 mile west of the lock. The lower end of the lock is mainly dressed Tonoloway limestone. Some sandstone is in the coping on the towing path side and in the berm coping. Concrete coping is at the lower recess, towing path side. Abutments for the towing path bridge over the feeder from Dam no. 6, at the lower end of the lock, are rough dressed sandstone blocks at the top and limestone at the base. The bridge was built 1850. - washed out in 1924. The breast wall of the lock has partly collapsed. Slots for stop gate planks are on the lock walls above the breast. The flume is 20 ft. from the lock on the berm. It is 3 ft. deep, 10 ft. wide with an 8 ft. drop at the spillway aht the front of the lower berm wing. Bolts in the

Have sketch + Barnes plan.

4/29/71
4

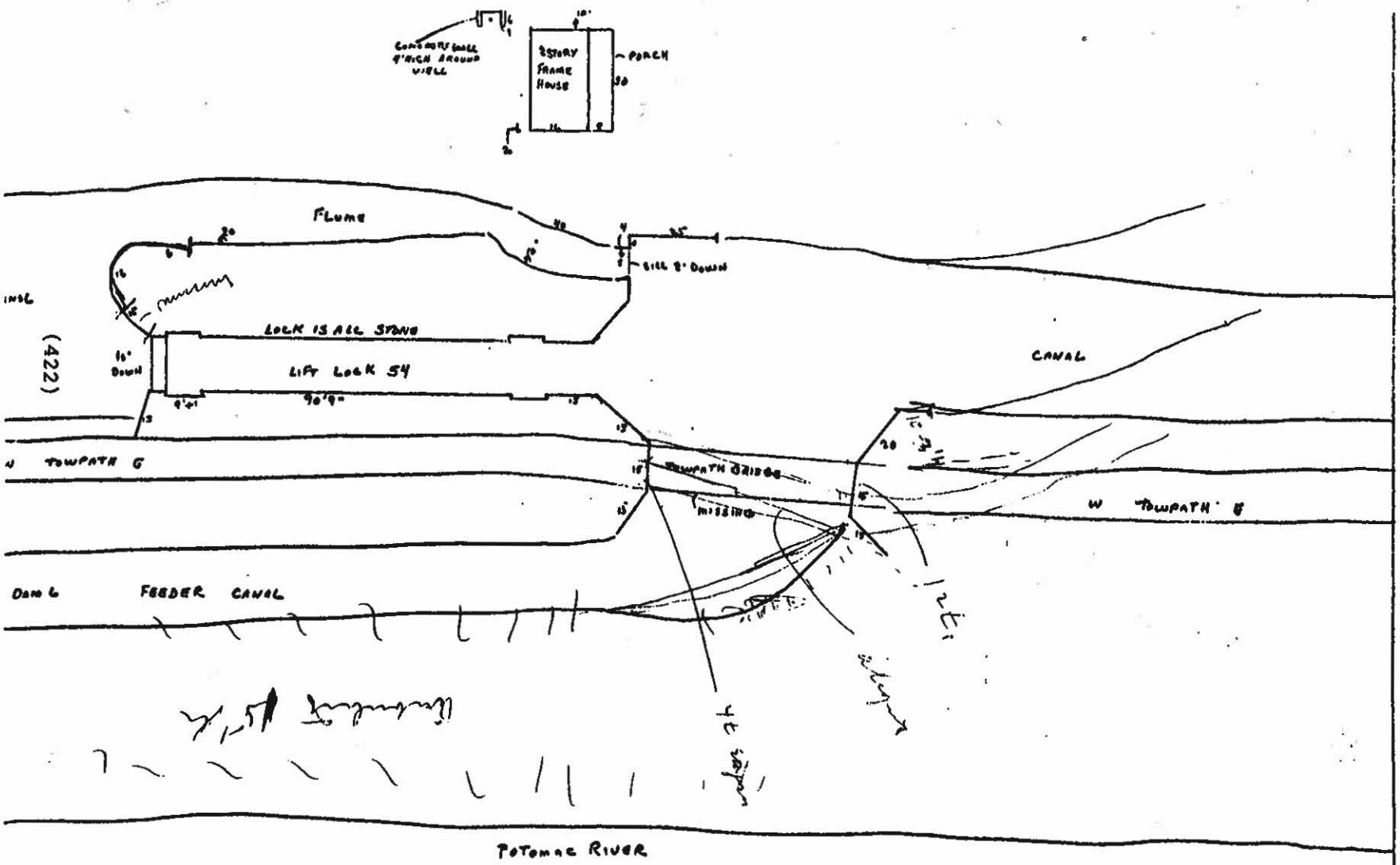
159.65 MP134 Lock 54

Lockhouse on berm - frame on foundation of rubble limestone and sandstone - whitewashed. At east end of lock on towpath - old cross bridge over feeder from Item 6. Footbridge over lock. Abutment of feeder bridge is Dor sandstone, with 3 tiers of limestone at base; 9 tiers of sandstone above - rough dressed.



159.78 Item 6 and Lock 55

Outcrop of Dor sandstone along WM Ry., dip 60° upstream.



FEEDER #6 ENTRANCE INTO CANAL
LOCK 54 AND LOCK HOUSE
LOCATION 134.0 TO W
50.5 TO C

upper towing path wing are remnants of a timber fender.

There ~~is~~ a foot ~~b~~ridge ove~~r~~ the cen~~t~~er of the ~~l~~ock. The miter frame is visible in the upper (buried now) recess. The lockhouse is on the berm and is a 2-story clapboard structure on rubble cellar walls. Lock has snubbing post

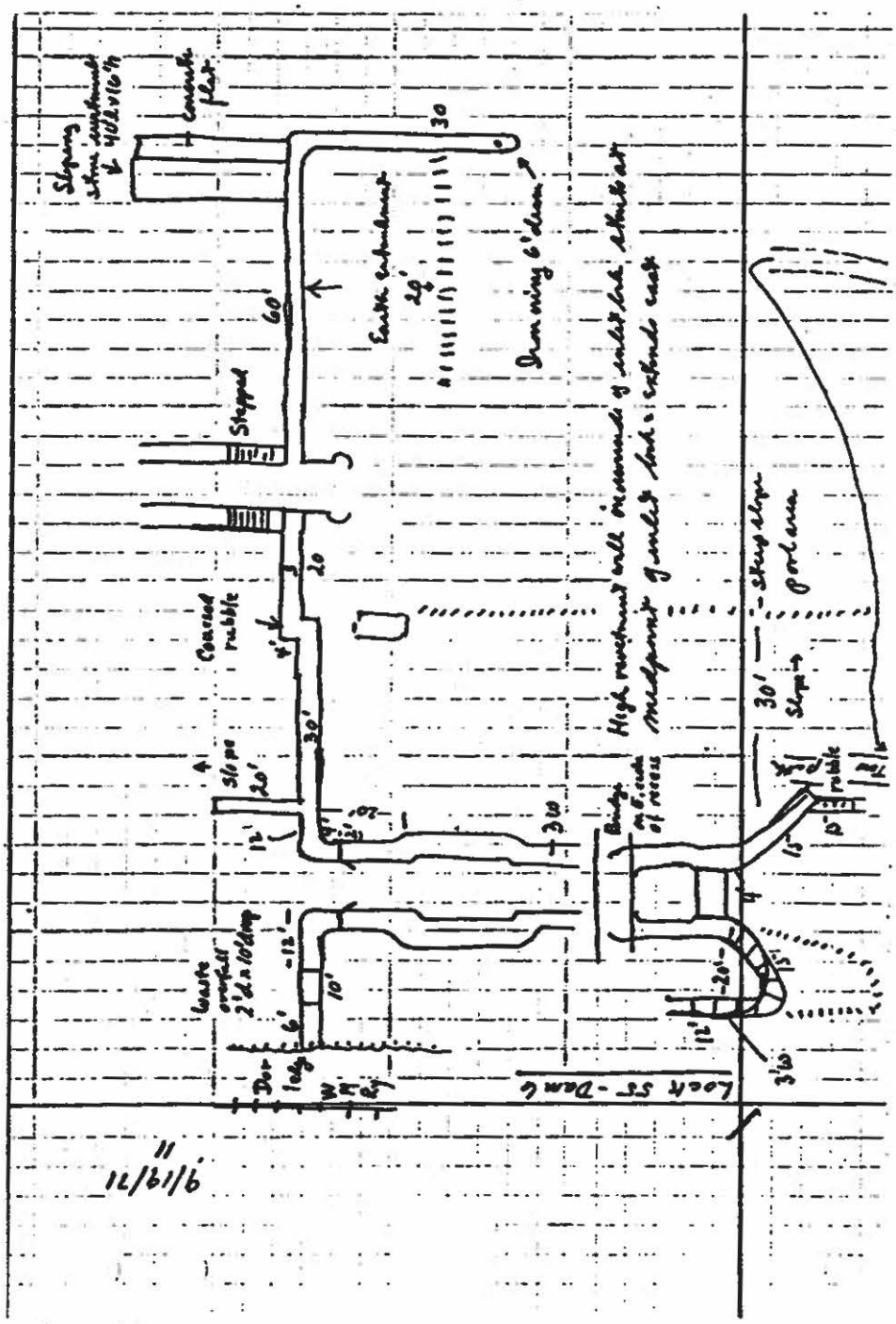
100 ft. west of the lock is an outcrop of Tonoloway Limestone. The beds strike N30°E, dip 45°NW; 150 ft. west the dip is 60°NW.

Retaining wall between WM Rg. and canal.

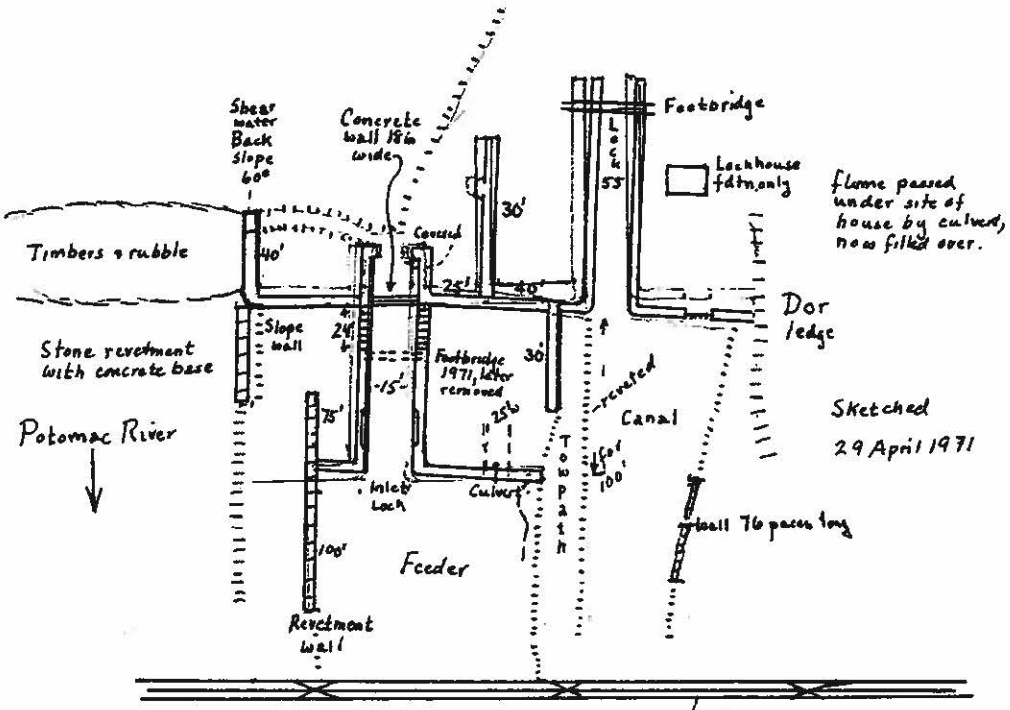
134.04 (134.09) OUTCROP (521.00) Keyser Limestone and limestones of the Helderberg Formation are exposed in a low ledge on the berm and in a railroad cut. The beds strike N30°E, dip 60°NW. 350 ft. of limestone is exposed and it is mainly thin bedded. The center part is massive.

Have sketch + Barmis plan

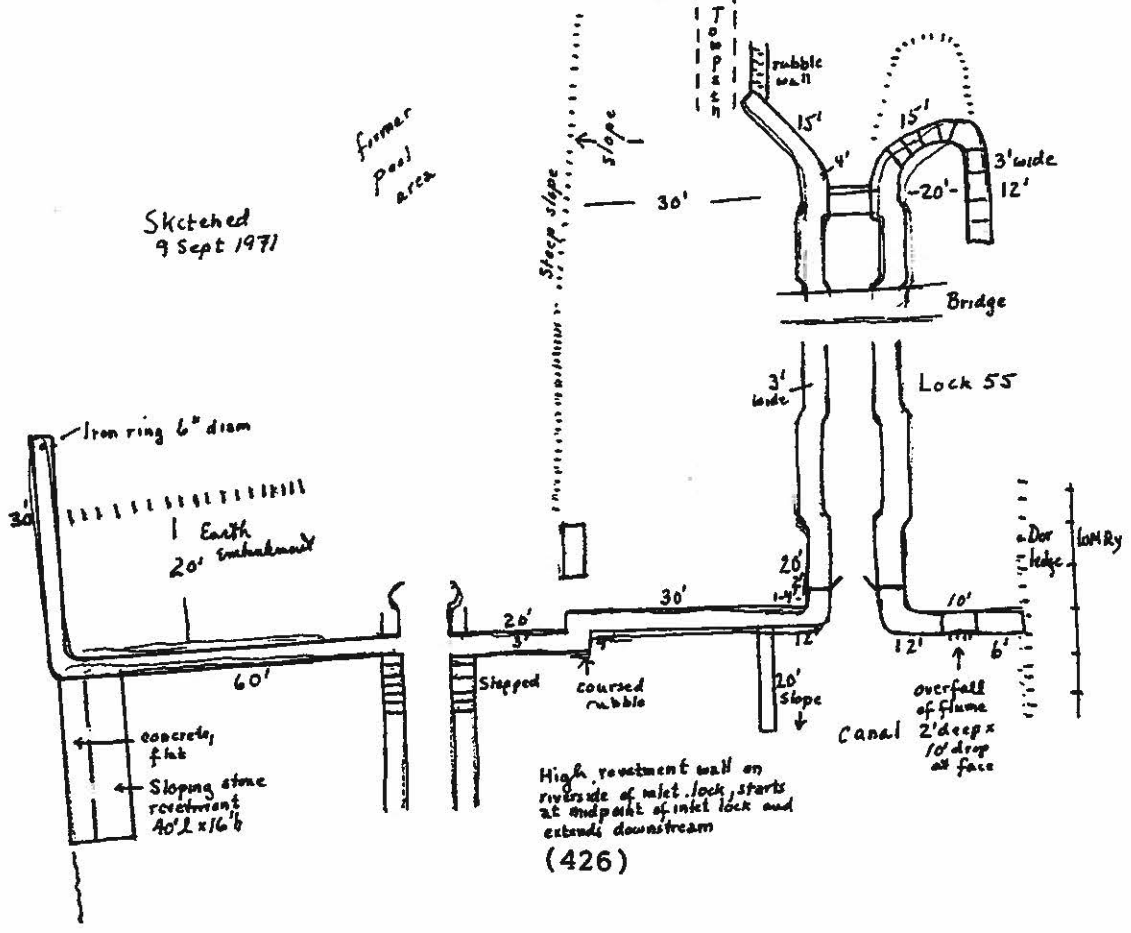
134.10 (134.13) DAM No. 6 AND LOCK 55 Constructed 1836 to 1839. The dam is 475 ft. long between abutments. The front of the dam was straight for 175 ft. in the center___.


Stepping stone approach to 40'x16'h
Concrete floor
30
Earth embankment
Stepped
60'
Dressing 6' diam.
20
Coarse rubble
4'
Slope
20'
30'
12'
30
Bridge
High merchantable wall revetment of selected hard material
Mudpoint gravelly sand & rubble refuse rock
30' — Stony slope
Slope
Coarse rubble
15'
Waste gravel 2'x2'x10'deep
10'
6'
Dock
Ladder
Wharf
Ry
Lock St - Dam 6
12'
3'
11
12/6/16

150 ft. on either side of this the face was flared upstream 5 ft. The front face was 15 ft. high above low water and the top was 58 ft. wide. The front 25 ft. of the top sloped down downstream at 5:1 and the back 33 ft. sloped down upstream at 2 1/2:1. The back face was8 ft. above low water. The dam was built of timber cribs, stone filled and with timber sheathing . It cost $104,426. The canal was opened to Dam no. 6 on April 19, 1839. From 1839 to 1850 the feeder channel to Lock 54 was used as a canal with barges passing into and out of the pool by way of a guard lock. The towing path was on river side of feeder. During this period coal was brought by the B & O Railroad from Cumberland to a wharf just above Dam no. 6 and transferred to canal barges. The Maryland abutment, guard lock and guard wall are hammer-dressed Ridgeley Sandstone from a quarry on Tonoloway Ridge, 1/2 mile to the north. The guard wall below the dam 15 ft. high, 120 ft. long and 15



DAM NO. 6 & VICINITY



ft. wide. The Virginia abutment is hammer-dressed Tonoloway Limestone quarried in Virginia, 1 mile from dam. Originally the Virginia abutment connected with two guard banks, one parallel to the river and the other continuing south from the dam; latter had gate allowing Long Hollow Run to pass through the guard bank. The guard banks were rebuilt in 1852 and the one parallel to the river was removed and masonry wall was extended south from the Virginia abutment to high ground. The dam backed a pool 4 1/2 miles long. The flood of 1852 broke through the guard banks on the Virginia side and the 1877 freshets damaged both abutments. The floods of March 31, April 1 and 4, 1886 tore out 237 ft. of dam. Most of the dam was rebuilt with new timbers at a cost of $45,335.67. 142 ft. of dam on Maryland side, was rebuilt in 1891. The 1924 freshet damaged the Maryland side of the dam and a breach of 50 ft. on Maryland side occurred on May 2, 1929. The cribs were rebuilt but the

freshet on August 2, 1933 again breached the dam. Another large breach on mainly the upstream side of the dam occurred on December 23, 1933. The remainder of the dam was partially destroyed by fire apparently set by fishermen on August 31, 1934. The flood of 1936 carried half of the dam away. The remains of the dam are now tree-covered mounds of timbers and rubble extending half way across the river from the Maryland abutment. The river flows against the West Virginia abutment. The guard wall between the dam and Lock 55 is an earth embankment and stone wall. A guard lock and chambered inlet lock cut through the guard wall. The feeder culvert on the north side of the guard lock extends through the guard wall. The culvert has a 10 ft. span and 5 ft. rise with 16 ringstones and a keystone in the face of the arch. The parapet and coping are 6 ft. high at the lower end. 18 ringstones and a keystone are in the face of the arch at the upper end. A foot bridge is

over the inlet lock. The revetment along the river bank extends 60 ft. downstream from the Maryland abutment. There is a stone guard wall on the river side of the feeder downstream from the inlet lock.

LOCK 55 7.8 ft. lift, constructed 1836-40. The lock is at the north end of the guard wall of Dam no. 6. It is faced with hammer-dressed Ridgeley (Oriskany) Sandstone from a quarry 200 ft. to the west at the south end of Tonoloway Ridge. The diagonal break in the stonework below the lower recess is the junction between the old guard wall ane the lock walls that were built later. Slots for stop gate boards are in the walls of the lock above the breast wall. The revetment on the upper berm, 15 ft. long, is probably the remains of a fender crib. Bolts on the upper wing, towing path side, are probably from timber fenders. The miter frame is visible in the upper recess. The lockhouse was on the berm but only the stone foundation

remains. A footbridge is over the head of the lock. The flume is on the berm with an overfall at the front face of the lock 10 ft. wide, 2 ft. deep and with a 10 ft. drop.

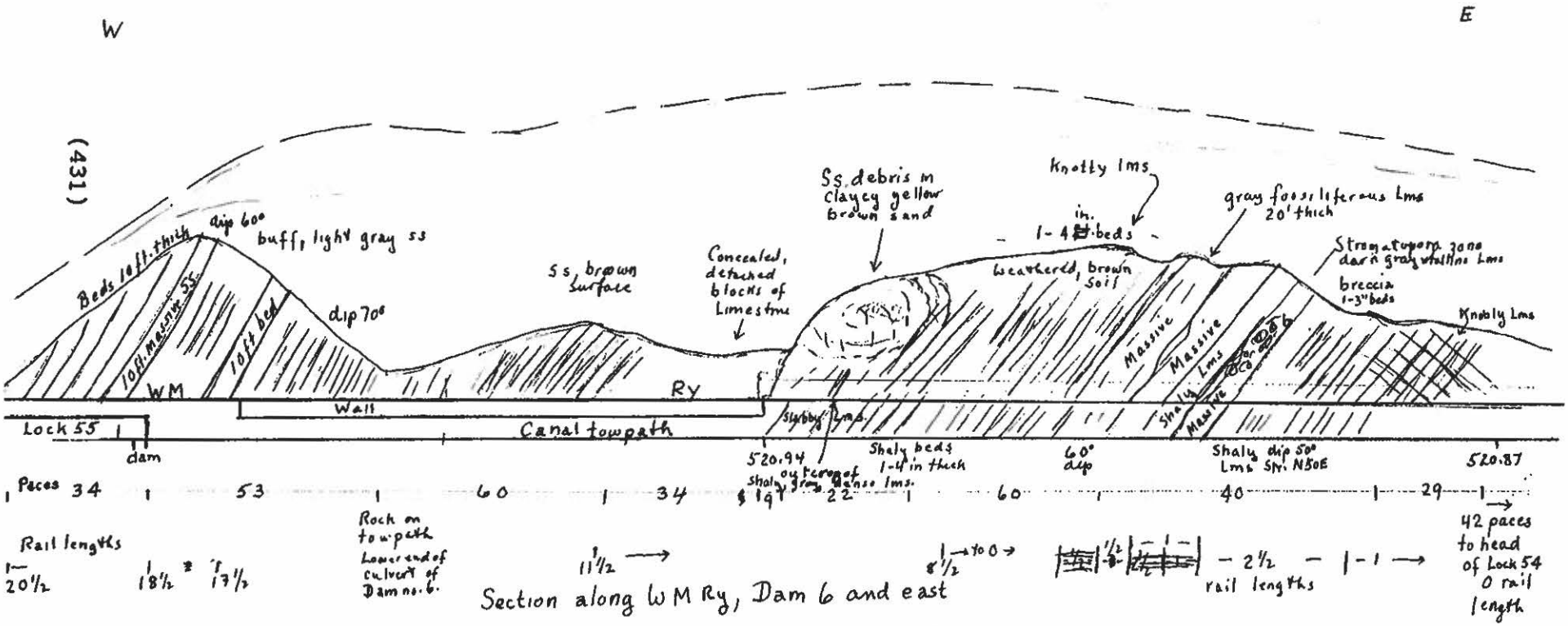
OUTCROPS of Ridgeley (Oriskany) Sandstone are on the north side of the lock and in ledges along the Western Maryland Railway. 150 ft. of the sandstone is exposed. Beds are 1 to 15 ft. thick with massive beds at the west end of the exposure. The beds strike N70°E and dip 45° to 60°NW. A large boulder of sandstone is adjacent to the towing path below Lock 55.

Diagram-1) plan of Dam no. 6, Lock 55
8"h x 16"w → 2" x 4" Field notes 4/29/71 p5
9/19/71 p 10,11
2) Perspective and exploded view Dam no. 6
48" x 36" → 16" x 12" → page size
-NA photostat

134.28 Concrete opening for Long Hollow (Polly) Pond with circular, corrugated pipe under towpath; 2 at 3 ft each (culverts). 2 rows of timber sheet piling across creek on bottom.

134.28 (134.31) RESLEY RUN SPILLWAY An overfall, 60 ft. long, is opposite Long Hollow, Polly Pond. The walls are cut limestone and the piers for the towing path bridge are limestone blocks and concrete 10 ft. long, 4 ft. high,

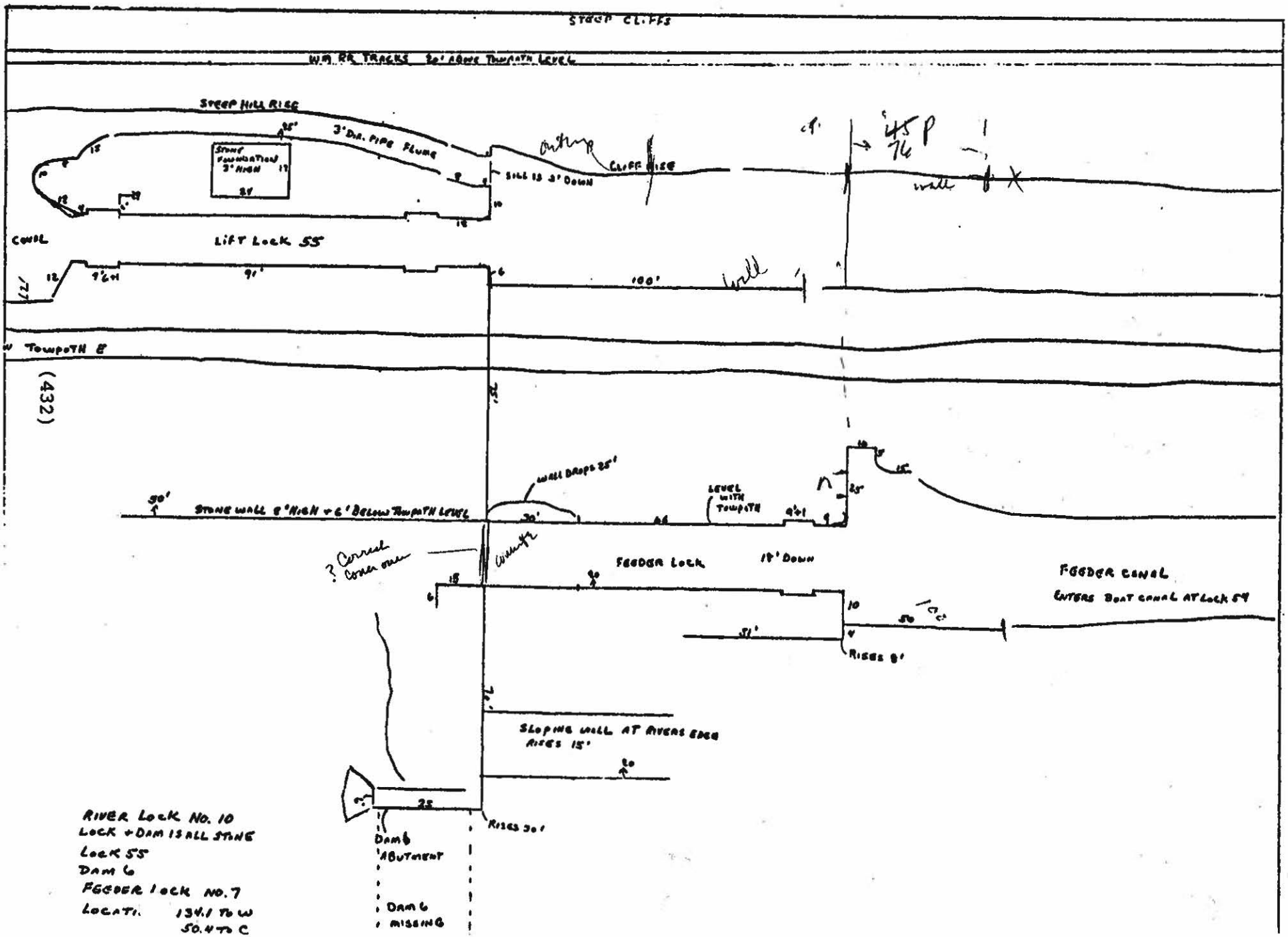
Barnes plan; sketch



Section along W M Ry, Dam 6 and east

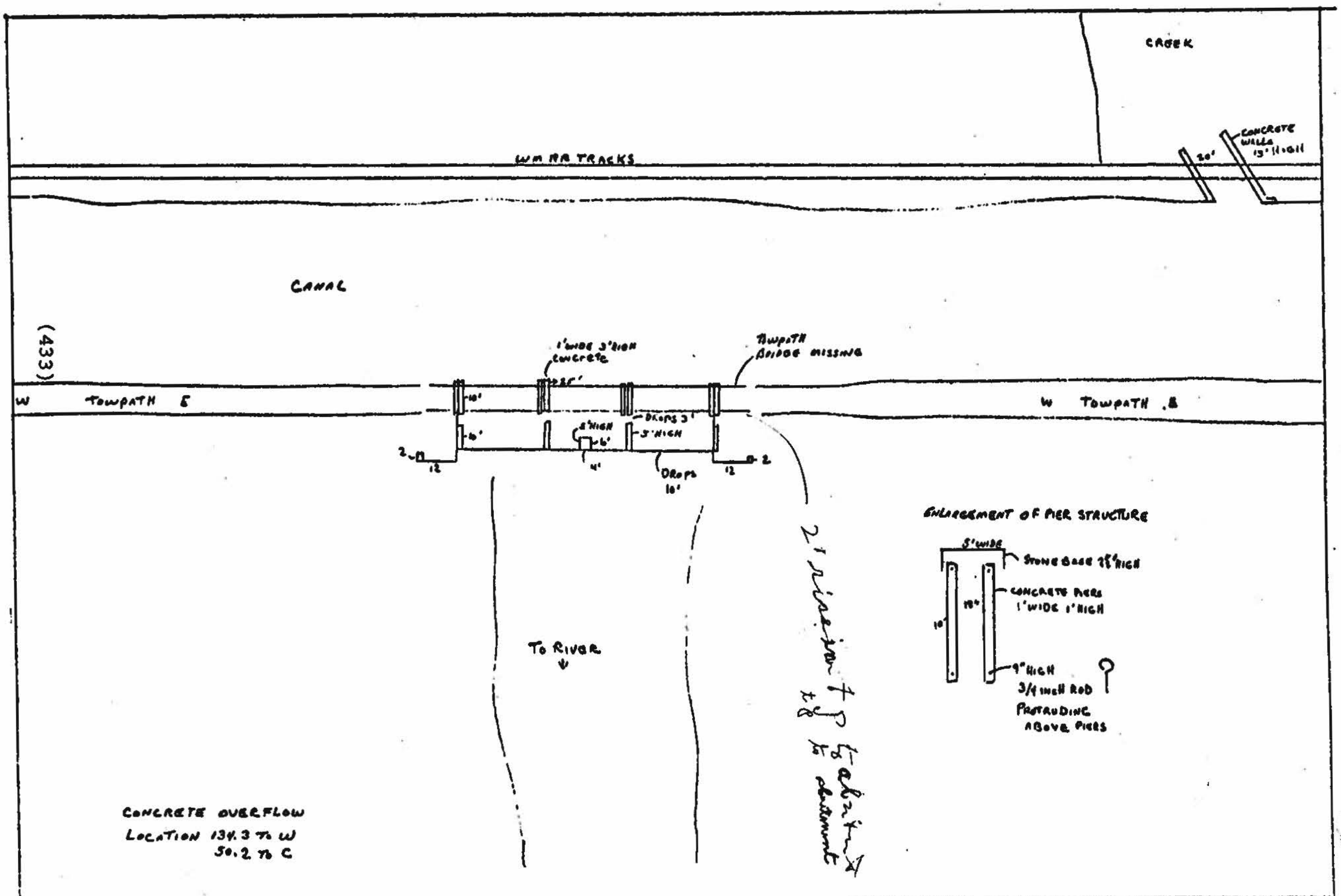
Sketched

379a


STEEP CLIFFS
W.M. RR TRACKS 20' ABOVE TOWPATH LEVEL
STEEP HILL RISE
3' DIA. PIPE FLUME
STONE FOUNDATION 3' HIGH
CLIFF RISE
STILL IS 3' DOWN
wall
CANAL
LIFT LOCK 55
100'
wall
TOWPATH
(432)
STONE WALL 8' HIGH + 6' BELOW TOWPATH LEVEL
WALL DROPS 25'
LEVEL WITH TOWPATH
? Carried Over
FEEDER LOCK
18' DOWN
FEEDER CANAL
ENTERS BOAT CANAL AT LOCK 54
RISES 8'
SLOPING WALL AT RIVERS EDGE
RISES 15'
RISES 30'
DAM 6
ABUTMENT
DAM 6
MISSING
RIVER LOCK NO. 10
LOCK + DAM IS ALL STONE
LOCK 55
DAM 6
FEEDER LOCK NO. 7
LOCATI. 134.1 TO W
50.4 TO C

3796

(433)


CREEK
CONCRETE WALLS 13' HIGH
20'
WM RR TRACKS
CANAL
1' WIDE 3' HIGH CONCRETE
25'
TOWPATH BRIDGE MISSING
W TOWPATH E
W TOWPATH E
10'
6'
3' HIGH
6'
DROPS 3'
3' HIGH
4'
DROPS 10'
12
12
TO RIVER
ENLARGEMENT OF PIER STRUCTURE
5' WIDE
STONE BASE 2½' HIGH
CONCRETE PIERS 1' WIDE 1' HIGH
10'
9" HIGH 3/4 INCH ROD PROTRUDING ABOVE PIERS
CONCRETE OVERFLOW
LOCATION 134.3 to W
50.2 to C

379e

520.75

spaced 20 ft. The towing path was formerly on a timber bridge resting on these piers. 10 ft. wings are on the river side. There is a 10 ft. drop at the front of the spillway. The pavement of the spillway is coursed sandstone rubble. An outcrop of Hamilton shale is along the Western Maryland Railway.

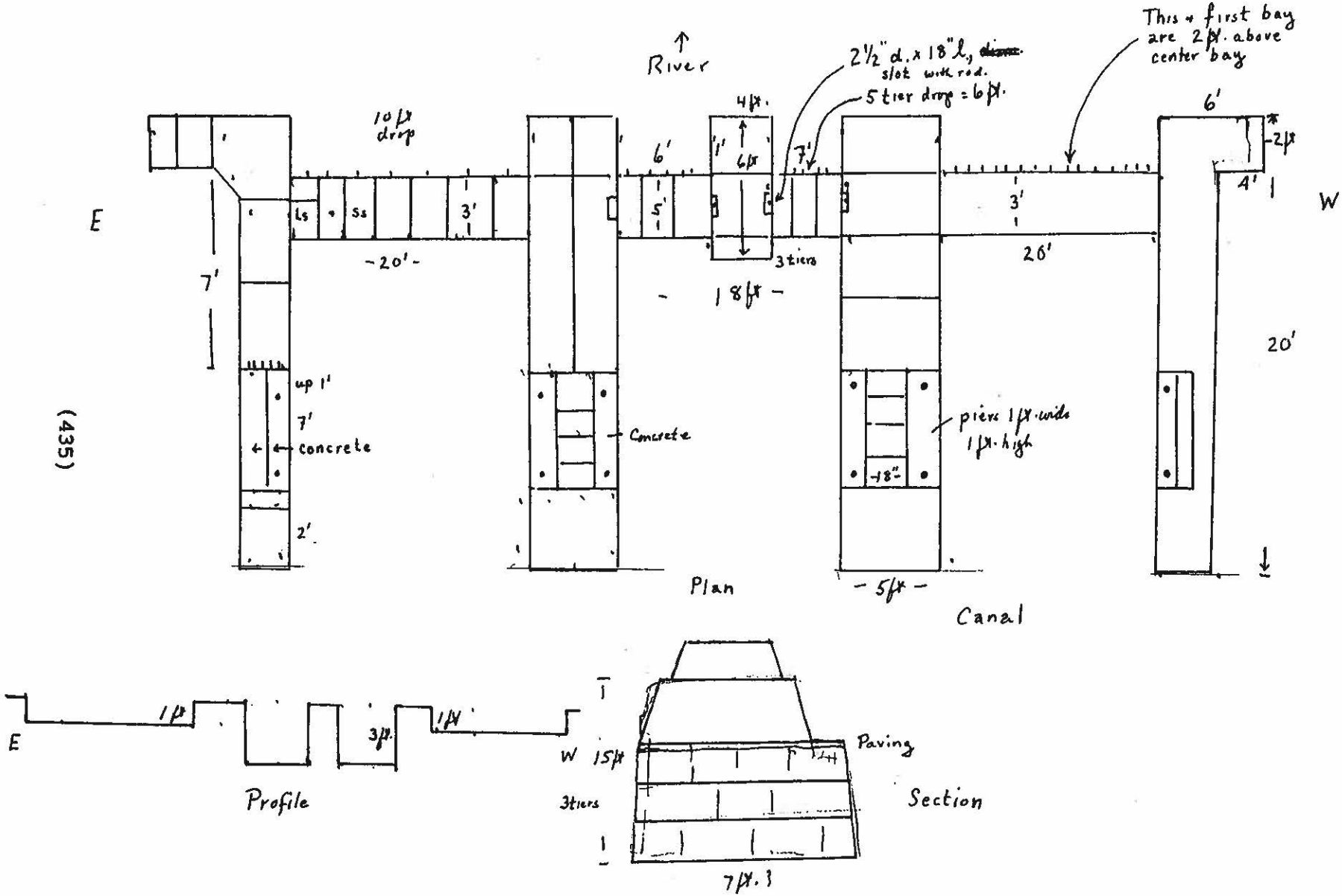
Have diagram + Barrow's diagram.

134.51. OUTCROP A bluff on the berm, 20 ft. high is
526.00-521.25
formed of highly cleared Hamilton gray, shaly sandstone.
Dip 70° upstream, strike N40E, cut in railroad 50ft. deep behind (north of outcrop.

134.57 OUTCROP Low ledges on the berm are gray
521.25 - 521.38
shale and shaly sandstone, Brallier (Woodmont) Formation.
The beds strike N30°E and dip 75°NW.
Beds vertical at west end., beds 1-4 in. Thick. -along RR + canal.

134.60-134.69 OUTCROP Low ledges on berm are formed of
521.40-521.55 + high cut on railroad.
gray shale and sandstone, Brallier (Woodmont) Formation.
The beds strike N30°E, dip vertical on east, 60 to 70°NW at the west.

134.90 CULVERT 199 Constructed 1837-38. The
521.75


River
2½" d. x 18" l, slot with rod.
5 tier drop = 6 ft.
This + first bay are 2 ft. above center bay
10 ft drop
4 ft.
6'
7'
6'
2 ft
4'
E
W
ls
ss
3'
5'
3'
-20'-
26'
7'
3 tiers
- 18 ft -
20'
up 1'
7'
concrete
2'
Concrete
piers 1 ft. wide 1 ft. high
18"
- 5 ft -
Plan
Canal
(435)
1 ft
1 ft
3 ft.
E
Profile
W 15 ft
3 tiers
Paving
Section
7 ft. 3
380

semicircular arch is cut Ridgeley (Oriskany) Sandstone with a 6 ft. span and a 3 ft. rise. 8 ringstones and a keystone are in the face of the arch. The parapet and coping are 3 ft. high. A 10 ft. embankment is above the coping. Spandrels, parapet and wings are coursed sandstone rubble. The culvert is filled to the arch (1971). Short wings 2 ft. long

MP 135 : 521.85 Road comes in from north : Woodmont Rd.

135.10 521.95 **SWING BRIDGE** The concrete piers and abutments with iron bars and rings on the berm and towing path are remnants of a timber footbridge that was formerly suspended by cables across the canal. The bridge gave access to the river from the Woodmont Club founded 1870.

abutment 5 x 8 ft., 4 ft. high on towpath. 3 small concrete blocks 3-4 ft x 1 ft. on berm.

Barron's diagram

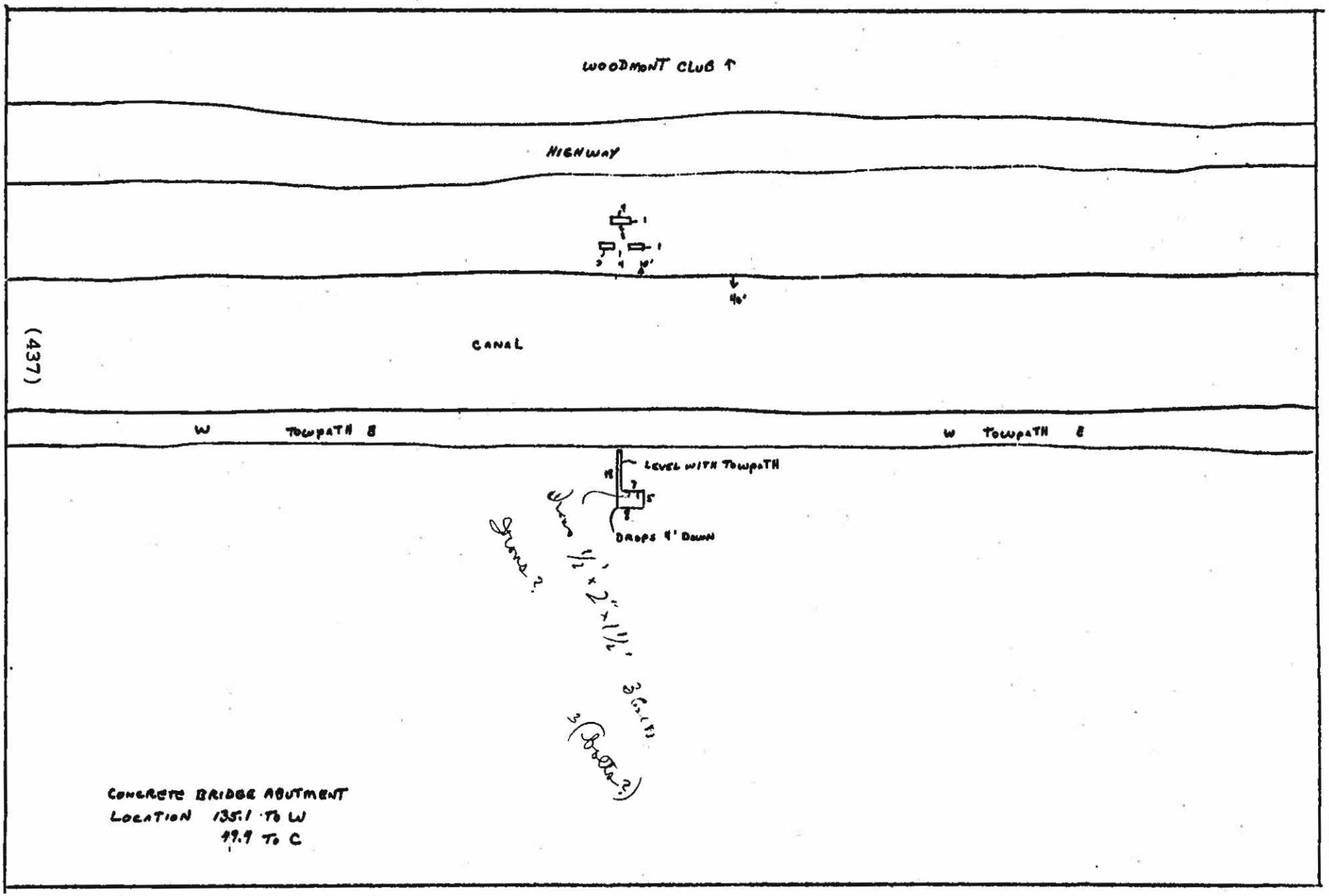
135.16 522.00 **CULVERT 200** Constructed 1837. The semicircular arch is cut white sandstone with a 10 ft. span and a 5 ft. rise. ~~20~~ 18 ringstones and a keystone are in the face of the arch. The spandrels and parapet are dressed coursed, red sandstone rubble. [The face of the culvert has fallen and the timber] Rebuilt

3 ft. parapet, 6 in. coping

Wings 15 ft 6 ft. drop

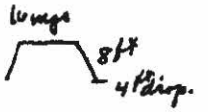
Arch & coping are sandstone, dressed; 3 ft drop (fall) at front.

U. S. GOVERNMENT PRINTING OFFICE : 1959 O - 511171


WOODMONT CLUB ↑
HIGHWAY
40'
CANAL
(437)
W TOWPATH E
W TOWPATH E
LEVEL WITH TOWPATH
DROPS 4' DOWN
CONCRETE BRIDGE ABUTMENT
LOCATION 135.1 TO W
49.9 TO C

footings are exposed.

135.20 ~~522.61~~ CUTCROP Cuts along the road on the berm side are in deep silty soilexposed in a nearly vertical face. The soil on the face of the cut is channeled by deep grooves. The ability to stand in steep cut slopes is characteristic of silty soils with fragments of shale that develop from Middle Devonian shale formations.

135.80 522.61 CULVERT 201 Constructed 1837-38, completed 1840. The semicircular arch is cut white Ridgeley (Oriskany) Sandstone with a 10 ft. span and a 5 ft. rise. 18 ringstones incl. skewbacks and a keystone are in the face of the arch. The abutments are 2 ft. high and the parapet and coping are 1 1/2 ft. high. The spandrels and parapet ae coursed red sandstone (Catskill) rubble. An embankment is 10 ft. above the coping. The timber footings of the culvert are exposed below the towing path. + 

Extend to front of wings.
Surface timbers, 3" x 8" parallel to culvert; cross timbers 10" x 10".

MP 136 = 522.85

136.05 CULVERT 202 Constructed 1837-39, completed 522.90

1848. The semicircular arch is cut white Ridgeley (Oriskany) Sandstone with a 6 ft. span and a 3 ft. rise. 10 ringstones incl. skewbacks (same on term) and a keystone are on the face of the arch. The abutments are 1 ft. high. The parapet and coping are 3 ft. high. The wings are flared. The spandrels and parapet are fine grained, well bedded, coursed limestone rubble. 10 ft. embankment abm

8' wings on towpath + term side

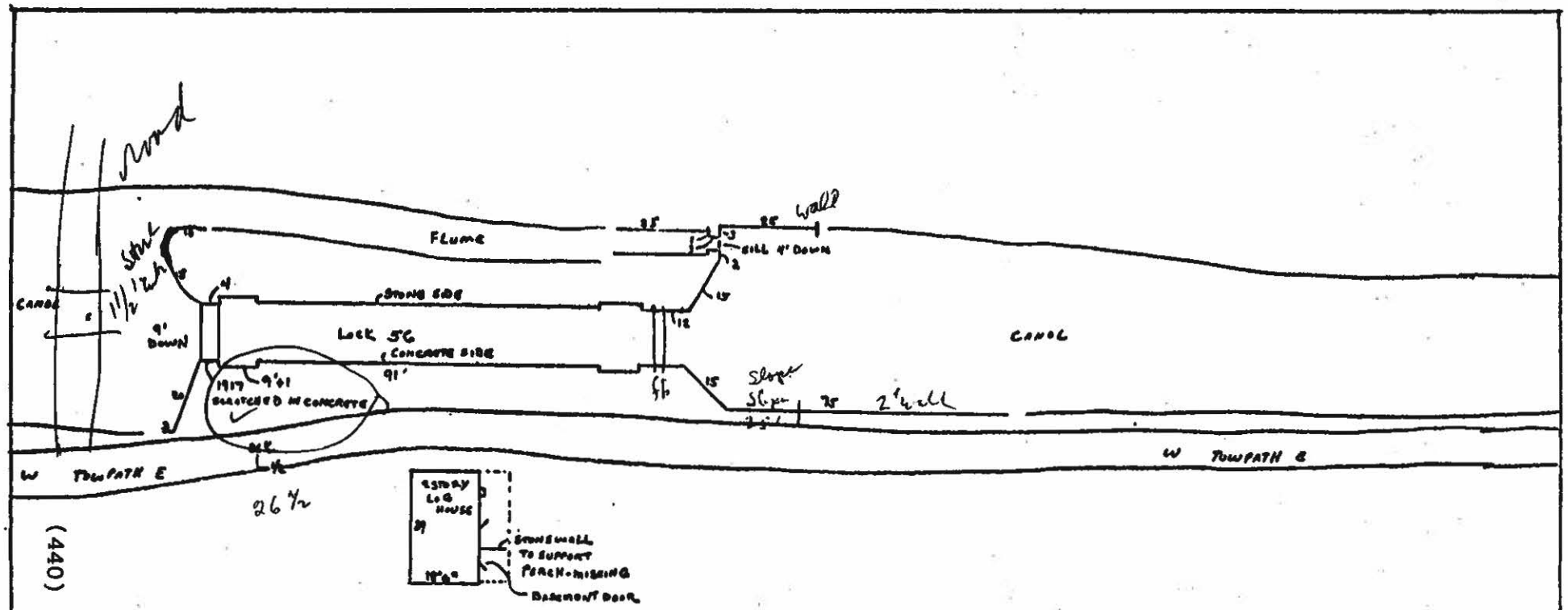
Coping. 136.06

Trace of wooden waste weir on term; wastes into inflow of culvert; about 30 ft. upstream of culvert; now an open ditch, 10' wide (cut through berm, timbers in bottom and rough stonework at back + front.

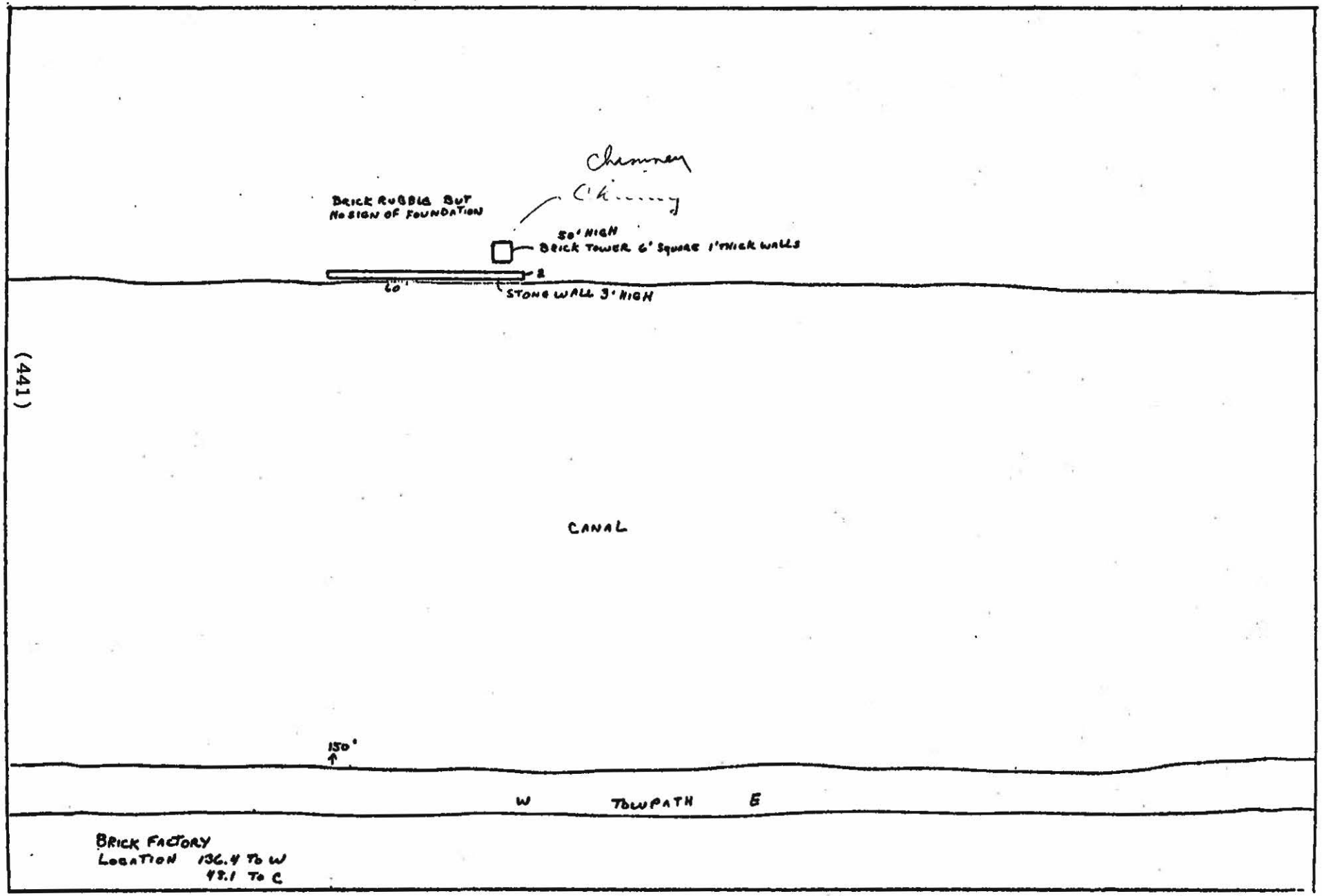
136.24 523.12 LOCK 56 7.7 ft. lift, constructed 1837-39, completed 1849. The facing is Tonoloway Limestone from a quarry near the mouth of Cacapon River in Virginia and from a quarry on Little Tonoloway Creek near Hancock. The limestone is wavy-banded, gray with orange stained bands up to an inch thick. Concrete is on the towing path side of the chamber, above the old coping, and at the circular quoins and recesses. A pile of limestone blocks removed from the chamber are along the towing path. Slots for stop gate boards are at the head of the lock. Bolts on the face of

Under rd. 2 - 24" concrete pipes

Barrons diagram



Lock is Stone on one side + Concrete on other
Lock 56 and Lock House
Location 136.2 To W
49.3 To C


Chimney
Chimney
BRICK RUBBLE BUT
NO SIGN OF FOUNDATION
50' HIGH
BRICK TOWER 6' SQUARE 1' THICK WALLS
2
20'
STONE WALL 3' HIGH
(441)
CANAL
150'
W
TOWPATH
E
BRICK FACTORY
LOCATION 136.4 TO W
48.1 TO C

3936

the lower and upper berm wings are from timber fenders.

The flume is on the berm, 25 ft. from the lock. The spillway for the flume is 10 ft. wide and 4 ft. deep with a 6 ft. drop at the lower berm wing wall. The lockhouse is on the towing path side of lock and is a clapboard structure over logs. The foundation is red, brown sandstone (Catskill) rubble.

Basin up to 150 ft. wide extends to 522.25 (523.25??)
Date - 1917 - in concrete on coping atop upper recess. 25 ft. wall on berm below tail of lock. Slope wall 75 ft. long on towpath/prism side.
Footbridge across lower end of lock - road on causeway atop lock.

136.4 523.20 "Brick factory" + stone wall on berm, 60 ft. long; dock; tower and ruins (Barron)
Brick tower 6 ft square, 50 ft. high, 1 ft. thick walls (chimney)

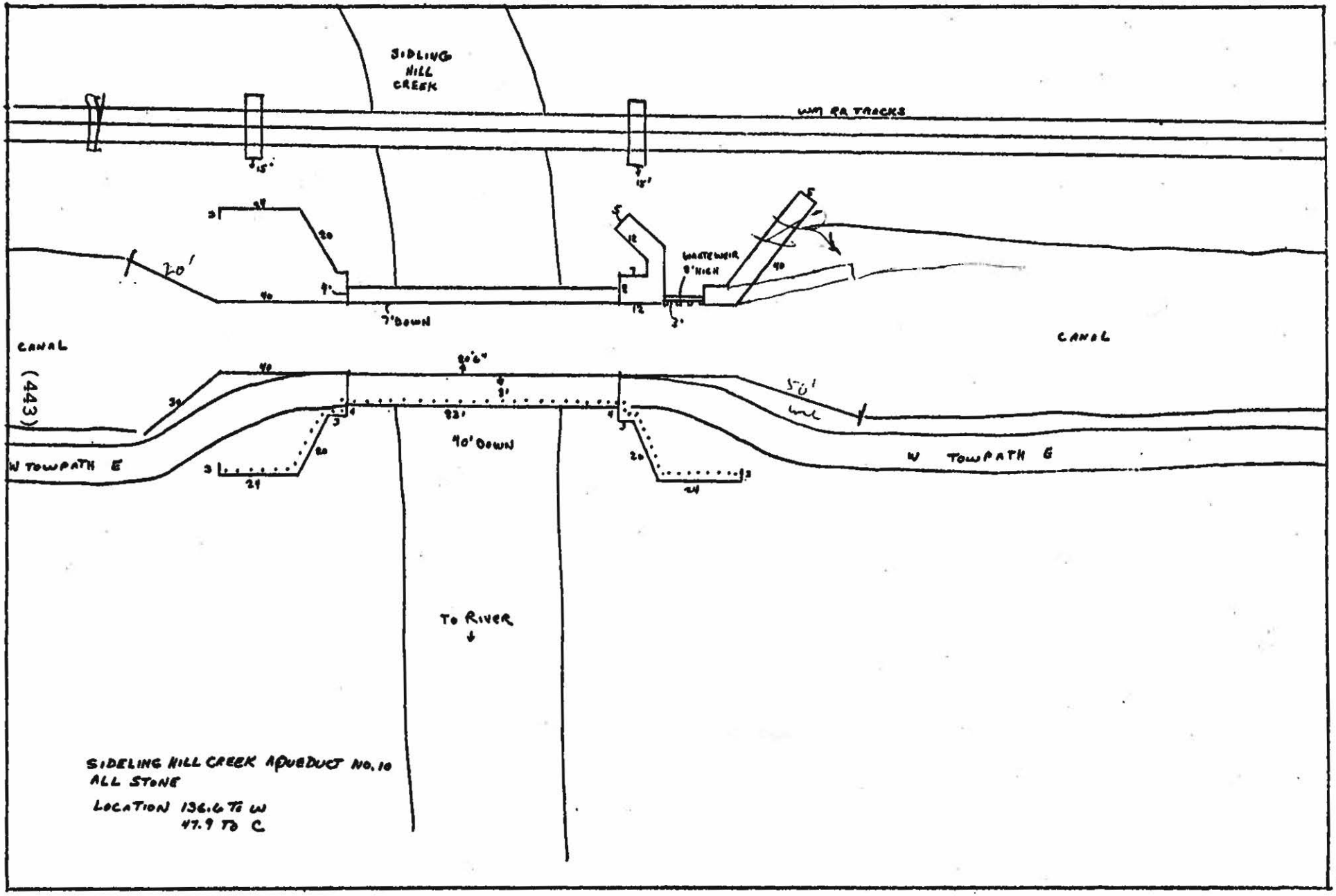
136.45-136.58 OUTCROP A cut along the Western Maryland Railway exposes gray and red shale, Catskill Formation, on the east and folded brown sandstone, Pocono Formation, on the west. The rocks are overlain by cobbles in orange brown silt, a Quaternary terrace deposit. The sandstone ledges at the railroad bridge and at the aqueduct are white, stained brown, fine grained, arkosic beds, 1/2 to 2 ft. thick, striking N10°W and dipping 77°E.

136.58 523.46 SIDELING HILL CREEK no. 8 AQUEDUCT Constructed

6 metal steel bars on upstream + downstream face + tie rods to hold arch

Barron Diagram.
Davies diagram of Aqueduct
Davies diagram of ruins on hill

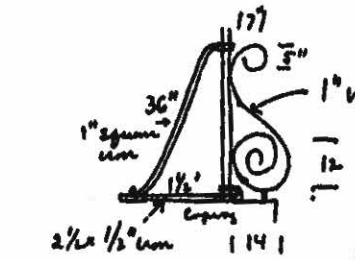
Data checked 9/16/1978 on aqueduct.


SIDLING HILL CREEK
WM RR TRACKS
WASTEWEIR 9' HIGH
7' DOWN
CANAL
CANAL
(443)
W TOWPATH E
W TOWPATH E
40' DOWN
To River
SIDELING HILL CREEK AQUEDUCT NO. 10
ALL STONE
LOCATION 136.6 TO W
47.9 TO C

1837-1840, completed 1848. This aqueduct has a single, asymmetrical elliptical arch with a 60 ft. span and a 12 ft. rise. 18 ringstones are on east side of the keystone, 25 on the west. The aqueduct is 150 ft. long between wings. The abutment is 5 ft. high on west and 8 ft. on the east. The east abutment is backed by a ledge of rock. Foundations for the abutments are 5 ft. below the present water level and 13 ft. below the former pool of Dam no. 6. The skewbacks are 2 tiers high. The parapet and coping are 7 ft. high. The top of the coping is 24 ft. above the former level of the pool of Dam no. 6 and 36 ft. above foundations. The towing path parapet is 7 ft. thick at the top and 7 1/2 ft. at base. The berm parapet is 5 ft. thick at the top and 5 1/2 ft. at the base. The arch, skewbacks, water table, coping and the inside of the parapet are cut, dense, black, laminated Tonoloway Limestone from near the mouth of the Cacapon River. The rest of the aqueduct is coursed limestone and Pocono sandstone rubble.

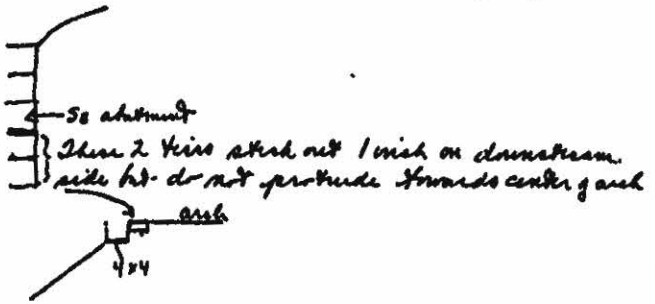
8/15/71
10

Sideling Hill Aqueduct



post = 1¼" square iron

36 ring stones + keystone in arch.
parapet = 3 tiers + coping = 7 ft.
2 tiers on arch to water table trim. = 2 ft.
1 tier water table
Archis limestone. Sandstone elsewhere



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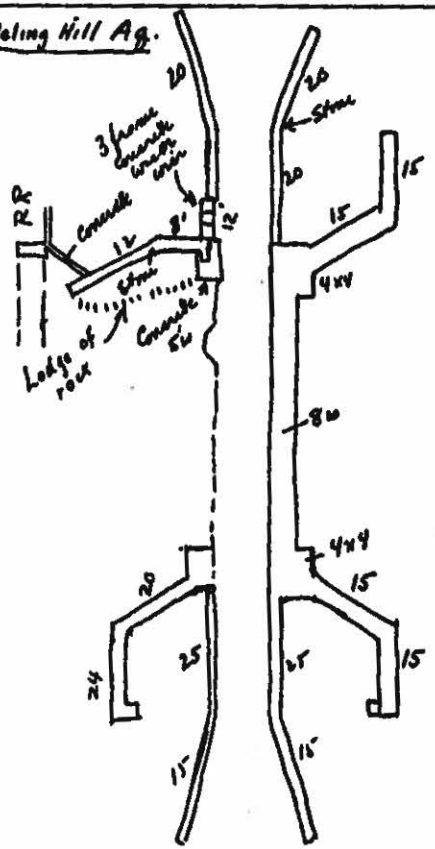
9

Sideling Hill Aq.



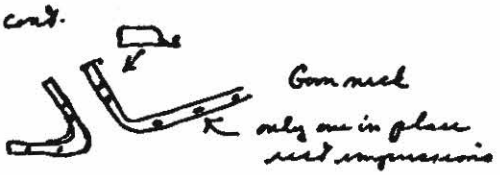
Square pegs hold stones.
Berm parapet removed. Trunk under span in trunk of canal.

(445)

385a

8/15/71
8

Lock 56 - cont.



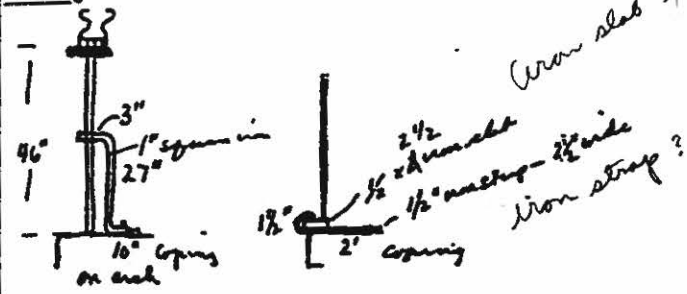
1 —4'— 1

Spilling or trim - overfall, not under gate

Toolhouse, clapboard over logs on towpath.
Pile of limestone blocks on towpath
Slot in wall above breast for stop planks.
No evidence of extension
WM Ry. - Sideling Hill Bridge, 2 spans, deck girder (plate).

Sideling Hill Aqueduct

Railing



Circular rods stand 6" abm longitudinal rail. which is ½ x 2½ wide. 8 circles between rounds 13 rounds between squares. All large types gone Base iron slot bar holds rails. Rounds and squares tapered at base.

L56
Sideling Hill Aq

The sandstone was quarried on Sideling Hill. The appraach walls are coursed rubble, mainly Pocono Sandstone with some limestone. The berm wall was removed and a timber trunk placed in 1874. The berm side gave way in 1885 and was rebuilt. 14 timbers, each 10 x 10 inches, spaced 4 ft., are embedded in concrete in the base of the waterway. A waste weir with a concrete frame for three gates and insert boards is on the berm at the east end of the aqueduct. The spillway was formerly over a rock ledge at the base of the railroad bridge. 100 ft. west of aqueduct - red purple sandstone crops out on riverside of towpath - 8 ft. high.

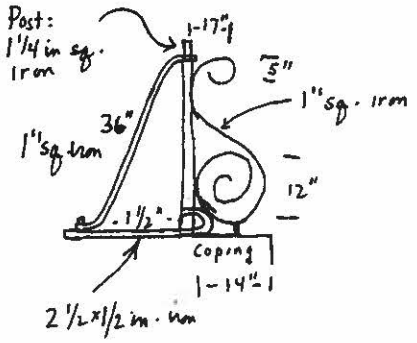
Western Maryland Railway bridge no. 1276 is on the berm side of the canal. It is a 2 span, deck plate girder bridge, built 1905, by the Pennsylvania Steel Company, Steelton, Pa.

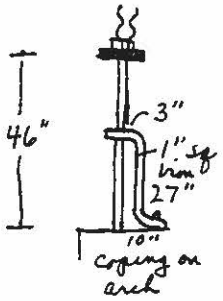
MP 137 = 523.68 ?

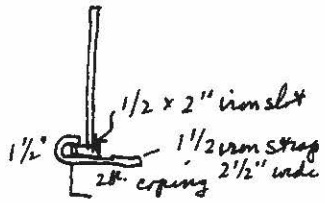
137.00 136.92 ? OUTCROP 523.60 Cuts on the Western Maryland Railway expose sandstone and shale of the Pocono Formation. The beds strike N20°E and dip 65°E.

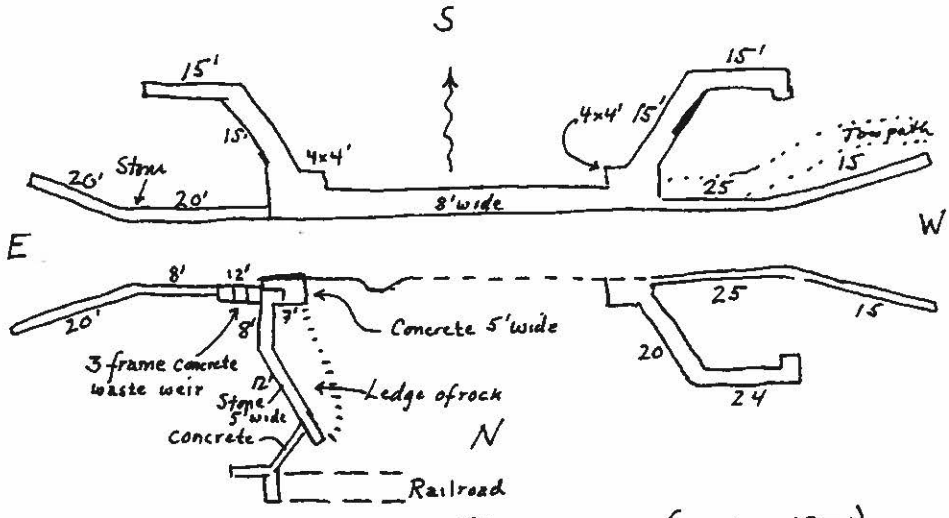
Davies diagram

Sidelling Hill Aqueduct (15 Aug. 1971)









Plan (15 Aug. 1971)

Brum parapet removed. Trunk timbers images in prism. Square pegs hold stones.

137.09-138.23 OUTCROP Cuts on the Western Maryland Railway expose red hackly shale and sandstone of the Catskill Formation. Some gray shale and sandstone, Chemung Formation, is on the west. Runside of towpath: spoil from railroad cuts; mound at 525.58 rises 5ft. above towpath for 30ft.

Davies - diagram of joints & section.

Diagram- section exposed on WM.
Original- 14" x 8"- 3 columns- + 2 plans of joints-
final 7" x 4" (full page). Field notes 9/6/69-p. 3-5 + 6,7.

137.50-138.50 Two floating bridges in this section were built to the West Virginia shore in 1838 to obtain embankment materials.

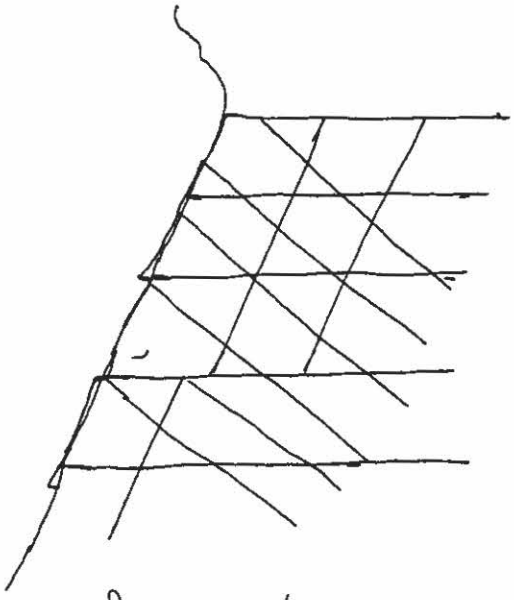
MP138 : 524.67 on May 15, 1950. derailment on WM Ry., just east of Indigo Tunnel put freight train + engine in canal

138.33 OUTCROP 524.90 - 525.00 A low ledge on the berm is just west of the portal of Indigo Tunnel(Western Maryland Railway). Red sandstone is overlain by 60 ft. of gray sandstone and shale of the Chemung Formation. The beds strike N30°E and dip 65°SE. The rocks exposed are similar to those at the end of the section east of the railroad tunnel.

138.48-138.57 OUTCROP 525.05-525.10 A ledge on the berm is formed of rocks of the Catskill Formation. The red sandstone is

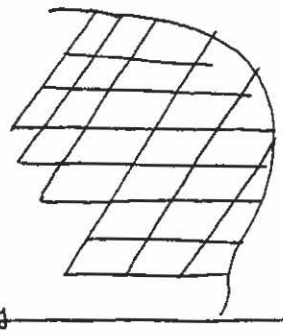
Strike N10E, dip 55° upstream.

99.3
137.9?
Mile 137.09



Joints on bedding plane in shaly sandstone in cut on WM Ry.
6 Sept. 1969

~~99.3~~
99.51
137.09



as above

W. WM Ry E.

irregularly bedded and strikes N40°E and dip 58°SE.
Beds 1m. to 4in; at 0.10 = 10ft. of gray ss 1-2ft. beds; red beds to 525.12.
Isolated outcrops to 525.20.

138.55 TERRACE There is a flat area on the berm, 5 to 10
525.35 —
ft. above the level of towing path, (20 ft. above the river)
on the east and at the towing path level 1,000 ft. to south-
east.

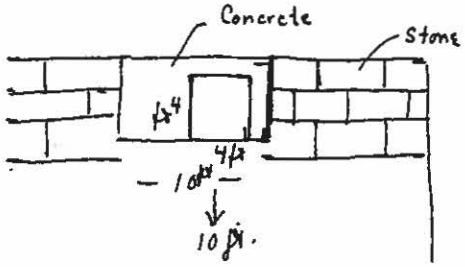
525.55 - 525.65 - Rubble revetment on riverside of towpath.
138.68 - 525.40? - underwater extension to Lock 57 = curve at Indigo Bend.
MP 139: 525.65 139.15 Informal overfall, about 140 ft. long (Perkins) - not seen
139.25 LOCK 57 8 ft. lift, constructed 1838-39, 1849-50.
526.09 Indigo Bend HBO - just west of Lock at 139.30.
The face is hammer-dressed limestone from a quarry near the
mouth of the Cacapon River in West Virginia. Some of the
limestone is from Harts Quarry on Little Tonoloway Creek.
The limestone is banded with bands 1/2 inch apart. The
upper circular quoins and the upper half of the chamber on
the towing path side, except for upper 3 tiers, are concrete.
Slabs of brown sandstone are in the wings. Slots for stop
gate boards are at the head of the lock. The flume is on
the berm, 20-30 ft. from lock. It is 4 ft. deep, 5 ft. wide,
with a revetment of red sandstone, limestone and gray sand-
stone rubble. A concrete frame, single gate, board insert

100 ft. on tailwater side of 525.95 - towpath displaced - riprap on riverside = overfall.

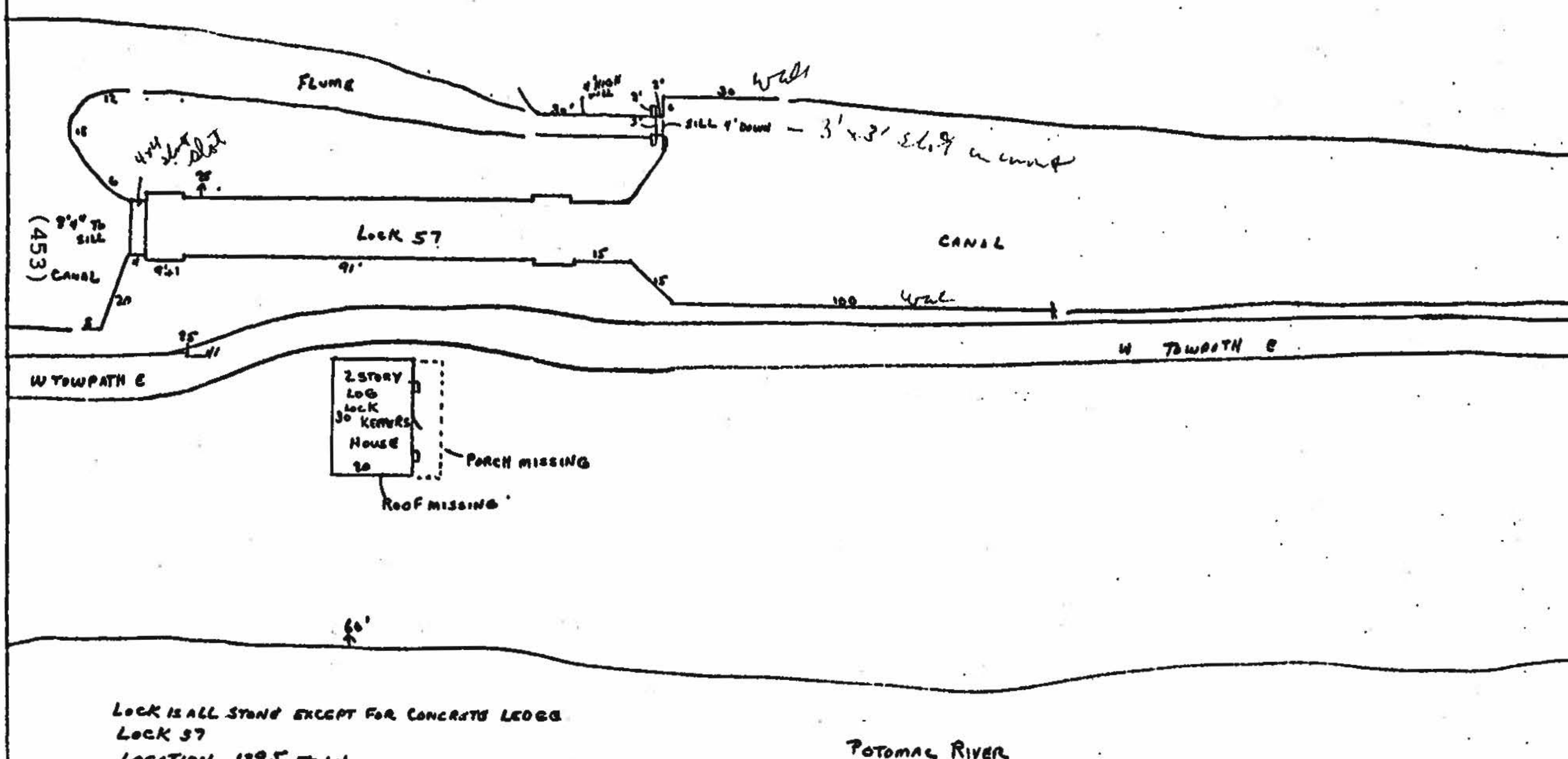
Barrm's diagram
Davies diagram.

139.25 (19 Sept. 1971)
Flume - tail of Lock 57.

Waste on berm, lower end of Lock 57, 30 ft. from lock
1 gate, concrete, boards placed across 10 ft wide overfall,
10 ft. drop at first.



View of berm face



LOCK IS ALL STONE EXCEPT FOR CONCRETE LEDGE
LOCK 57
LOCATION 139.5 TO W
45.0 TO C

control gate is at the lower end of the flume. An overfall for the flume, 10 ft. wide with an 8 ft. drop, is on the berm wing. The miter sill is exposed in the upper recess. Bolts on the towing path and berm sides at the lower end of the lock are remains of the timber fenders. The lockhouse is on the side of the towing path. It is clapboard over logs with a foundation of reddish brown and dark gray sandstone rubble. Blocks of limestone from lock chamber are along the towing path at the upper end of the lock. A cement house was at the lock in 1840. 30 ft. wall on berm below lock. 4 x 4 in. slot for insert boards at head of lock. Rubble masonry wall 100 ft. long on towpath/prism at tail of lock.

A 40 ft. long embankment on the berm at the upper end of lock is an old landslide.

Brown shaly Catskill Sandstone crops out on the hill on the berm. 8 ft. is exposed and the beds strike N40°E and dip 35°SE.

139.40-140.26 OUTCROP A long exposure of the Catskill

and Chemung Formations is in railroad and canal cuts. The east half duplicates the western part of exposure which is at the east portal of the Indigo railroad tunnel. Two bridges across the Potomac for embankment materials were

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Diagram 14"l x 8"h - final 7" x 4" - page size
2 tiers of profiles- Field notes 9/19/71, p.4-6.

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built in 1839 between 139.40 and 140.00. They were washed out January 15, 1840 with debris from the upper bridge wrecking the lower bridge.

MP 140.00 = 526.88
140.03 = 100 ft. long stone wall on berm, just west of Indigo Tunnel Portal
527.05 = shale ledges above railroad - crumbling; cut is up to 100 ft. high.

140.91 **FIFTEEN MILE CREEK No.9 AQUEDUCT** Constructed
527.70 Aqueduct repointed
527.95
1838-41. The arch was laid in July 1849 and the aqueduct completed in 1850. It has a single, semicircular arch with a 50 ft. span and a 10 ft. rise. There are 38 ringstones and a keystone in the face of the arch. The aqueduct is 140 ft. long between ends of the wings. The water table belt is 1 ft. above the crown of the arch. Abutments are 5 ft. high and the coping and the parapet 7 ft. high. The

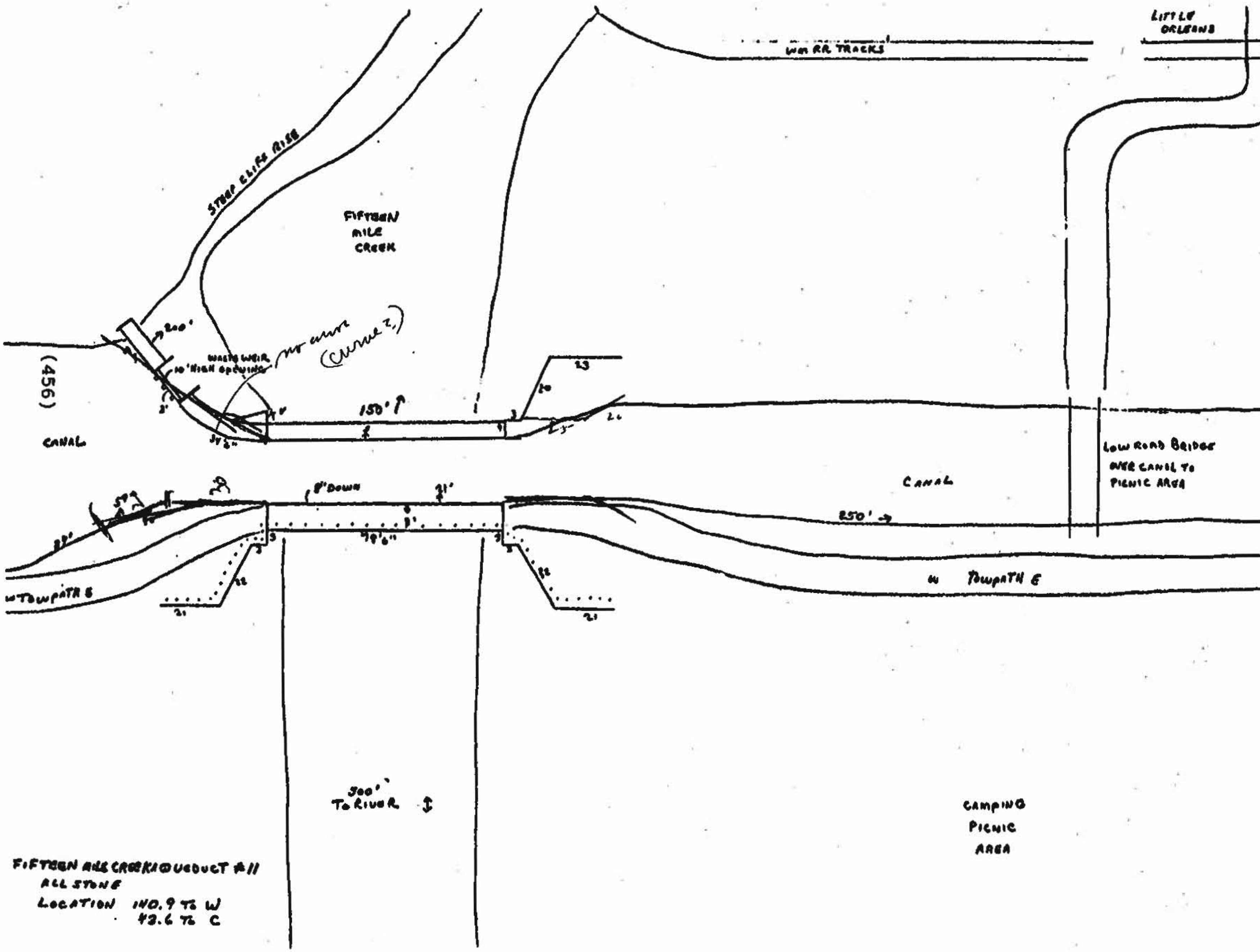
Cemetery at St. Patricks Church - unmarked graves of canal laborers.
Riot at Little Orleans 17 May 1838-over non-payment of wages. Germans replaced Irish; Germans clubbed to death.

527.82 = 15-mile, Little Orleans entrance.
140.91 (527.95) - Aqueduct.
527.28 stone wall on berm, 100 ft. long x 6 ft. high, subtle masonry; same as 527.30.

Davies diagram

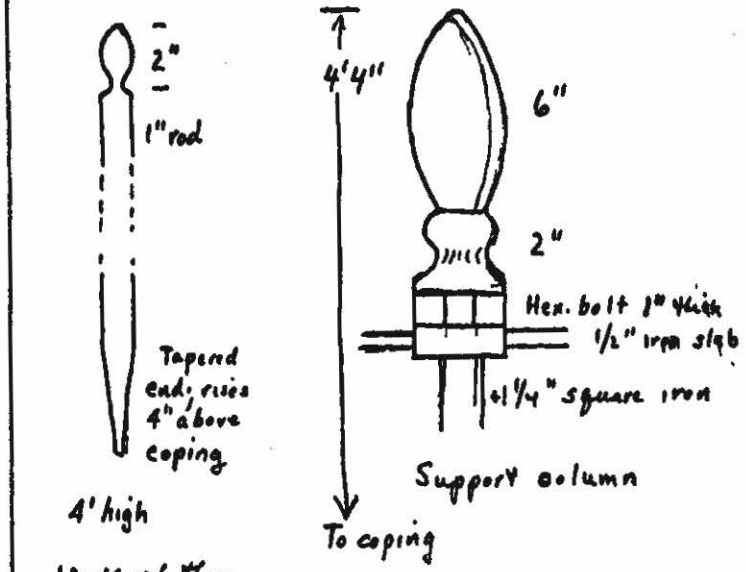
Barnes diagram
Davies diagram.

(456)

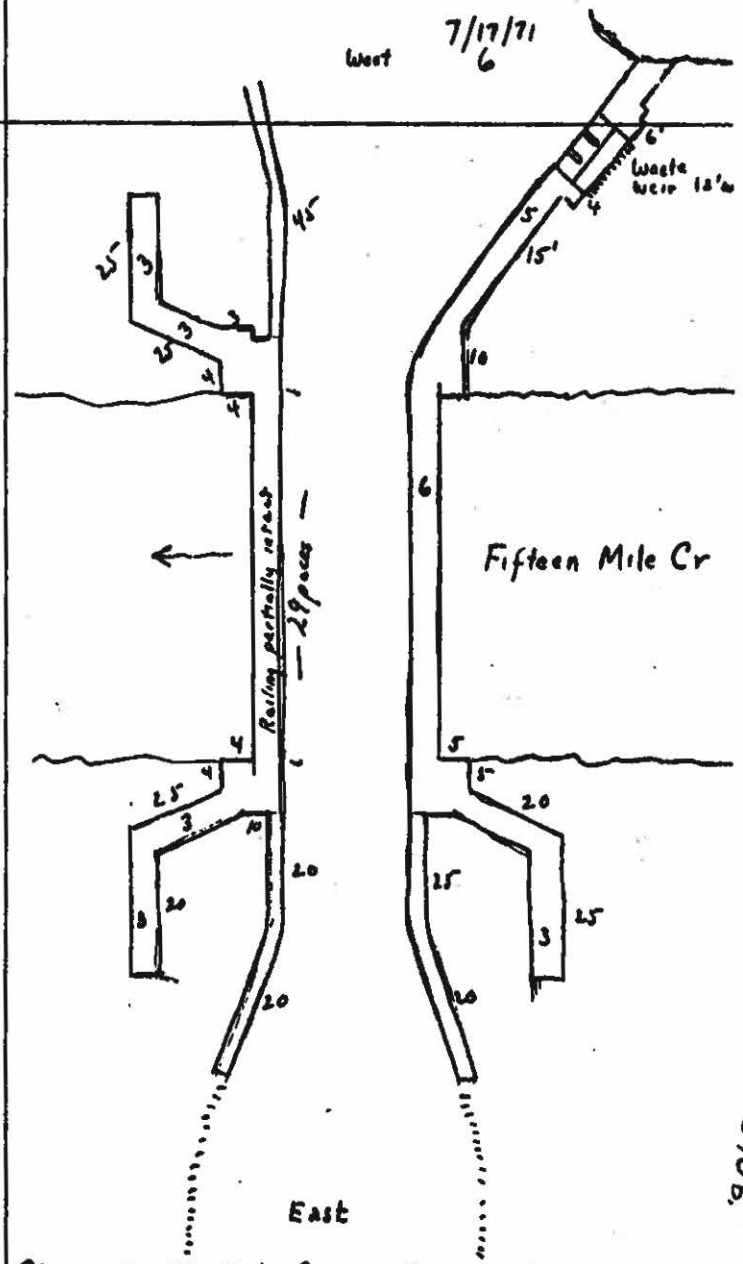


FIFTEEN MILE CREEK AQUEDUCT #11
ALL STONE
LOCATION 140.9 TO W
43.6 TO C

7/18/71
7



7/17/71
6



(457)

3906

top of the coping is 29 ft. above the stream and 31 ft. above the foundation. The towing path parapet is 7 ft. wide at the top and 7 1/2 ft. at the base. The berm parapet (stone) is 5 ft. wide at the top and 5 1/2 ft. at the base. The waterway is 21 ft. wide. Arch stones, skewbacks, water table, coping and inside of the parapet are cut sugary, white sandstone. Some pebbly conglomerate, with pebbles up 1/2 inch size, in the aqueduct was obtained from the Pocono Formation on the summit of Sideling Hill in West Virginia, 3 1/2 miles from the aqueduct. The rest of the aqueduct is coursed sandstone rubble. A concrete frame, three gate waste weir with insert boards is on the upper berm wing.

Walkin campground - all yer camping, on upstream side of aqueduct = Group HBO.

The bluff on the west bank of Fifteen Mile Creek is 20 ft. high and is formed of olive gray shale and shaly sandstones in beds 1 to 6 inches thick, which strike N30°E and dip 80°NW (downstream) to vertical. The rock is part of the Chemung Formation.

527.82 = Little Orleans access road to canal.

141 MP = 528.65

The Western Maryland Railway crosses the creek on a fill
Bridge no. 1309.
over 2 concrete semicircular arches with 15 ft. spans and 7 1/2 ft. rises. These arches are on 12 ft. abutments.
141.14 Boat tie up & building on berm.

141.30 (141.35) **OUTCROP** A low ledge on the berm is
528.32 - 528.40
Intermittent ~~[illegible]~~ outcrop to 528.82
formed of gray sandy shale, Chemung Formation, in beds 1 to 2 inches thick. The beds strike N40°E and dip 60°SE (v.s.) to vertical. - at 141.00 - as above, dip 60° (v.s.).

141.76 (141.83) **OUTCROP** A ~~low~~ ledge on the berm is formed of gray sandy shale and sandstone, Chemung Formation, in beds 1 to 2 inches thick. The beds strike N20°E and dip 60°ESE.

141.78 (141.87) **OUTCROP** A ledge on the berm is formed of
528.82-528.84 - Small outcrop 150 ft. long. ledge of same at 528.86
thick-bedded, gray sandstone, Chemung Formation. The beds strike N30°E and dip 45°SE. (v.s.)

142.00 MP = 528.90 - at beginning of curve.
142.05 : informal overfall - 138 ft. long; leads to gully at center; some stone revetment on canal prism; stone rubble in gully. gully? 10 ft. wide x 6 ft. deep.
142.26-142.40 (142.35-142.48) **OUTCROP** A cliff 100 ft.
529.26
high on the berm and a low ledge along the canal contain

dark gray, fine grained highly fractured , thick bedded
outcrop 200 ft. long.
sandstone, Catskill Formation. There are some zones up to
2 inches thick made up of beds 1/4 to 1/2 thick. 3 prom-
inent joints, 120° angle between each and one set parallel
to the strike, are all at right angles to the bedding. The
strike of the beds is N30°E and the dip 55°ESE. (d.s.)
529.32 Smaller ledge, 50 ft. long, similar to above.
142.80 possible breakwater between towpath & river.

142.58-143.29 (142.66-143.37) OUTCROP Ledges and cliffs on
529.35-529.50 Intermittent outcrop to 529.60
the berm contain complexly folded, gray, hackly shale, sand-
529.40 - old quarry, 100 ft. long, 50 ft. back, shale, some ss; N30°E x 55° d.s. (140°)
y shale and sandstone.
529.60 Quarry in sandy shale & sandstone, dip 30° d.s.; ravine.

Davies diagram

Diagram- 7 1/2"h x 8"w - reduce to 3 3/4"x 4".
Section profile, field notes 9/6/69, p. 11-15.

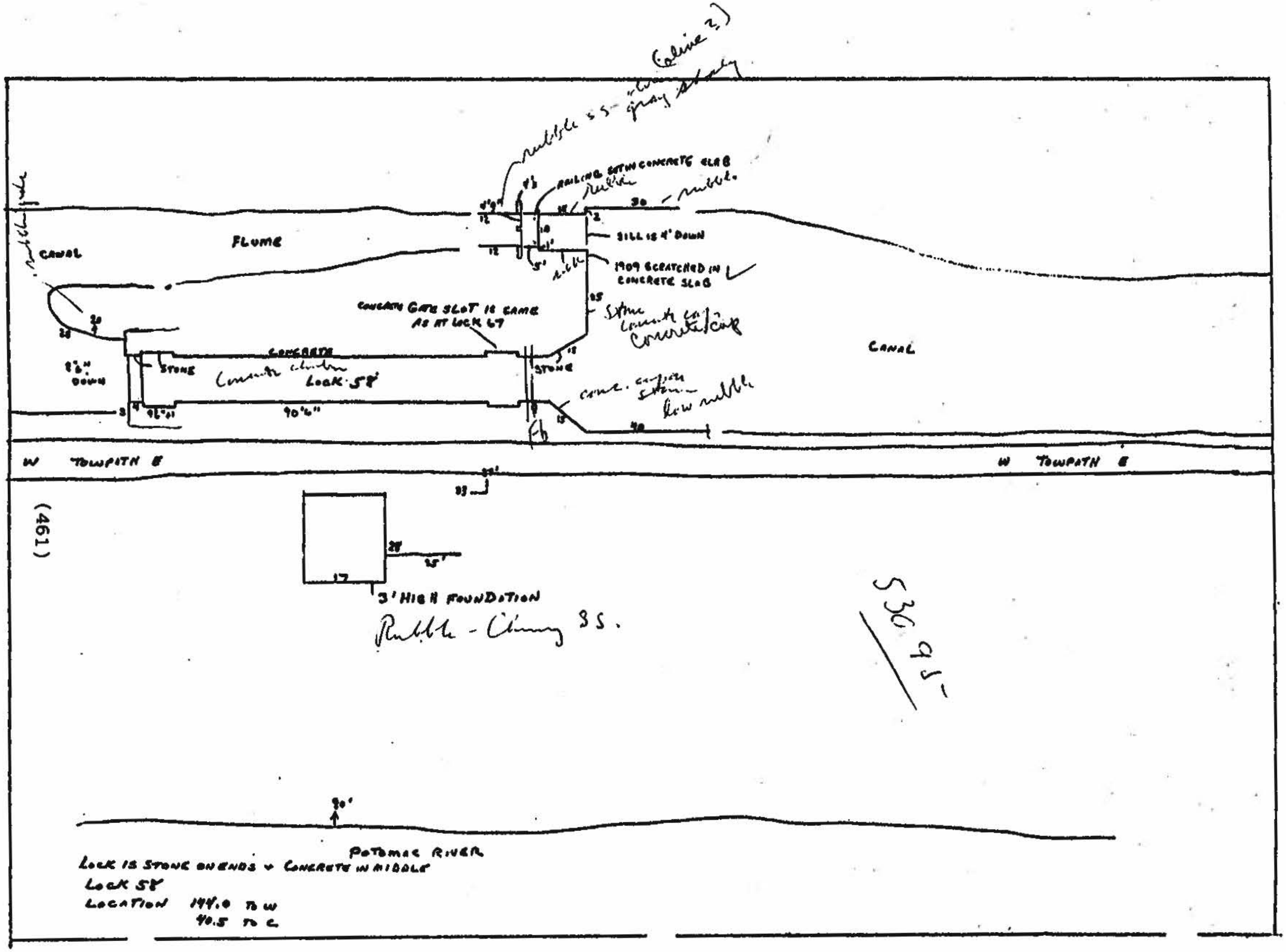
~~MP~~ MP 143 529.90

143.36 (143.44) BRIDGE Western Maryland Railway Bridge
529.65-529.74 (530.36) Bridge no. 1317.
Ledges up to 75 ft. high 6" to 2 ft. beds shale, ss., prominent joints, transverse joints closely spaced
N40°E x 55° d.s. (130°)
no. 1317. has 4 deck Warren steel trusses on concrete piers
over the river and single deck plate girder spans on the
west and over the canal on the east. The bridge was con-
529.81 prominent light anticline in shale & ss.
45°
Shale
structed in 1917.
530.55 ledge 70 ft. high, 200 ft. long, crumbly shale, N40°E x 47° d.s.
530.85 - anticline in berm in shale, 1"-4" beds 63°/45° 20' h, axis strikes N40°E.
143.53 - canal widens, continues until Lock no. 58; up to 150 ft. wide; widens at 530.40

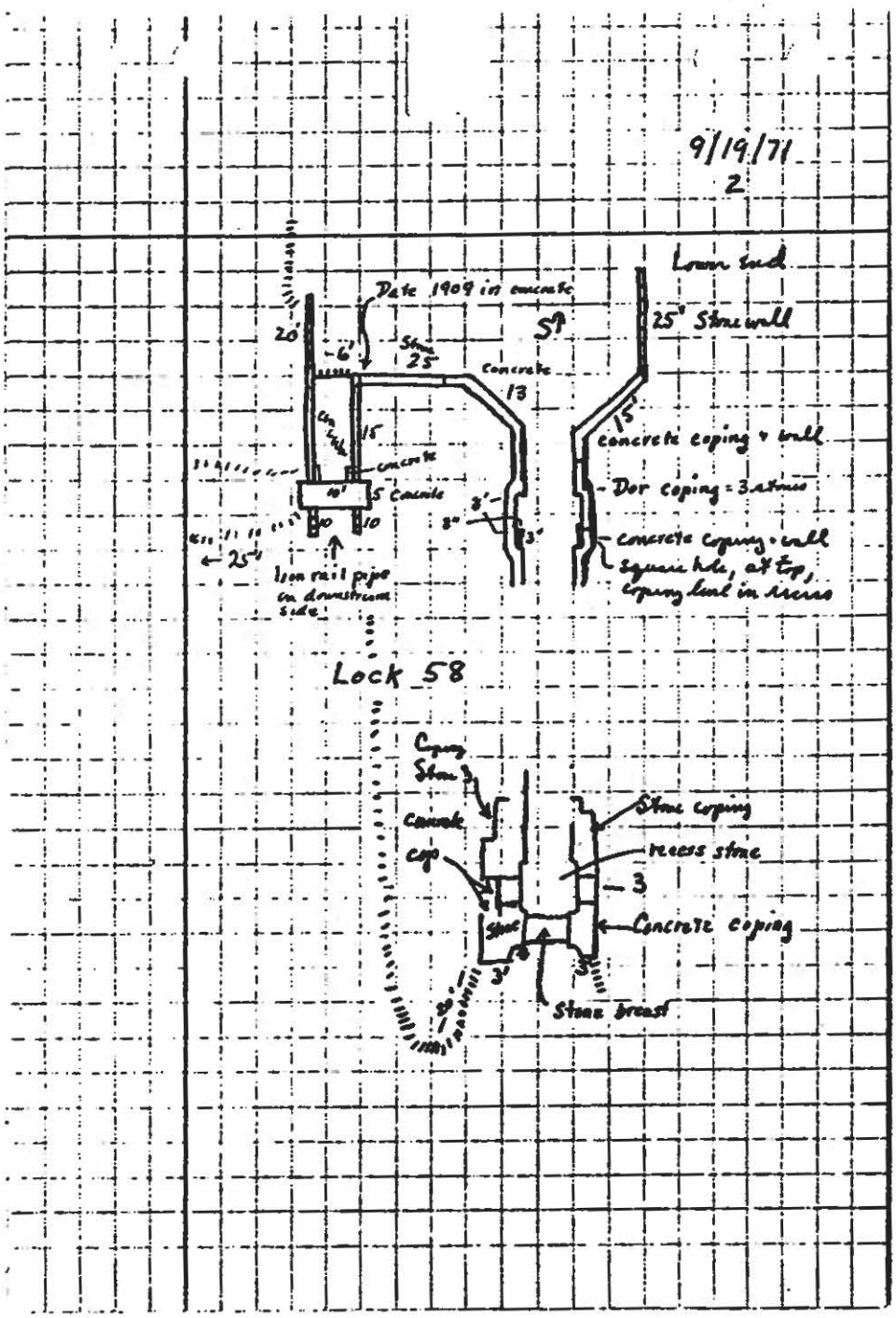
Barnes diagram
Davies diagram

143.94 (143.99) LOCK 58 8 ft. lift, constructed 1838-
530.95

MP 144: 50 ft. below tail of lock


CANAL
FLUME
RAILING SET IN CONCRETE SLAB
SILL IS 4' DOWN
1909 SCRATCHED IN CONCRETE SLAB
CONCRETE GATE SLOT IS SAME AS AT LOCK 67
CONCRETE
STONE
LOCK 58
90'6"
STONE
CANAL
W TOWPATH E
W TOWPATH E
(461)
3' HIGH FOUNDATION
Rubble - Chimney SS.
536 95
POTOMAC RIVER
LOCK IS STONE ON ENDS + CONCRETE IN MIDDLE
LOCK 58
LOCATION 144.0 TO W
40.5 TO C

9/19/71
2


Lower end
Date 1909 in concrete
5°
25° Stone wall
20'
6'
Stone
25'
Concrete
13
15'
concrete coping + wall
15
Dor coping = 3 stones
5 Concrete
3'
3"
3'
10
10
25'
Iron rail pipe on downstream side
concrete coping + wall
square hole, at top, coping level in recess
Lock 58
Coping Stone
Concrete cap
Stone coping
recess stone
3
Concrete coping
Stone
3'
3'
Stone breast

L 58

Composite lock?

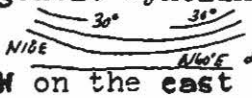
1840, completed 1848-50. The lock was originally built of hammer-dressed Tonoloway Limestone quarried in West Virginia near the mouth of the Cacapon River. Some limestone is also from Harts Quarry on Little Tonoloway Creek. The chamber walls and most of the coping were faced with concrete in 1909. The upper recess and tail of the lock are Ridgeley (Oriskany) brown gray sandstone and some limestone. The coping at the lower recess is white Ridgeley (Oriskany) Sandstone. The flume is on the berm 20 ~25 ft. from the lock. It has a concrete frame with 2 gates for insert boards. 15 ft. from the lower berm wing. A spillway, 10 ft. wide is at the face of the wing and ends in a 6 ft. drop. The spillway is coursed, gray and reddish brown sandstone (Catskill Formation). Slots and rods in the upper wing, towing path side are remnants of a crib fender. The 20 ft. revetment on the upper berm is probably the remnant of another crib fender. There was no wing on the upper berm

of the lock. A bridge was formerly over the tail of the lock. It was constructed in 1849 with stone abutments and a wooden superstructure with 17 ft. clearance over the surface of the canal. The footbridge is now over the lower part of the lock. The lockhouse was on the towing path side and was formerly clapboard on a gray sandstone rubble foundation. It was carried away in the 1936 flood.

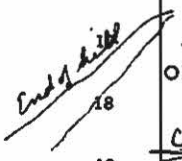
Low spot 85 paces long; hgins 42 paces below lower end of lock, no stone work : o.f.?

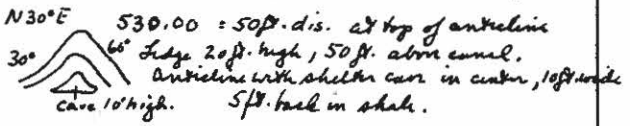
144.09-144.40 (144.15-144.46) OUTCROP The ledges on the berm are formed of gray shale, Chemung Formation. The beds strike N30°E and dip 60°NW. A gentle syncline (Fishpot Rock) at the west end dips 20°NW on the east limb and 23°SE on the west.

531.10 = u.s. sticking shale ledge, dips 60° u.s.



531.26





530.00 = 50ft. d.i.s. at top of anticline
Ledge 20ft. high, 50ft. above canal.
Anticline with shelter cave in center, 10ft. wide
5ft. back in shale.

144.40-144.45 (144.46-144.51) OUTCROP The ledges on the berm are formed of gray shale and sandstone, Chemung Formation. An anticline is on the east end of the exposure. The beds strike N30°E and dip 58° to 70°NW on west limb

531.35-531.48

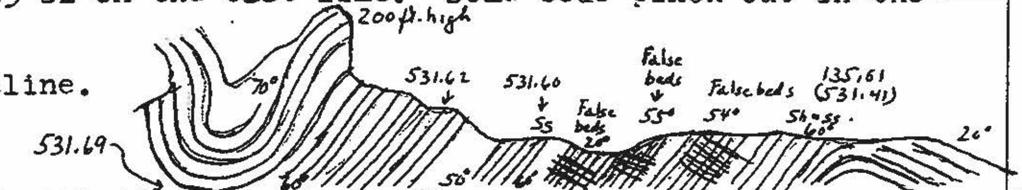
531.40

on east 26°-30° dip d.i.s.

Anticline at Devils Alley HBO

144.50 Devils Alley HBO (531.40) - o.k.

~~and 25°SE on the east limb. Some beds pinch out in the~~ anticline.



144.60-144.66 (144.64-144.68) <u>OUTCROP</u> Low ledges on the berm contain gray shale, Chemung Formation. The beds strike N20°E and dip 70°WNW.

144.71 (144.72) <u>OUTCROP</u> A dark gray to black sandstone with thin, irregular veins of calcite is exposed in a cliff on the berm. The beds are 1/2 to 4 ft. thick and form a tightly folded syncline, one of the few that are well exposed along the canal.: 531.69

531.89

Shale + ss. dip 30° d.s. at top of ledge 70 ft. above canal. Shelter cave, 20 ft. wide, 10 ft. back in shale at 531.92

Davies diagram

Diagram
8" x 8" reduced to 4" x 4".
Field notes 9/6/69 p.18.

144.84-144.86 (144.85-144.87) <u>OUTCROP</u> Gray shale and sandstone, in a succession of anticlines and shallow synclines, are exposed in ledges on the berm.

Davies diagram

Diagram 8"x 8" reduced to 4" x 4"
Field notes, 9/6/69, p.18.

Shale is olive green; revetment from drain (ravine) downstream to MP 145. 397
Shaly, dark green sandstone outcrop at MP 145 continues to 531.95
Outcrop ledge 40 ft. high at 532.00, shale and ss., green, dip 50° u.s., strike N40°E.
Anticline at 50 ft. above canal 60 / 45°
0 paces - upstream end shale cut = 30°
46 paces = anticline; 50 paces - begin outcrop in ss. at 70° dip u.s. 138 p. = 532.00; 532.05 end outcrop.

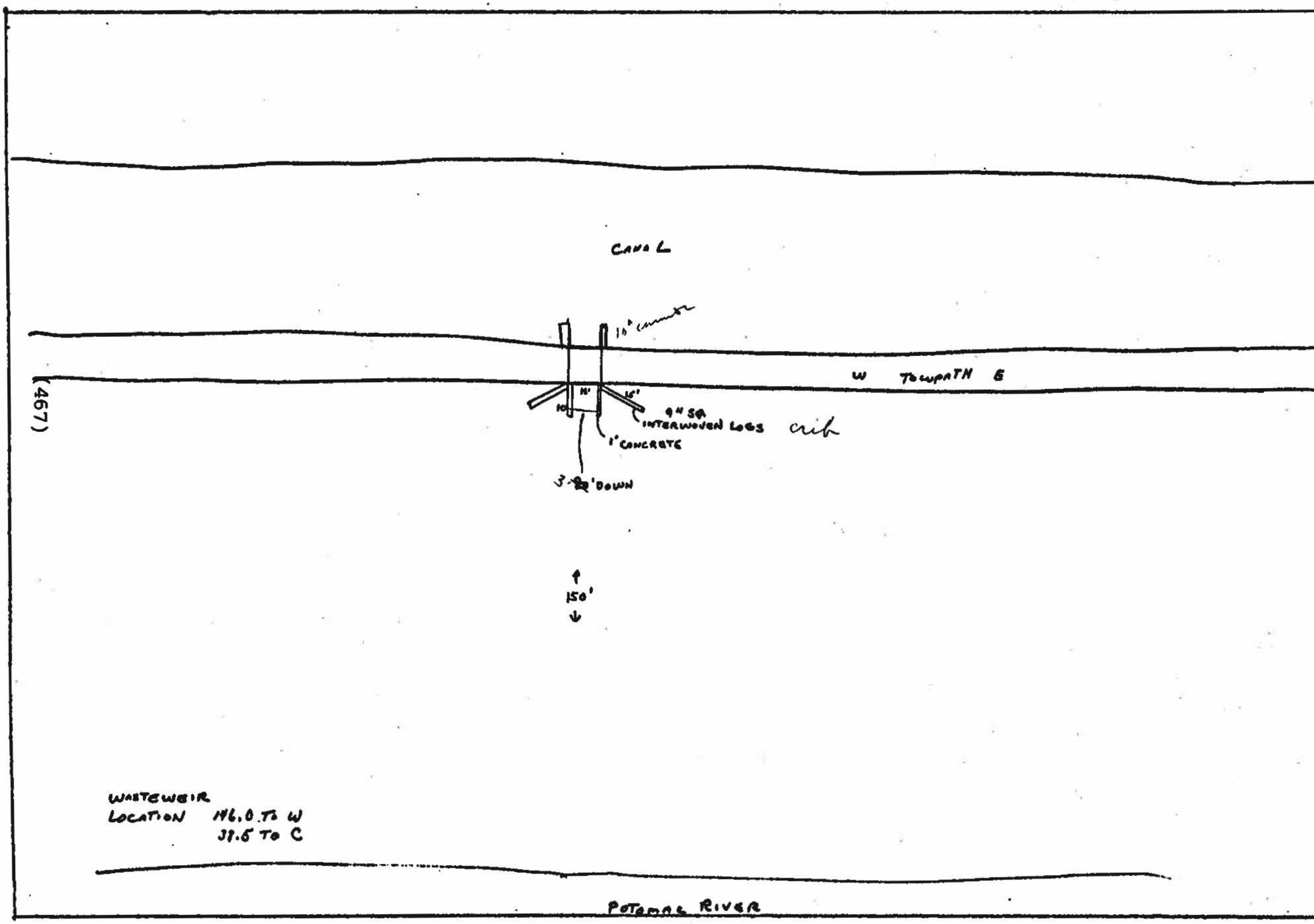
Construction of canal from 144.90 to 145.70 was very ex- Δ joints Thickly SS
pensive because of the steep slopes and lack of earth for embankment. In 1839 engineers planned a temporary bridge across the Potomac to get earth from West Virginia. The contractor, however, got earth from the uplands in Maryland and incurred heavy costs in road building.

144.95 (144.99) OUTCROP A ledge on the berm is formed of gray shale and shaly sandstone, Chemung Formation. The beds strike N40°E and dip 25° to 30°SE. A high flood plain is on the river side of the canal.

MP 145 = 531.92.

145.61 (145.63) OUTCROP Dense, dull gray Reddish brown sandstone in beds
532.55 - 532.60
up to 2 ft. thick is exposed in a ledge on the berm. The beds strike N~~45~~ 30°E and dip ~~55~~ 50°NW. (300°).

145.86 (145.95) WASTE WEIR This structure is a concrete
5 3.2.82
frame for 3 gates with board inserts. Timber cribbing is in the wings on the river side. The original overfall was


CANAL
W TOWPATH E
4" SQ
INTERWOVEN LOGS
crib
1' CONCRETE
150'
WASTEWEIR
LOCATION 146.0 To W
38.5 To C
POTOMAC RIVER

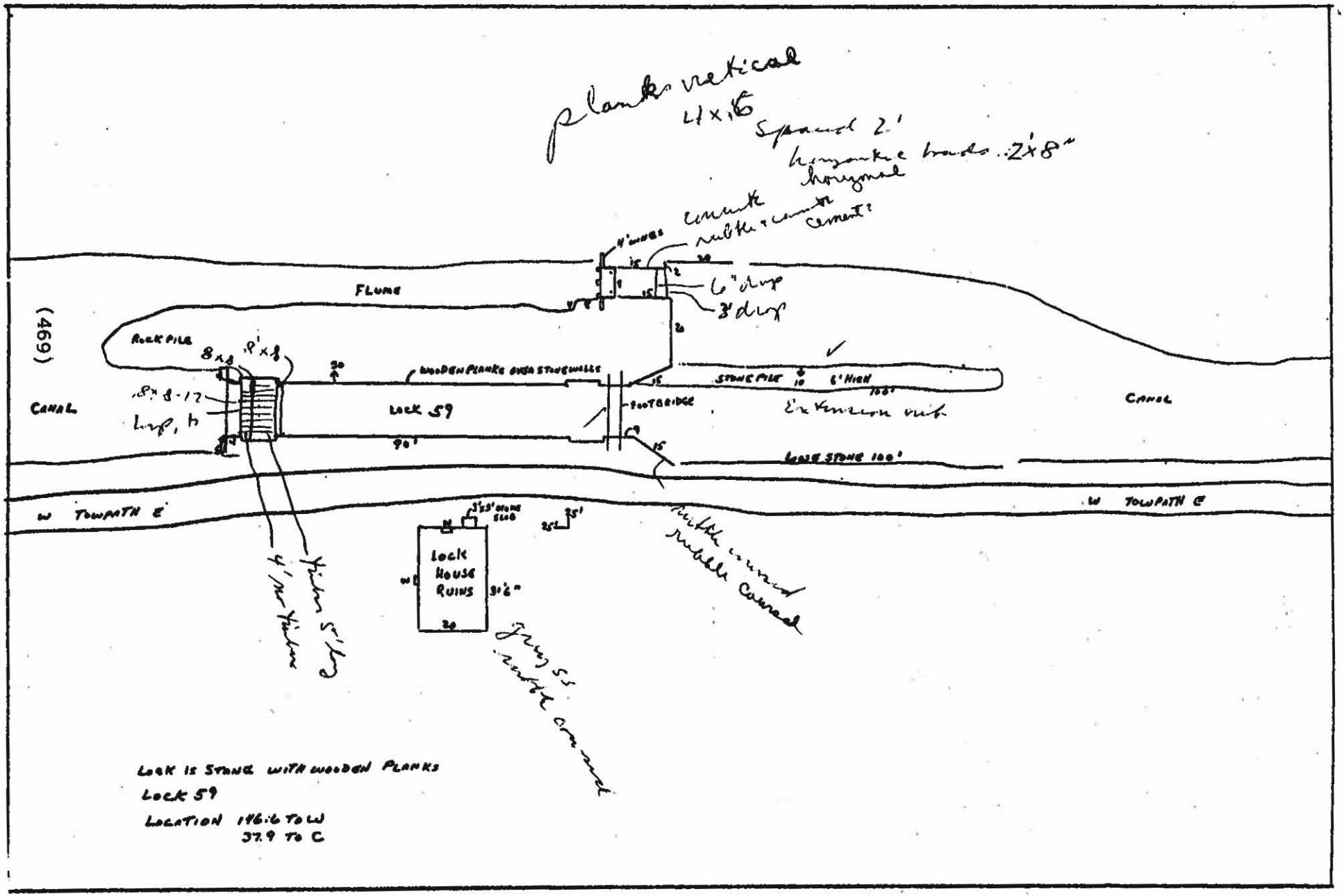
constructed here in 1850. The concrete waste weir was built in 1915., dam on running w.w.

MP146:532.86
wide water, canal up to 150ft. wide starting 100ft. east of w.w., ends at Lock nr. 59.

146.39 (146.50) LOCK 59 8 ft. lift, composite lock con-
533.35
structed 1838-39, completed 1848-49, rebuilt 1872. The chamber walls are coursed gray sandstone rubble, Chemung Formation. Hammer-dressed limestone is at the upper end of the lock. The lock was formerly faced with timber and some firring and bolts remain. The recesses were faced with timber. Ridgeley (Oriskany) white sandstone are in the coping at the recesses and the upper end of the lock. The revetment on the lower berm, 150 ft. long, is a remnant of the crib extension built in 1881. The miter sill is exposed in the upper recess on a longitudinal timber floor. A revetment, 20 ft. long on the upper berm, is probably a remnant of a crib fender. There are no slots for stop gates at the upper end of the lock. The flume on the berm, ~~30~~ 25 ft. from the lock, has a 2 gate concrete waste, with insert boards,

Continuous wall across lower end of lock (Hahn)

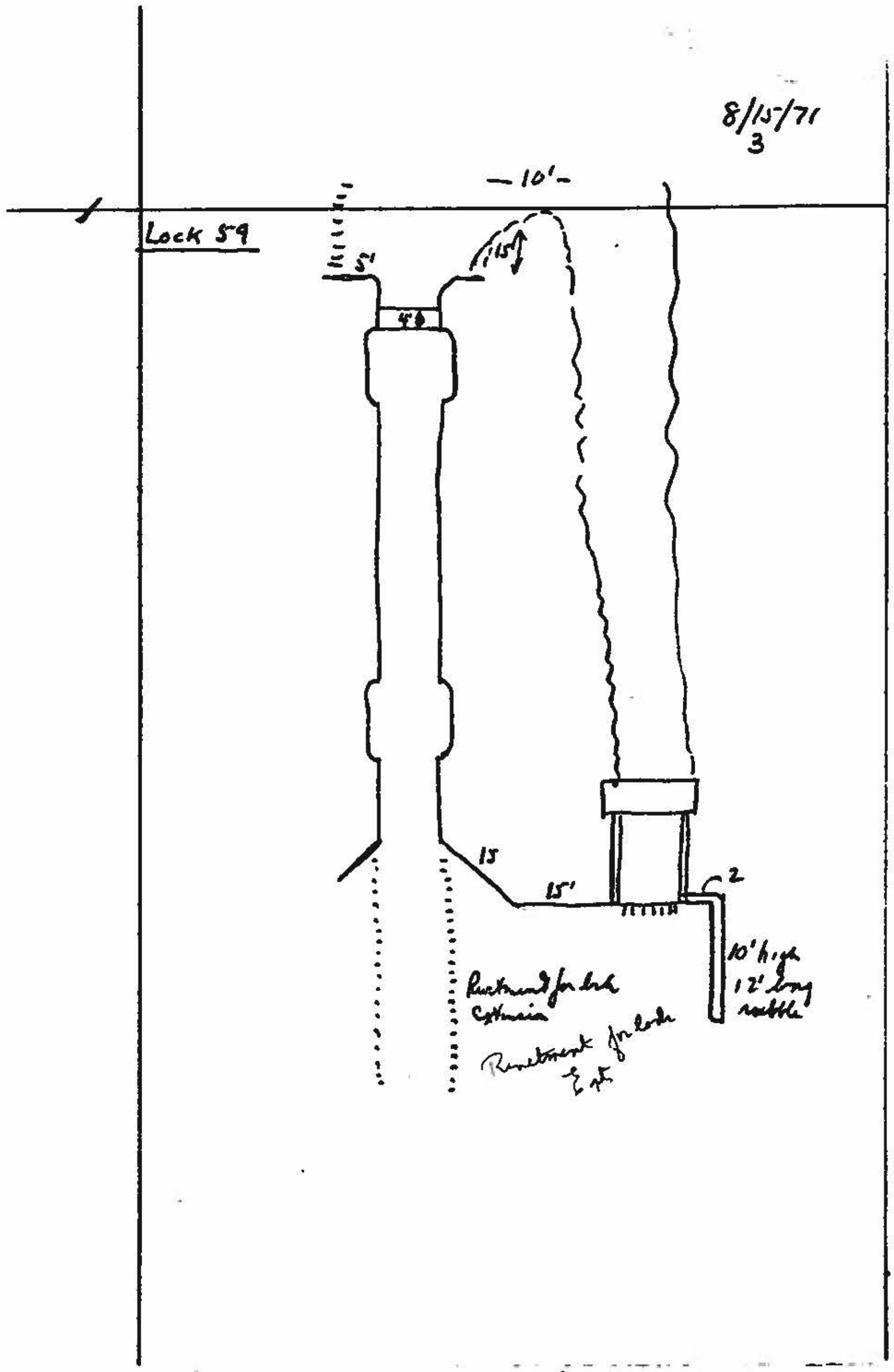
Barrows diagram
Davies diagram



LOCK IS STONE WITH WOODEN PLANKS

LOCK 59

LOCATION 196.6 TO W
37.9 TO C



L59

20 ft. upstream from the face of the lock. The waste weir was built in 1910. The flume ends in an overfall spillway 10 ft. wide, 5 ft. deep with a 4 ft. drop on the lower berm wing. There is a footbridge over the lower recesses. The lockhouse was along the towing path and was clapboard on a foundation of sandstone rubble. It was destroyed in the flood of March, 1936. Lock 59 is at the lower end of 7-mile Bottom.

146.79 (533.65) 146.79 **BRICKHOUSE** There are ruins of a large brickhouse on the berm.

146.73 (533.70) 146.82 (access point) CULVERT 206 DEVILS ALLEY Road culvert constructed 1838-39, 1849. The semicircular (may be only segmental ? ?) brick arch has 5 layers of bricks, 5 inches on side with a 12 ft. span and a 6 ft. rise. The parapet and coping are 3 ft. high. The spandrels, parapet and coping are mainly coursed ~~red~~ gray green sandstone (Catskill Formation) rubble, with some white sandstone.

Coping slopes downward upstream.
No wings, silted, opening breadth arch only 3ft. 54° arch.

The culvert was in use as a road culvert until 1924 serving "Bevans Farm".

MP 147: 533.88

147.02 (147.10) **BRIDGE** Western Maryland Railway Bridge no. 1348
533.98

no. 1348 consists of an east approach deck, plate girder span, 5 steel skew deck Warren spans on concrete piers over the Potomac River and 4 deck plate girders on steel towers between the river and the canal. 1 steel deck Warren truss is over the canal. The approach span on the west is a deck plate girder.

Widewater from 534.52, canal berm dug down 2 ft. water up to 700 ft. wide.

147.57 - (534.52) "Superintendent's" house + brickpiles - access, private road over canal via steel culvert. House on berm, 2 story, clapboard, porch facing canal.

147.81. Informal o.f. 246 ft. long, centered 534.18, ravine 20 ft. wide, 8 ft. deep, leads off.; some riprap on towpath - 5 ravines lead off, 2-3 ft. deep, up to 10 ft. wide, d.s. one 20 ft. wide; ends up stream 40 ft. from MP 148.

MP 148: 534.81.

148.10 (148.23) **CULVERT 207** Constructed 1849. The semi-circular brick arch formed of 3 tiers of brick has an 8 ft. span and a 4 ft. rise. The parapet and coping are 2 ft. high. Spandrels, parapet and coping are coursed red sandstone, dense gray sandstone, and white coarse grain sandstone rubble. The river side of the culvert is collapsing and partially filled with debris (1971). No wings. Dike 500 yds. d.s. enclosed creek basin - forms berm end of wide water. 10 ft. embankment; berm dike merges with terrace at 534.90

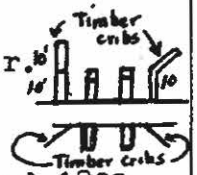
500 ft. d.s. of Superintendent House = broken shale - extends to 535.34.

MP 149 = 535.85

149.17 - 536.12 - Stichpile HBO ; canal is 75-100ft. wide between H.B.O & waste weir.

149.26 149.36 WASTE WEIR The original overfall at this
536.22
site was constructed in 1850. The present waste weir is a concrete frame with 3 gates for board inserts. The upstream wing has fallen and the concrete walls are collapsing. Wooden cribbing supports the bridge over the waste weir.

Barrn's diagram



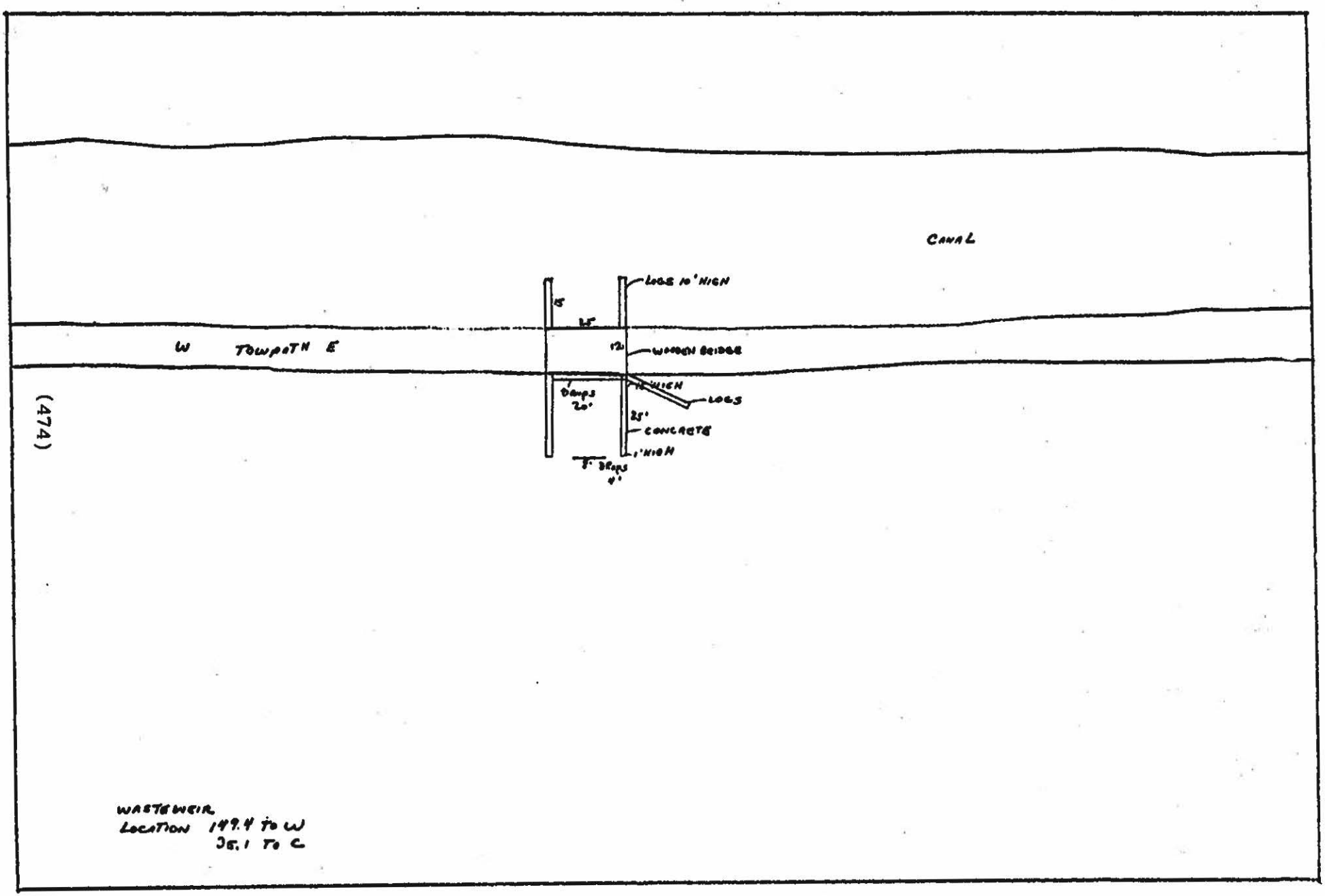
Concrete base and floor washed out: This w.w. replaced in 1980's with new concrete bons.

536.48
149.53 149.61 LOCK 60 8.385 ft. lift, constructed 1839, 1848-49. This is a composite lock with walls of coursed gray and red sandstone from a quarry on the ridge above the canal near mile 152. Hammer-dressed limestone and white sandstone are in the recesses. Remnants of timber facing are in the walls of the chamber. The miter frame in the upper recess is exposed and rests on longitudinal timbers in the floor of the lock. The lock was rebuilt in 1872. A 150 ft. revetment wall on the lower berm is a remnant of a crib extension added in 1881. A rock wall extends 20 ft. downstream from the extension. A 20 ft. revetment on the upper berm is probably a remnant of a crib fender.

Barrns diagram

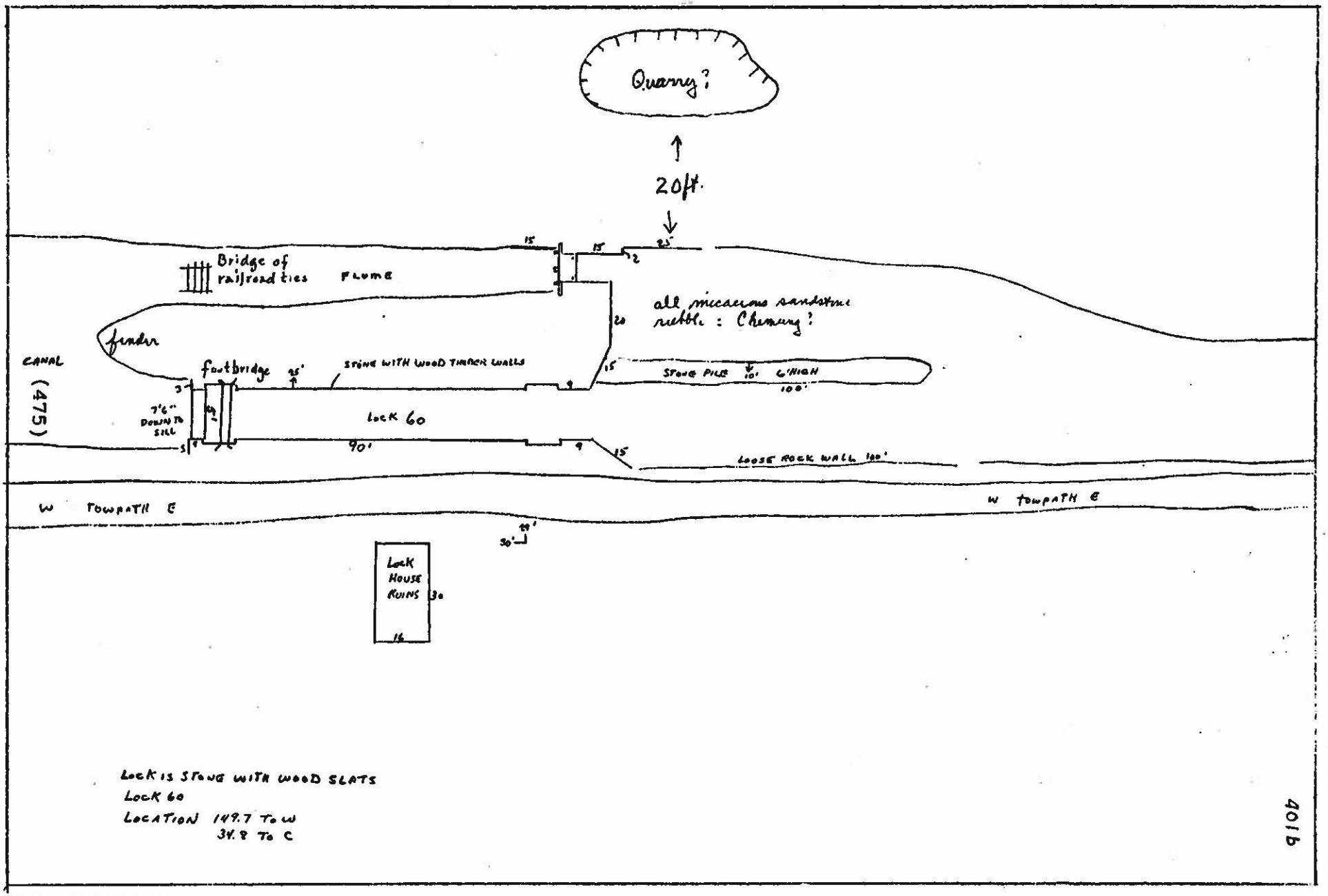
facing boards 2×10 and 2×8, 10 ft. long.

Timber in gate, insets as well.



WASTEWEIR
LOCATION 149.4 TO W
36.1 TO C

401a


Quarry?
20ft.
Bridge of railroad ties
FLUME
all micaceous sandstone rubble: Chemung?
finder
CANAL
(475)
footbridge
STONE WITH WOOD TIMBER WALLS
STONE PILE
6' HIGH
7'6" DOWN TO SILL
LOCK 60
90'
LOOSE ROCK WALL
W TOWPATH E
W TOWPATH E
LOCK HOUSE RUINS
30
16
LOCK IS STONE WITH WOOD SLATS
LOCK 60
LOCATION 149.7 To W
34.8 To C
401b

35
~~The flume, on the berm 38 ft. from the lock, has a concrete~~ frame control gate with 2 gates for insert boards. The spillway is below the gate and is built of coursed gray and brown sandstone. There are no slots for stop gate boards at the upper end of the lock. The lockhouse was along the towing path and was clapboard on a foundation of red sand-
Berm indistinct from lock to 336.60 = widewater?; 536.65 - 537.35 except 537.05 - 537.10 where there is a cut in the terrace.
stone rubble. It was [illegible] carried away in the March 1936 flood. A footbridge is across the upper recess. (yes. 1975)

MP150 536.75
150:151 Informal overflow, 180 ft. long ✓ 537.47?
MP151 537.75

151.00 151.20 <u>CULVERT 208 ROBY HOLLOW</u> Road culvert con-
537.95
structed 1838-39, 1849. The arch is formed of 5 tiers of brick with a 12 ft. span and a 6 ft. rise. The parapet and coping are 2 ft. high and are mainly white sugary sandstone and some red brown sandstone rubble. The spandrels are of coursed red sandstone rubble. The culvert was in use as a road culvert until 1924. A log and clapboard structure, 500 ft. up the hollow, was a construction office for the canal from 1838 to 1850. No wings

537.88 berm on embankment

537.90 scour channel on riverside of canal, 83 paces long; swamp [illegible]
536.86 access to canal via ford across canal. 3 rom here upstream towpath is surfaced with fine crushed stone.

151.04? Bury construction cabin, log.
Canal laborers cemetery - Roby Cemetery - ½ mile from Stickpile Tunnel.

151.03 151.23 BRIDGE Western Maryland Railway Bridge no. 538.00 1360 consists of 3 deck plate girders on trestle towers on the east and over the canal. 3 deck Warren trusses on concrete piers are over the Potomac River and one plate girder is on the west approach. The bridge was built by the Pennsylvania Steel Company, Steelton, Pa., 1904. A freight train derailed and buckled on the bridge on December 13, 1920 and 2 carloads of steel rods fell into canal. The railroad lifted the contents of 1 1/2 cars from the canal and the canal company dredged the rest from the canal and charged the railroad $40.30.

538.05 - outcrop, 30 ft. ledge; shale and sandstone, dip 45° downstream, shelter cave 15'l. x 6'h. x 5'deep in downstream end at canal level.
538.10 + 538.20 - 538.25 outcrop shale and sandstone, dip 45° downstream.

151.36 (151.56) OUTCROP A ledge 100 ft. high on the berm is formed of
outcrop begins 538.28 538.32 small shelter caves in ledge.
gray shale and sandstone in beds 1 to 4 inches thick, Chemung Formation. The beds strike N40°E and dip 45° 55°NW.
Prominent transverse joints cut rocks into angular cut blocks
Syncline at west end = 538.35

151.38 (151.50) OUTCROP A bluff, 80 ft. high on the berm, contains gray shale and some sandstone in beds 1 inch

thick, Chemung Formation. The beds strike N30°E and dip 30°NW. A prominent strike joint is at right angles to the beds.

151.48 (151.68) OUTCROP Ledges on the berm contain gray sandstone and shale, Chemung Formation. The beds strike N50°E and dip 37°SE on the east flank of the anticline. The west flank is covered.

151.49-151.66 (151.69-151.86) OUTCROP A ledge on the berm contains gray shale, Chemung Formation. The beds strike N50°E and dip 30°SE. The exposure continues west to an anticline exposed at Mitchells Rock. The beds strike N55°E and dip 30°SE on the east and 70°NW on west.

Davies diagram

Diagram- 8" x 8" → 4" x 4"
Field notes p.

151.79 (152.00) OUTCROP A ledge on the upstream side of a ravine contains gray shale, Chemung Formation. The beds

strike N70°E and dip 70° to 80°NNW.

151.79-151.92 (152.00-152.13) OUTCROP A high bluff on the berm is formed of gray shale and sandstone, Chemung Formation. The west part of the exposure is sandstone with beds up to 4 ft. thick.

MP 152 538.75

152.01 (152.22) OUTCROP A ledge on the berm contains gray shale and some sandstone in beds 1 ft. thick. The shale is highly cleaved. The beds strike N40°E and dip 75°NW.

152.09-152.59 (152.30-152.80) Two bridges across the Potomac at this point were used during construction in 1839 to obtain earth for embankment. The lower bridge collapsed on January 15, 1840.

538.85 - ledge 30 ft. high, dip 45° upstream - shale.
538.92 - shale outcrop 100 ft. upslope.

152.14-152.18 (152.35-152.39) OUTCROP A ledge on the
539.08 +
berm is formed of gray sandstone in beds up to 6 ft. thick. Some highly cleaved shale in beds 2 inches thick is mixed with the sandstone. The beds form an anticline with a

Plan diagram

strike of N30°E and dips of 35°SE and 40°NW.

Diagram 8"w x 6"h → 4" x 3"
Field notes p.

✓OK

538.95? may h 539.45 Sandstone, 2-4 in. beds, strike N50°E, dip 77° towards 330°. 500 ft. of discontinuous outcrop. 539.06 - small ravine.

152.40 (152.61) OUTCROP A ledge on the berm contains 539.32 - 539.45 gray, fine grained sandstone with yellow specks in beds up to 4 ft. thick, Chemung Formation. The beds strike N40°E and dip 55°NW. Syncline @ 539.38 downstream end of ledge, strike N40°E, dip 52° to 310°; upstream strike N40°E, dip 40° to 130° 40 52 → downstream.

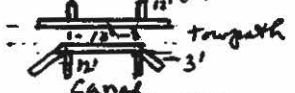
152.~~43~~ 34 (152.66) OUTCROP A low ledge on the berm is formed of gray sandstone, Chemung Formation. Ripple marks are prominent on the bedding planes. The beds strike N40°E and dip 55°SE.

152.59 50? (152.74) OUTCROP A ~~low~~ 40 ft. ledge on the berm is formed of gray sandstone, Chemung Formation. The beds strike N40°E and dip 45° to 60°NW. - towards 300°. 539.46 - 539.50

MP153 - 539.73

1 52.86 (153.00) WASTE WEIR This structure is a concrete 539.74 (75 ft. E of MP153. frame with 3 gates for insert boards. A gray sandstone

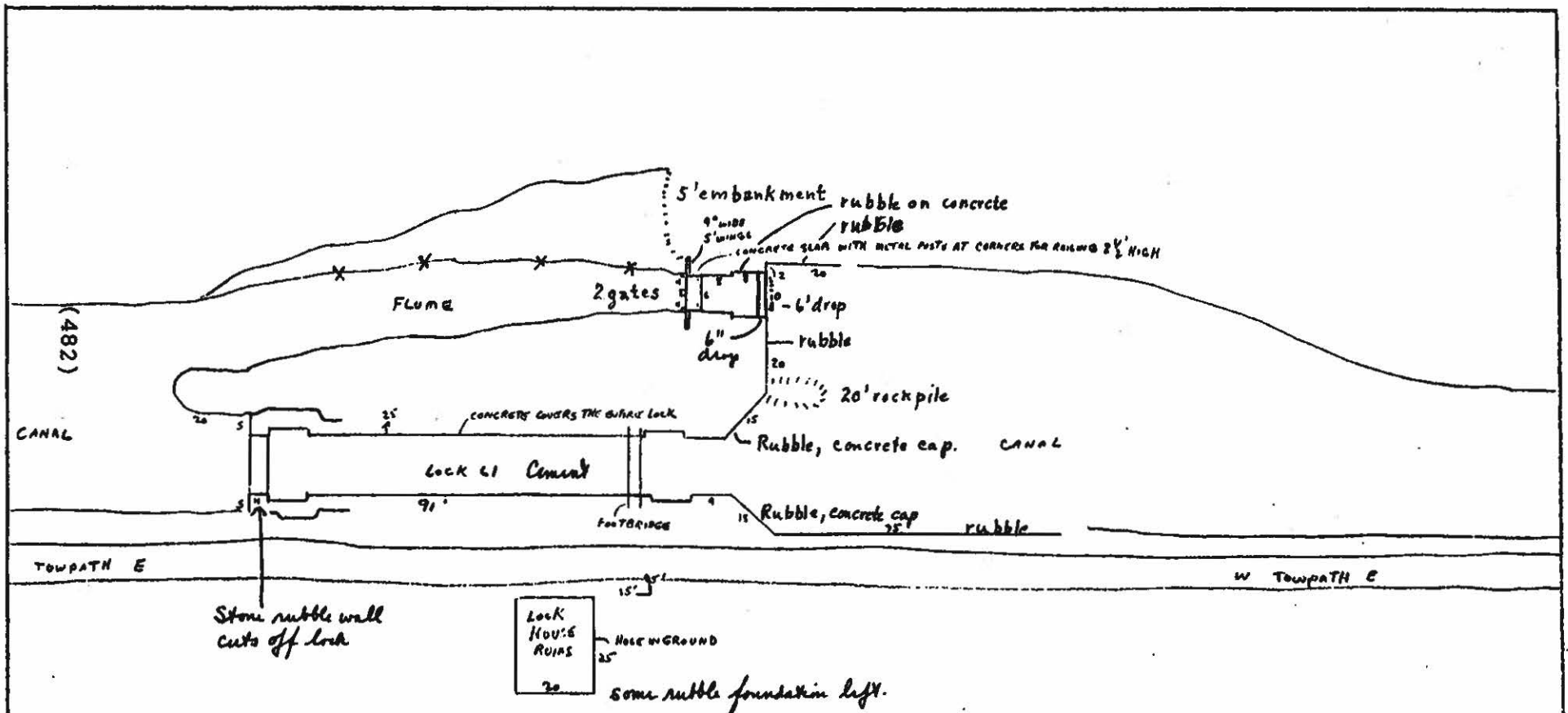
rubble revetment is at the base of the waste weir. A 3 ft. drop to the valley floor is at the lower end of the spillway. Some Catskill red sandstone is in the spillway.



Barren's diagram

152.96 (153.10) LOCK 61 8 ft. lift, constructed 1839, 1848-50. This is a composite lock with a concrete facing on coursed brown sandstone rubble. The concrete replaced a timber facing in 1910. Coursed sandstone rubble walls are at the tail of the lock. Concrete coping is over the old stone coping. The circular quoins and coping on the lower end of the lock are white Ridgeley (Oriskany) Sandstone. The flume on the berm is 25 ft. from the lock. It has a 2 gate concrete waste weir with insert boards at lower end. The flume below the waste gate is lined with gray sandstone rubble. Notches at the head of the lock are remnants of old crib fenders. The lower berm revetment is 20 ft. long with embedded timbers and is a remnant of a crib fender. The stone for the lock is from a quarry in Twigg Hollow west of

Barren's diagram



Lock is all concrete covered stone

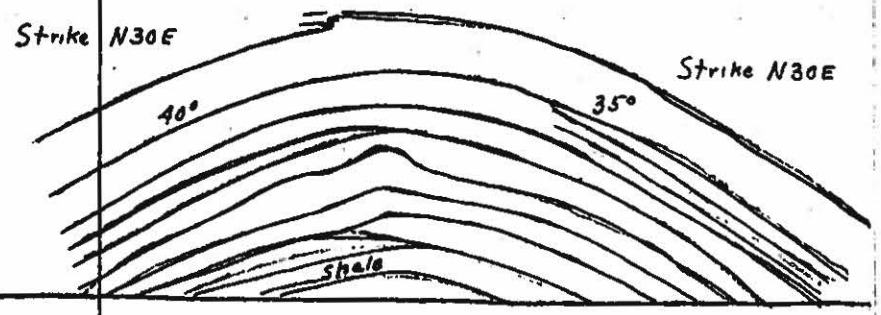
Lock 61

Location 153.1 To W
31.4 To C

115.15

115.4 ✓ Highly cleaved shale with sandstone beds 1 ft.
152.22 thick. Strike N45E, dip 75° upstream.

115.55 ✓ Anticline, gray sandstone, up to 6 ft. thick,
152.36 shale 2 inch beds, Elrand.



(483) Syncline

115.6 ✓ End of outcrop
152.40

115.85 ✓ Thick sandstone, up to 4 ft. beds, ~~up to 4 ft. beds~~
152.63 N40°E, dip 55° at 315°. Gray fine grained sandstone, iron yellow specks in sandstone.

115.92 ✓ N40°E, 55° dip at 130° gray sandstone, ripple
152.70 marks

116.0 ✓ Strike N40E, dip 45°-60° away from river
152.76

116.0 = 116.25 (retraced part of path)

116.5 ✓ MP 153
153.00 Lock wire, sandstone rubble at base (gray) from older weir. Some red sandstone in lock spillway

116.65 Lock 61 White sandstone at end; rubble wing and
153.13 weir are gray sandstone. Lock chamber is concrete.

114.65 ✓ Shale and gray shaly sandstone exposed on turn.
151.56 Strike N40E, dip 55° upstream. Beds 1-4 inches thick

114.68 ✓ 80 ft. bluff of shale with some sandstone, 1 inch
151.59 beds. Strike N30E, dip 30° upstream. Prominent strike joint at right angles to beds, spaced 20 ft.

114.8 ✓ Anticline, downstream side dips 37° downstream;
151.69 upstream limit covered.; in gray sandstone and shale.

114.81 ✓ Shale, strike N50E, dip 30° downstream; exposure
151.70 continues upstream to 114.95

114.95 Anticline in dense gray sandy shale and sandstone
151.83 50 ft. high

115.0 151.87
← upstream

151.87
115.00 ✓ Upstream from 100 ft. ravine, dip is 70°-80° upstream
strike N70E.

115.15 ✓ Milepost 152
152.100

115.3 Large bluff of shale and sandstone. Sandstone
152.131 ✓ west of 115.1, thick in places, beds are 4 ft. thick

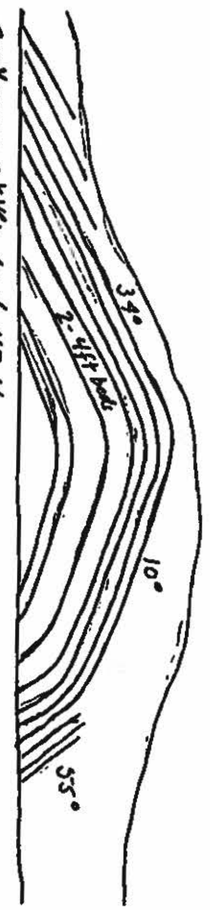
407b

4
9/28/64

116.88 ✓ Foot bridge to dirt road.
153.33

117.01 ✓ Culvert, 12 ft. arch, 6 ft. rise
153.46 Arch of brick, 5 tiers thick.
Rubble in spandrel mainly red sandstone, some gray sandstone, 1 tier over arch. River side of arch failing.

✓ 117.35 Anticline, strikes at right angles to canal
153.76 Gray sandstone and shale.

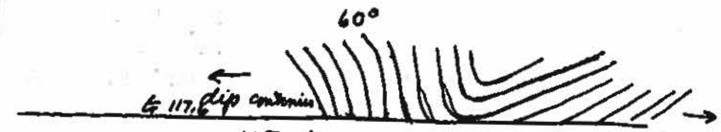


Continues at this dip to 117.4
153.81 ✓

← upstream

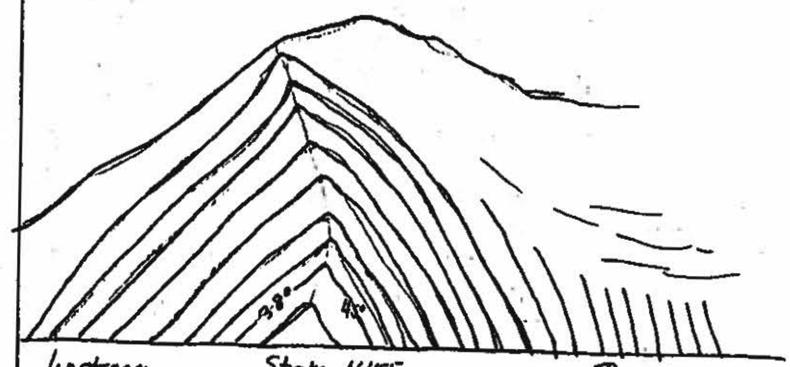
5
9/28/64

117.4 ✓
153.81



117.4
Strike N15E
downstream
Connects with 117.35

117.6 ✓
153.96



Upstream Strike N15E Downstream

117.65 ✓ Milepost 154
154.00 Vertically cleaved shale in berm, beds dip 45° upstream.

117.75 ✓ Small Ridge Hiker - Biker - Overnighter.
154.09

117.8 ✓ Lock 62
154.13 White cut sandstone on copes at ends. Rubble forming lock is gray sandstone, some red brown sandstone. Lock planked.
Cement lock recesses.
Spillway walls - gray sandstone

Grey sandstone and shale
65°
45°
60°
35°
10°
downstream, dip same to 117.6
200'
300'
Same dip continues to bed 117.7
117.7 to bed 62
134.04 - 154.13

b
9/28/64

the lock. The lockhouse was clapboard on the towing path side of the lock with a sandstone rubble foundation. It was carried away in the flood of March, 1936. The upper end of the lock is walled up with stone and earth.

153.20-153.27 Informal overflow, 145 ft. long.
153.3 footbridge to Outdoor Club Road. 540.05
540.12 large ravine, 43 paces across = overflow? Stone revetment on riverside of towpath. Seeds to ravine 46 paces downstream of footbridge & 10 paces upstream.

153.32 (153.45) 546.18 CULVERT 210 GROSS HOLLOW Constructed 1849. The arch is 5 tiers of brick with a 12 ft. span and a 6 ft. rise. The parapet is 1 ft. high. The spandrels and parapet are mainly red sandstone rubble and some gray sandstone. Brick lined. Berm 16 ringstones, white sandstone, + keystone; parapet; coping concrete (2 ft. h.) The river side of the arch is failing (1971).

/8 8\ berm wings stepped rubble. Wings on towpath = rubble gray ss. wings - 16' battered

153.50-153.60 (153.70-153.75) 540.44 - 540.51 OUTCROP An anticline on berm is formed of gray sandstone and shale, Chemung Formation. The beds strike N40°E and a syncline is at the upstream end. Outcrops begin at 540.42

Intermittent outcrops dipping downstream at 60°-70°; 40 ft. ledge at 540.62

Davies diagram

Diagram 8"h x 6"w   4" x 3"
Field notes   p.

153.81 (153.95) 540.69 OUTCROP A sharp peaked anticline in Chemung sandstone is on the berm.

Davies diagram

153.86 (154.00) OUTCROP A ledge on the berm is formed of gray shale, Chemung Formation. Vertical cleavage is prominent. The beds strike N40°E and dip 45°SE. *Outcrop continuous upstream* *dip 45 - 50° upstream to 540.73*

45° 45° sharp syncline

dip 45° down stream to Intermittent outcrop to anticline at 540.75

An embankment bridge over the Potomac in this vicinity was built in the summer, 1839. It was carried away in a freshet shortly after its completion.

MP154 - 540.72

153.91-154.00 (154.05-154.14) OUTCROP In this distance *540.75* there is a sequence of small, tight syncline-anticline-syncline and a broad anticline in gray sandstone and shale, Chemung Formation.

Davies diagram

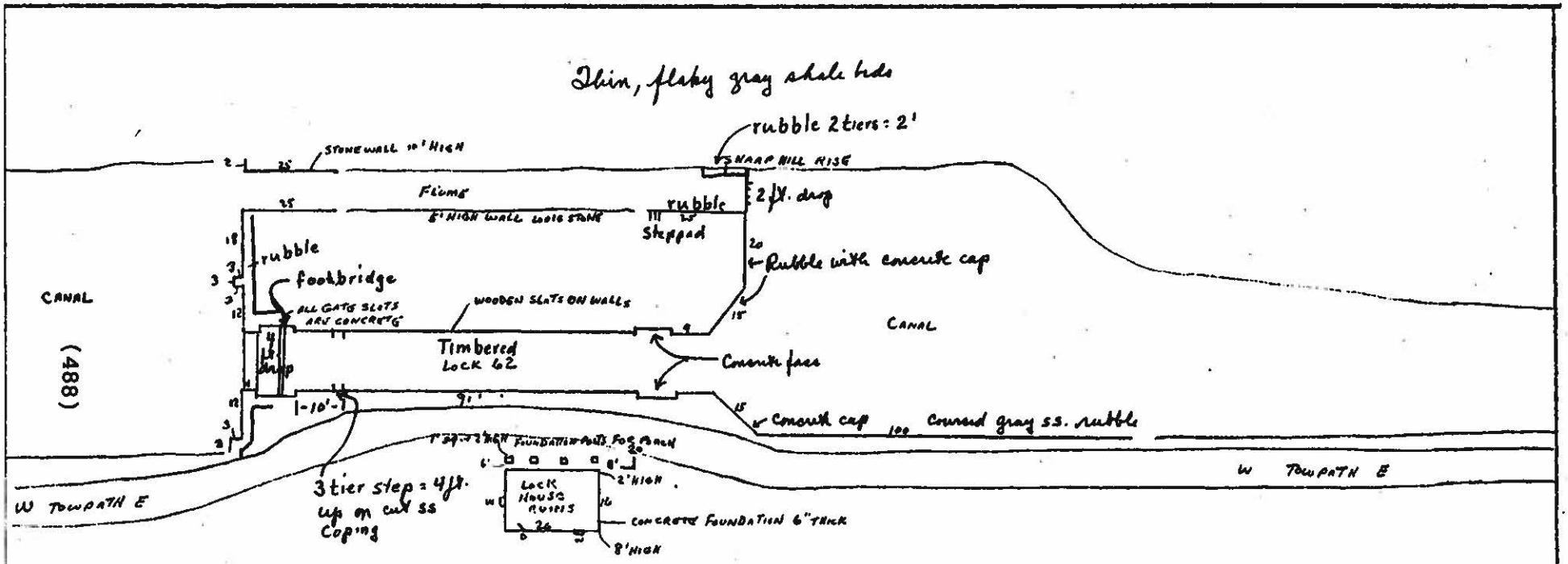
Apiebanks on river from tunnel

Diagram 8"h x 6"w → 4" x 3"
Field notes p.

154.00 Sorrel Ridge H.B.10 540.82

154.00 (154.12) LOCK 62 10 ft. lift, constructed 1838-39, 1848-49. *540.86* This composite lock has a chamber of coursed gray and red sandstone rubble which was faced with timber planks. Bolts and some timber remain in the walls. The recesses were faced with concrete in 1910. The coping

Barron's diagram



LOCK IS STONE WITH CONCRETE GATE SLOTS
LOCK 62
LOCATION 154.2 TO W
30.3 TO C

540.86

409a

below the lower recess is concrete. Cut white Ridgeley (Oriskany) sandstone is at the recesses and at the ends of the lock. Notches for crib fender timbers and an old revetment are on the upper berm side. 20 ft. revetments at the lower end of the lock are probably remnants of crib fenders. The stone for the lock is from a quarry in Twiggs Hollow above Lock 61. The flume is at the base of a 30 ft. cliff on the berm. An overfall spillway lined with gray sandstone rubble is at the lower end of the flume. A single gate, concrete frame control is in the flume at the tail. A footbridge is at the head of the lock. The lockhouse was on the towing path side. It was clapboard but only the concrete foundation remains. Chemung gray shale crops out in the cliff on the berm. The beds strike N40°E, dip 25°SE. A holding basin was just above the lock. Dam no. 7 was planned to be about 1 mile upstream on the Potomac River and a feeder would have entered the canal at

Prentice says on berm near lower end of lock

150 ft. = Sandy Flat Hollow

the tail of Lock 62. The Baltimore and Ohio Railroad was graded to provide for the pool behind the proposed dam; the dam was not built.

Old turning basin 200 ft. downstream, old hollow on berm.

154.12 (541.00) WASTE WEIR, mouth of Atheys (Tunnel) Hollow. This is an overfall, 100 ft. long and 16 ft. wide, constructed in 1849-50. A concrete frame, 3 gate, board insert waste weir was placed in the overfall ~~###~~ about 1913. The original overfall is coursed gray and red sandstone rubble with a few blocks of white sandstone. Two stone overflow channels slightly curved around to meet in common stone central channel. Stone mason's mark near edge downstream on river side - appears to be drill holes 3 in. long, 3/4 in. diameter.

Davies diagram

Diagram 8"w x 6"h 4" x 3"
Field notes 8/8/71, p.7.

154.23 (541.10?) (154.36) OUTCROP Chemung olive gray shale is exposed on the towing path. The beds strike N40°E and dip 30°SE (away from canal → 

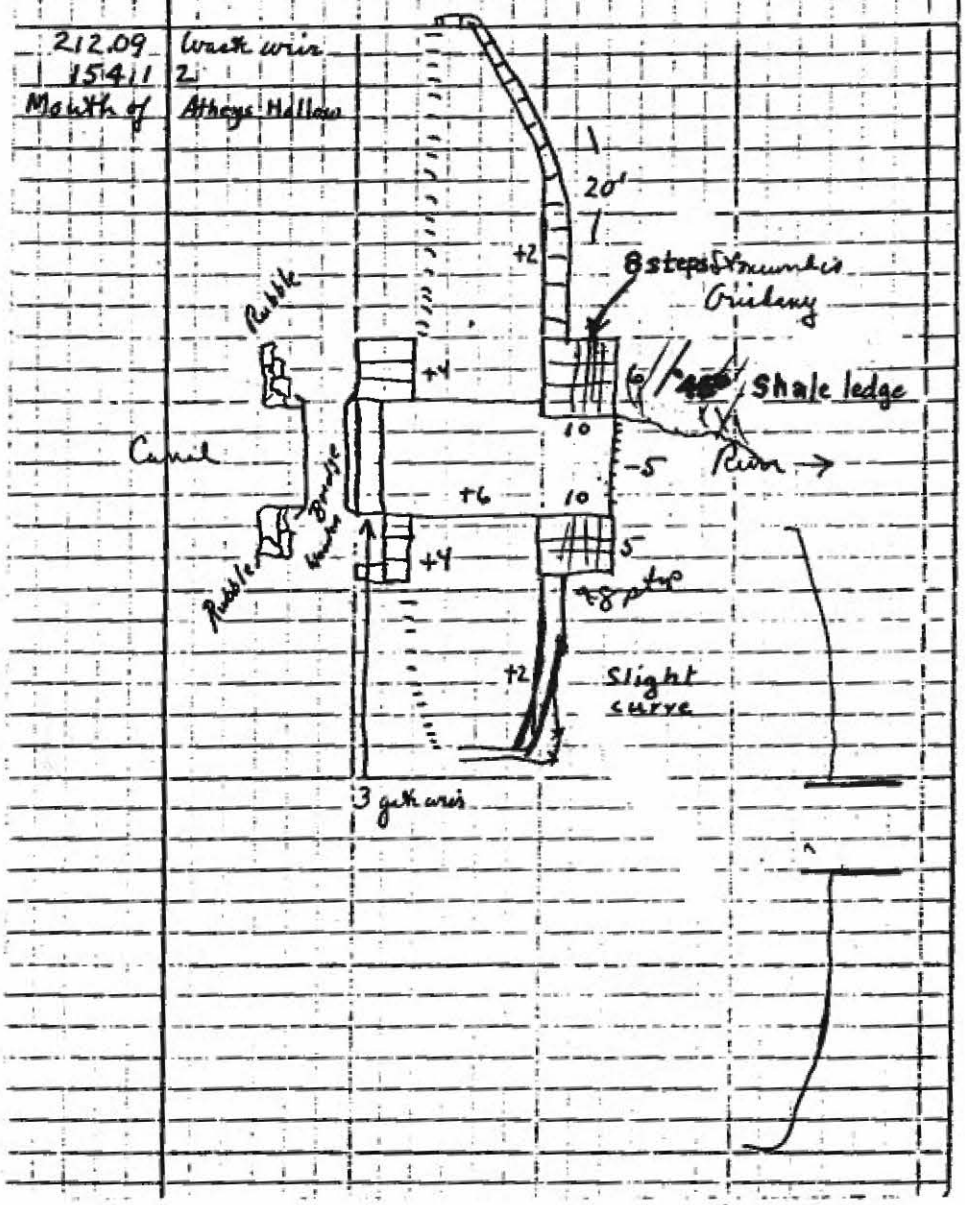
)

154.33 (541.15 - 541.18;) (154.45) OUTCROP Chemung olive gray shale is exposed on the towing path. It is platy and fissil. The beds strike N40°E and dip 45°SE. 3 sets of joints at right

8/8/71 411a

7

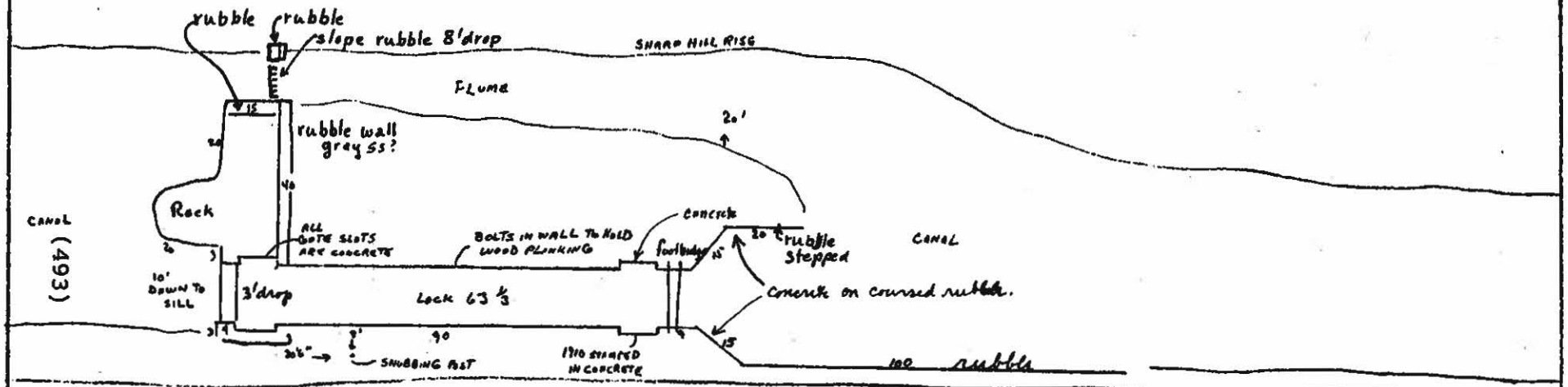
212.09 Wash wier
15411 2
Mouth of Athens Hollow



angles to beds cut the shale.

154.34 (154.46) 541.20 Lock 63 1/3 10 ft. lift, constructed 1838-39, 1848-49. This is a composite lock with walls of coursed rubblr, mainly white sandstone and some gray sandstone. The chamber was faced with timber. The concrete faces of the recesses were placed in 1910. There is a concrete coping at lower end of lock. Coping at the upper ends of the lock are cut white sandstone. Wing walls are coursed gray sandstone rubble. A miter frame is in place in the upper recess. Notches in the concrete are for crib fenders. A revetment wall, 20 ft. long on the berm at head of lock, is probably the remnant of a crib fender. Stone for the lock is from Twiggs Hollow above Lock 61. A "railroad" was used to haul the stone to the lock. The flume is on the berm and is lined withgray and brown sandstone. An overfall with a concrete frame for insert gates is at the upper end of the lock. A snubbing post is at the head of

Barrens diagram



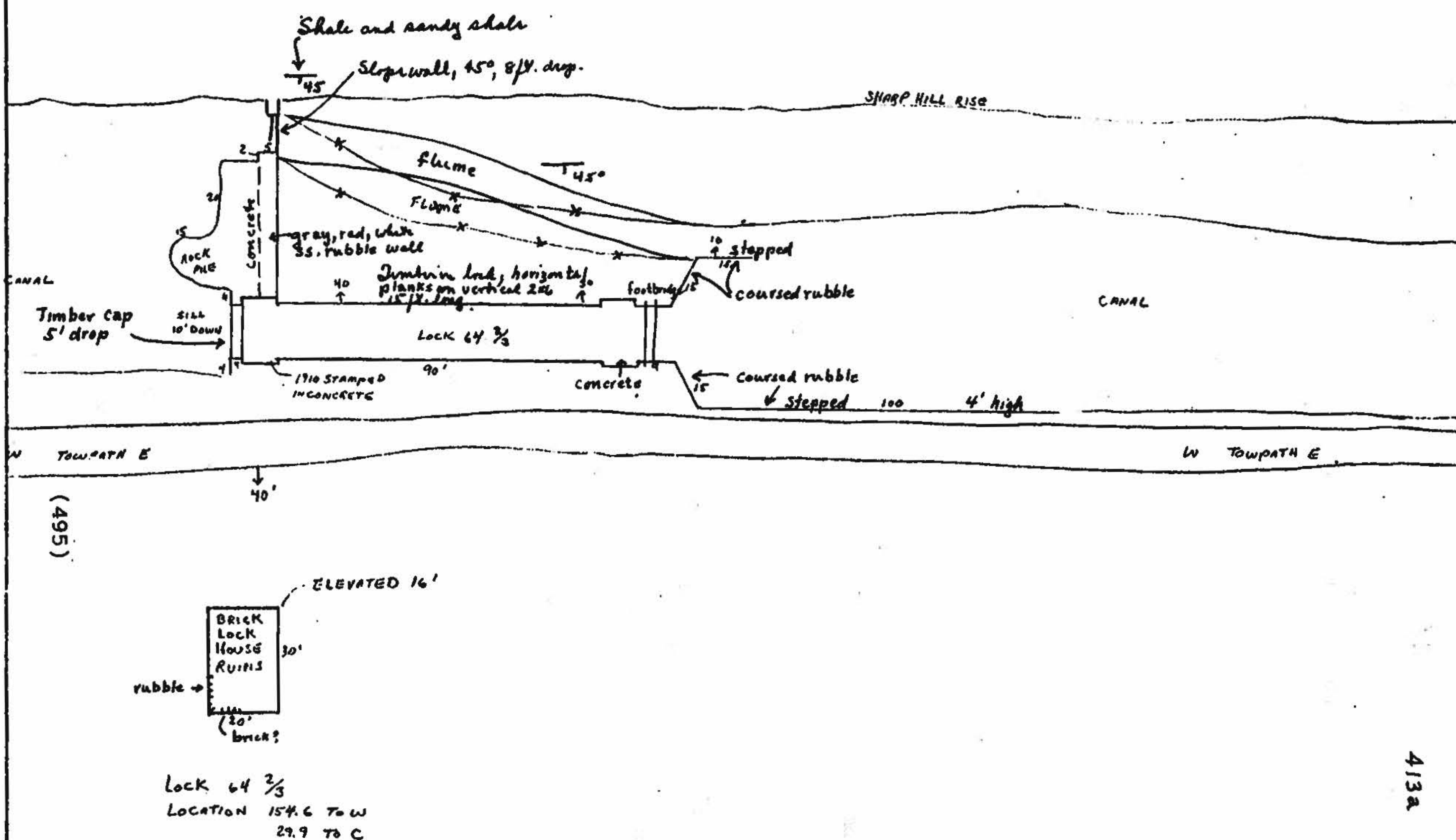
NO LOCK HOUSE
LOCK TENDED BY LOCKKEEPER AT 64

LOCK IS STONE WITH CONCRETE GATE SLOTS
LOCK 63 1/3
LOCATION 154.4 TO W
30' TO C

412a

the lock on the towing path side. An outcrop on the towing path opposite the lock is formed of gray shale, Chemung Formation. Slickensides are prominent on bedding planes. There is a bridge over the lower recess. Sandstone blocks from the upper recess are along the towing path. Date in concrete on towpath at town gate: 1910. Machell's map shows lockhouse on berm at mid lock - no apparent lockhouse 1975.

154.45 (154.57) LOCK 64 2/3 10 ft. lift, constructed 54-1.3 1838-39, 1848-49. This composite lock is similar to Lock 63 1/3. The chamber walls are coursed rubble gray and red sandstone from a quarry in Twiggs Hollow. It was brought to the lock by "railway". The chamber had a timber facing. Cut white sandstone is in the coping below the lower recess. There is no coping in the chamber area. The flume is on the berm, ~~20~~ 15-40 ft. from the lock. A concrete frame spillway control is at the tail of the flume. The upper end of the flume is lined with coursed red and white sandstone. Notches at the head of the lock was for timbers for crib fenders. A footbridge is over the tail of the lock. The lock house


Shale and sandy shale
Slopewall, 45°, 8 ft. drop.
45
SHARP HILL RISE
flume
45°
Flume
gray, red, white
SS. rubble wall
Concrete
ROCK PILE
CANAL
Timber in lock; horizontal planks on vertical 2x6 15 ft. long.
40
footbridge
10 stepped
15
coursed rubble
CANAL
Timber cap
5' drop
SILL 10' DOWN
LOCK 64 2/3
1910 STAMPED IN CONCRETE
90'
Concrete
Coursed rubble
15
Stepped
100
4' high
W TOWPATH E
W TOWPATH E
40'
ELEVATED 16'
BRICK LOCK HOUSE RUINS
30'
rubble
20'
brick?
Lock 64 2/3
LOCATION 154.6 TO W
29.9 TO C

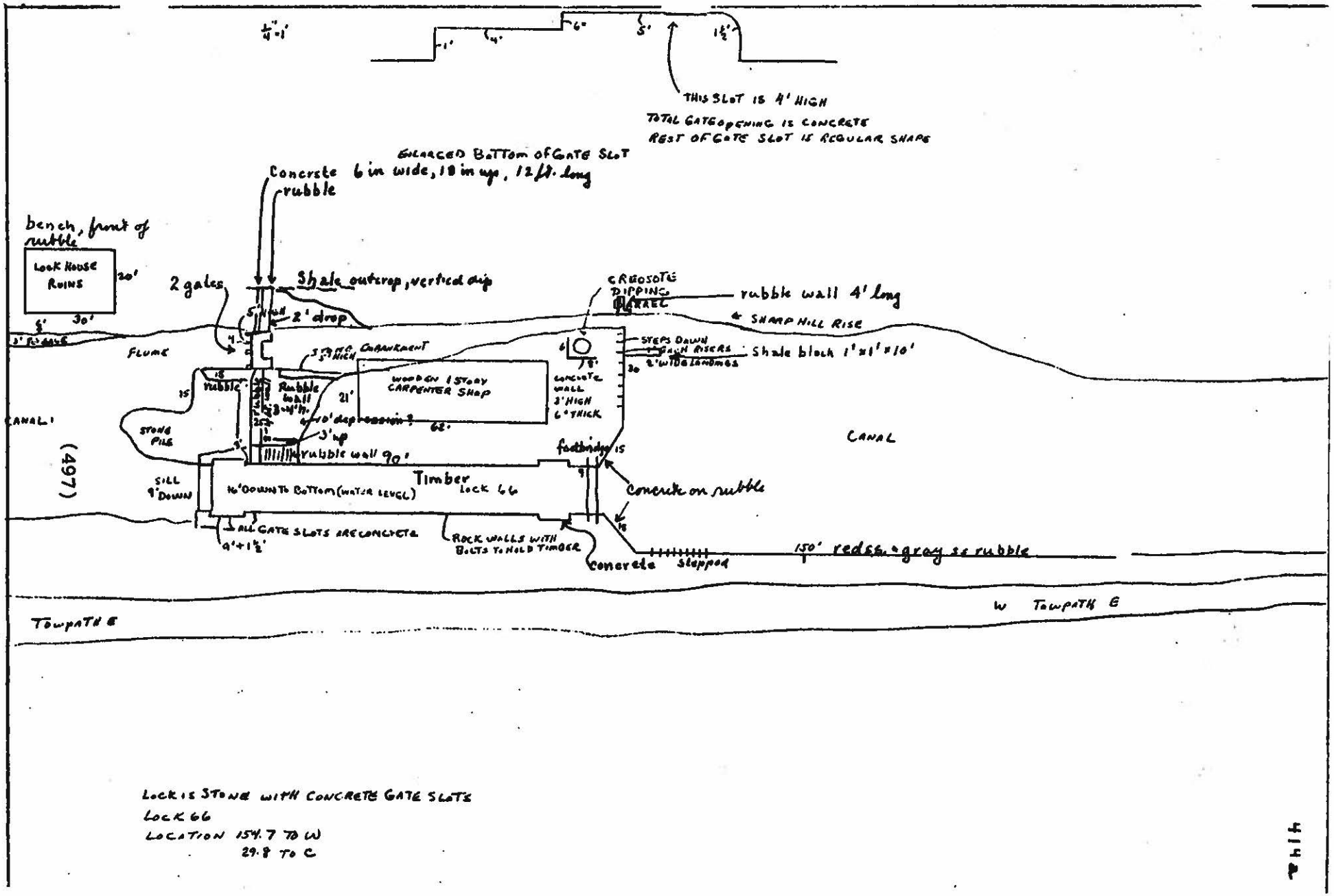
was formerly clapboard on a rubble foundation. Only the foundation remains on the side of the towing path. An outcrop of gray shale is on the towing path. The beds strike N30°E and dip 30°ESE.

Butt of snubbing post on towpath, near gone (1975)
Date 1910 in concrete, recess on upper end, towpath side.
Small bench 10 ft. above x 50 ft. back of towpath = bedrock sill? - upstream?
541.36 - 541.40 outcrop on towpath edge = shale beds up to 2 in. thick, strike parallel to towpath, dip 40° towards 130°; strike = N40E.

154.52 (154.65) LOCK 66 10 ft. lift, constructed 1838-39, 1848-49. 541.40 This composite lock has walls of coursed red brown and gray sandstone rubble from a quarry in Twiggs Hollow above Lock 61. It was brought to the lock by a "railway". The chamber was formerly faced with timber. Cut white sandstone is in the recesses of the lower gates. The gate recesses were faced with concrete in 1910. Notches for timbers of crib fenders are at the junction of the wings and the lock walls at the head of the lock. A footbridge is over the tail of the lock. The flume is on the berm, 25 ft. from the lock. A concrete frame, 2 gate, drop board control structure is at the head of the flume. A carpenter shop was on the berm. It was a frame building, 40 ft. 4

Barms diagram

End of Ontelaunee Club Road 543.01 ? ?

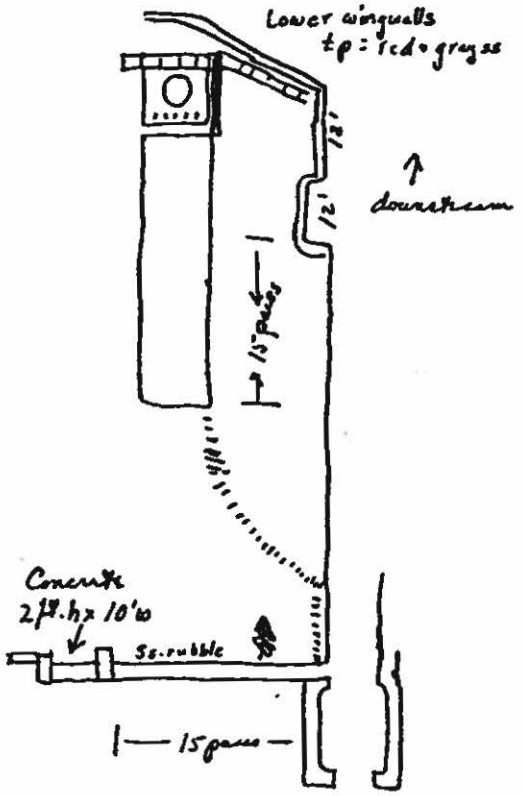


LOCK IS STONE WITH CONCRETE GATE SLOTS
LOCK 66
LOCATION 154.7 TO W
29.8 TO C

8/8/71
9

414b

✓ Lock 66 - berm side



213.0 Tunnel portal

Portbridge = 63,592.8 - car reading - Aitken Club Rd.
RJ. - Aitken Club Rd = Martens Ave - 63,594.15
RJ - Martens Ave = ~~Aitken Club Rd~~ Aitken Rd - 63,594.6
Junction - Aitken = Thomas Rds ~~63599.5~~ 63597.5
Junction - Thomas Rd = Rd 81 63599.5

Burnt in early 1960's. Remnants of lock gate abandoned when canal ceased operation was in shop. 415

inches long and 20 ft. 2 inches wide. A creosote dip tank was at the north end of the shop. It is a vertical cylinder, 28 1/4 inches outside diameter, 6 ft. deep and formed of 3 1/16 inch steel plate. The top is at ground level and there is a concrete wall on two sides. The tank rests on a concrete slab that was elevated to allow the building of a fire beneath. An old race to the shop isjust below the upper recess but is now blocked off. Chemung gray sandstone crops out at the base of the flume spillway.

Lockhouse on berm at head of lock (per Baron) - yes.

551.55 - road to summit above tunnel leave canal

154.54-154.98 (154.66-155.10) DEEP APPROACH CUT excavated in 1836 to 38. Additional work was done in 1847-50. The cut, 2,322 ft. long, up to 79 ft. deep, involved 213,229 cubic yards of excavation and cost $218,000. The cut is in Woodmont dark gray, splintery shale, which strikes N30°E and dips 30°SE on the towing path side and 45°NW on the berm. Slides in the cut are common. The Tunnel Trail leads off the towing path at 154.71, crosses summit of Tunnel

Davis diagram

Outcrop at 551.55 on towpath - shale, dip vertical, strike N40E, on berm side, strike N40°E, dip 40° towards 300°; ?? vertical joints.

9/6/71
9

Structure at north portal.

244.05 North portal.

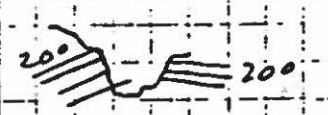
200' N. of N. Portal. view north.

Axis of anticline crosses 50 ft. north of north portal.

End of board walk

view north

At Tunnel Hill Trail - end of retaining wall.



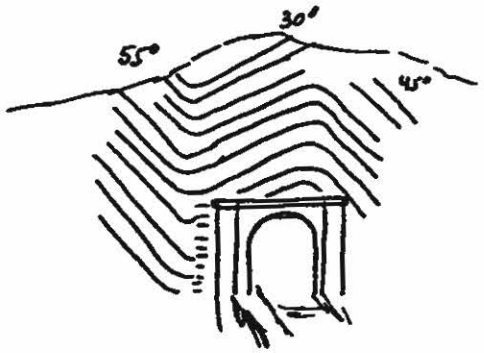
Tunnel Approach Cut

Hill and descends on the south to the South Portal. Terraced spoil banks of shale are along the trail and the mouth of the old ravine, formerly connected with Atheys Hollow, is now blocked by a graded spoil bank. From 154.73 to 154.98 (154.85 to 155.10) the towing path is on a timber platform 1,285 ft. long. The canal crosses the apex of the anticline at the north end of platform. 700 ft. north of the tunnel, Woodmont gray shale with a rusty brown surface stain is exposed in the cut. Vertical cleavage in the rock is parallel to the strike of the beds. The beds strike N30°E, dips 37°NW increasing to 55°NW near the tunnel. Slickensides are well developed on bedding planes. The slickenside surfaces are smooth down dip indicating that the top beds moved down relative to the lower beds. 300 ft. north of the tunnel, joints are well developed on the dip slope cut face. Strike joints are at right angles to the beds and spaced 3 to 5 ft. Transverse joints are spaced

20 ft. Beds near the tunnel are 1 ft. thick and steel rods have been driven to hold beds in place on the dip slope. Rock slides were common in the area of the diip cuts. Some developed slickensided bedding planes on the towing path side and on joint surfaces on berm. A large slide in November, 1857 required 2 months to remove; another large slide in 1969 almost blocked the south portal of the tunnel.

154.99-155.58 (155.10-155.70) <u>PAWPAW TUNNEL</u> The tunnel is 3,118 ft. long and in 1840 when it was holed through it was the longest tunnel in the United States. Its construction covered the period June 1837 to 1850. The tunnel axis is N6°30'E. The maximum depth beneath the summit of the ridge is 362 ft. Headings were driven from the portals and from 2 sets of double shafts. The shafts in each set were spaced 15 ft. Each of the 4 shafts were 8 ft. diameter. Shafts A and B were 418 ft. from the north portal and were 126 ft. deep. Shafts C and D were 893 ft. from the north portal

9
9/28/69

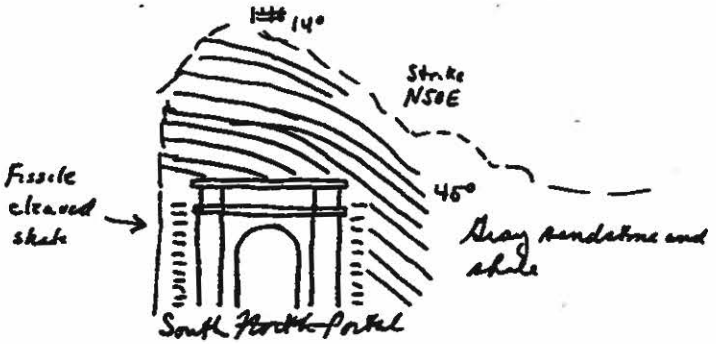


North Portal

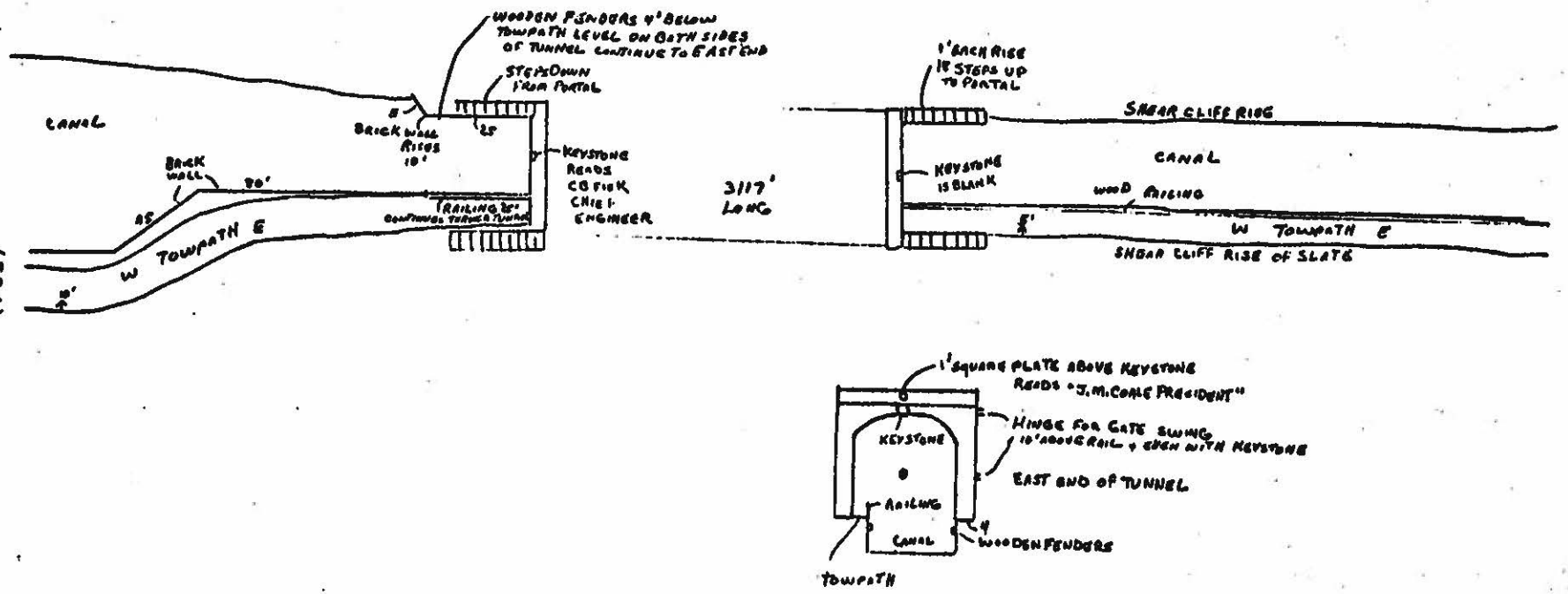
Tunnel survey - white coarse grained sandstone cut blocks.

Arch - white pebbly sandstone cut blocks; at 25 ft. in brick replaces cut blocks.

119.64
155.80



Tunnel portals



(504)

PAW PAW TUNNEL
LOCATION 155.8 TO W
28.7 TO C

4176.

Tunnel started 1836

1836 May 8 – Montgomery - picked men - had some guns + spittle sticks
1836 May 5 - Strike at Millstone Pt. t Capon, Man beaten t death at Rd. Top - April 25
dissatisfaction spread to Prathers Neck

1837

Montgomery 250 men at work

February 1, 2 or 3 days of war like demonstration by men

May 15 Montgomery in need of $1000 as he used funds to pay passage of miners from England.

1836 Montgomery set up some men to maintain order – have guns + sticks

1837- January 5. Montgomery discharged 7 men. If there is another incident the Chief Engineer wants Montgomery to suspend work.

<u>1838</u> 5/8 + 7 to 5/18

Men idle 3 wks – some starving – <u>Prathers Neck.</u>

Co. offered 50¢ on dollar – labor wants all or nothing

Powder hauled off to Hagerstown – 5/16

5/15 - Militia arrived

5/9 - laborers do not know where to lay grievances
blame C+O for suffering + misery – cannot feed families - seek revenge

1838

11/27 - 3 men killed in shaft D - fell down shaft when hook on bucket broke

Shaft B - 2 killed 2 wounded to date
D 4 killed 0 "
1 previously killed - bucket improperly attached

2/15 - Laborers surrounded tunnel offices; threatened to quit
rumors of robberies, threats of disturbance, & destruction
Fisk advocated adjustment in contract so Montgomery could pay men; ~~advanced money~~ advance M - all money owed would not suffice
M - could be ruined financially. C&O in difficult financial position

Oct 5 - 497 men 116 miners at Tunnel
6/23 - Trouble at tunnel, men threatened bosses; work slowdown. In January 1838 several men jailed in Cumberland but bail given & cases nolle prossed. Men returned to agitate at tunnel; Montgomery needs military forces.
6/16 - Morale low, men strike three more times to respond.
Men flogged one of bosses who tried to get them to work.
Men threaten bosses & contractors - Irish organized to fight off any new workers try to prevent bosses from engineering work. Threats of murder. M - authorized to discharge all hands

Dec - 134 men 97 miners.
1.66/day
1.12 - 1.33/day
boys 0.91 1/4/day
Smiths & Carpenters 1.35 - 1.50/day

2/21/38 400 hands at tunnel not paid for 2 months,
threaten to destroy works

2/13/38 M on brink of insolvency, miners threaten to quit
store broken into & robbed. M - life not safe if he ~~doesn't~~ [illegible] tunnel without money

6/10/38 Scoundrels hammering all newcomers
June 8 - 2 excellent miners at work a week assaulted on leaving shaft - attacked by 20-40 men with clubs
also mob fight in Athey's Hollow

1839

8/12 -

Attack made on Klutchmen on Sect 28 by party of men from Watkins sect. below tunnel — Attack on Sun. 8/11 — early hour Men attacked in sleep, some escaped by swimming river, one in river shot twice in arm. Intruders vandalized camp, carried off $110 cash 3 pistols 1 rifle, &c. 14 men wounded. Attack = friction between Dutchmen and Irish.

May 4 - Operations & tunnel suspended - riots & disturbances because of unemployment 300-400 laborers marching along line of canal with arms & causing violence

4 2/3 - 17 2/3 years

10/31/39 - 14 sentenced & penitentiary, 9 pardoned by Gov & imprisonment, one sent to Wash Co for trial, 1 acquitted Grand jury ~~recom~~ forced withdrawal of liquor licenses.

1839 March — 15 mile Co. area - trouble with armed men

1839 Oct 28 - Dutchmen injured by Irish - all night in tunnel area

Nov 8 - Blacksmith established in cooperation with B&O - Benj. H. Latrobe continued until 1853

1840

Tunnel holed thru 6/5

28 Feb — M — having trouble with liquor problem. Men idle looking for trouble at N end of tunnel — and back wages

1846 — Jan. 8 · Montgomery appointed trustee — bankrupt.
Grog shop reopened on island at mouth of Athy's Holl. — licensed

1849 — 11/13 Good voices s[illegible] tunnel —
Mc Cullough & Day, contractor
sublet to Bridge Co

1850 — 4/24 Men quit at tunnel — walked down + L 61 · stopped work
acted under influence of [illegible] of [illegible]

aler 2/14

and were 187 ft. deep. The shafts were completed in 1839 and upon completion of the tunnel they were left unfilled to reduce weight on the lining. They are capped by a brick well with a concrete lid and mounded over with earth. The headings were joined and the tunnel holed through on June 5, 1840 at a point 1503 ft. from the south portal. The tunnel excavation was 27 ft. wide and 25 ft. high. The span of the lined arch is 24 ft; the waterway is 19 ft. wide; the towing path is 5 ft. wide and the depth of water 7 ft. The total excavation is 78,874 cubic yards, overbreakage and rockfalls in tunnel during construction 6,628 cubic yards. The tunnel is lined with 5,800,000 bricks. The lining is 13 inches thick with 4 courses of brick, 9 x 4 1/2 x 2 1/4 inches laid long-wise to ~~6 courses~~ the tunnel axis. The2 1/4 inch face of the brick shows in the tunnel. The lining is up to 7 ~~layers~~ 6 courses thick. Weep holes through the shafts. - closely spaced in area of shafts are at the springing line. Dry backpacking over the arch consumed 12,000 cubic yards of material. The tunnel portals

wings and arch for 26 ft., 3 inches in from the portals are cut blocks of white coarse grained Ridgeley (Oriskany) Sandstone. A rectangular stone, 22 inches high, 26 inches wide, above the keystone at the north portal is inscribed J. M. Coale, President 1850. The keystone at the south portal is inscribed C. B. Fisk, Engineer. A swing boom at the north portal was used for lifting and dropping timbers into slots of the stop gate. The approach cut at the south portal is 200 ft. long, involving 21,000 cubic yards of excavated material. It was completed in 1838. At the top of the hill, above the tunnel, ~~are~~ were 6 alinement stones, each 10 inches square and 10 inches above the ground. The groove on the top of the face across the stone is at right angles to the tunnel axis and was used for distance measuring. 5 of the stones are still in place The small hole in the groove was used for alinement. Cost of excavating the tunnel was $317,000; brick masonry $78,400; and shafts $44,000. A wooden tramway was used in the

tunnel in 1849-50 for trimming and placing the arch. A wooden tramway also was used in northern approach cut to haul spoil. The original contractor (1836-46), Lee Montgomery was a preacher by vocation and built a tunnel on the Dansville and Pottsville Railroad in Pennsylvania. He went bankrupt in 1846. There was severe labor trouble at the tunnel from 1837 to 1839 at which time up to 497 laborers and 116 miners were at work in the tunnel. After 1872 a semaphore signal at the west end of the tunnel was used to control traffic on the 4,212 ft. of single lane waterway at the tunnel and the northern approach. The tunnel lining was repaired 1966.

Spoil piles in ravines adjacent to shafts atop tunnel.
Picnic table, pump, toilets 100 yards upstream of tunnel along towpath.

Note- The tunnel is closed from November 15 to April 1; use the tunnel trail. ??

West portal of tunnel 566.45

Camp area - toilets, tables, pump - in field to east.

155.78 (155.90) SECTION HOUSE A large 2 story frame house, L-shaped in plan with brick foundation, is on the on the flat on the river side of the towing path. The house was

Basin

Bricks unearthed between section house and Md.51 in field + near towpath are discards for tunnel. Kiln probably at upstream end of field where cinders and coal have been found in soil in bull dozing.

(511)

occupied by the Division Superintendent of the canal.
MP 156 = 566.70

156.08 (156.33) HIGHWAY BRIDGE A Warren, curved-chord, 566.92
pony (open) truss, constructed in 1932, carries Maryland
Highway 51 over the canal. A holding basin for the south
portal of the tunnel was north of the bridge.

l = lattice beams

all verticals are lattice beams.

156.18-156.47 (156.40-156.69) MITCHELLS NECK CUT The 557.00
canal crosses a terrace in a cut up to 40 ft. deep. Sand
and gravel up to 10 ft. thick overlying Chemung gray shale
and sandstone are exposed in the cut. The rock beds strike
Emphasize anticline
N20°E and dip 60°SE. Parkhead fine grained gray sandstone
is on the north limb of an anticline at 156.43 where the
strike is N20°E and the dip 60°ESE on north, 20°WNW on the
south.

~~156.08 (156.33) HIGHWAY BRIDGE A Warren, curved-chord,~~
~~pony (open) truss, constructed in 1932, carries Maryland~~
~~Highway 51 over the canal. A holding basin for the south~~

7/3/77
Falls Ch 3816
Pangus 3968
Oldham 3979

Towpath,
Tunnel &
Md. 51. Bridge
= Crushed
Stone

156.28 (156.50) WESTERN MARYLAND RAILWAY BRIDGE no. 1416.
557.10
Wabash Bridge no. 5 - in canal company records.
This is a single span, modified Baltimore truss, constructed 1905 by the Pennsylvania Steel Company, Steelton, Pa.; The expansion bearings, consisting of a nest of cylindrical rollers, can be seen on the abutment along the towing path. On berm abutment the bridge is on a fixed bed plate. The rollers on the towing path side permit adjustment of the bridge to thermal expansion and contraction.

all are lattice trusses except portals, top and bottom chords

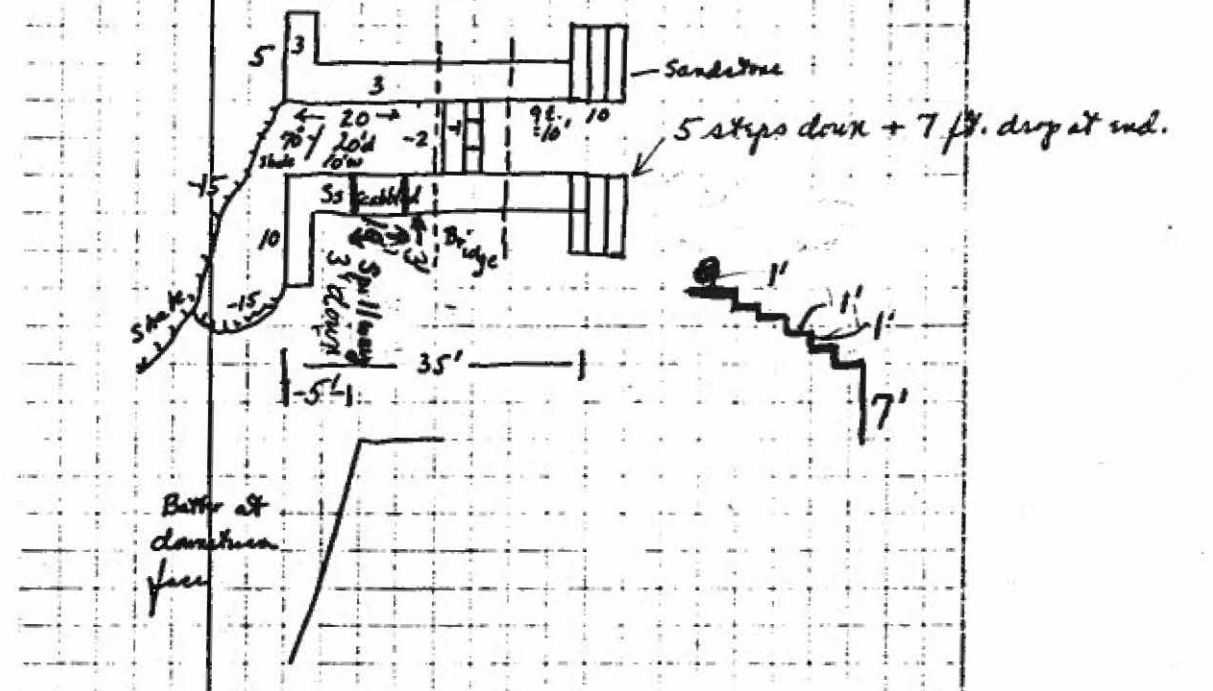
156.46 (156.67) WASTE WEIR This structure was built in
557.30
1849-50 as an overfall 100 ft. long with a drain 16 ft. wide. The walls are hammer-dressed, coarse, pebbly white sandstone (Oriskany). The present waste weir is a concrete frame with 3 gates for insert boards (no paddle gates). A wooden bridge is over the gate. There is a 15 ft. drop over bedrock at the lower end of the waste channel. Chemung gray shale is exposed in the waste channel and the beds strike N55°E and dip 20°SE (60).
Old spillway on north. Shows as drop in wall on north side of channel below weir; drop 3 ft. x 10 ft. long; log crib fills gap now.

156.51 (156.71) OUTCROP An anticline on the berm con-

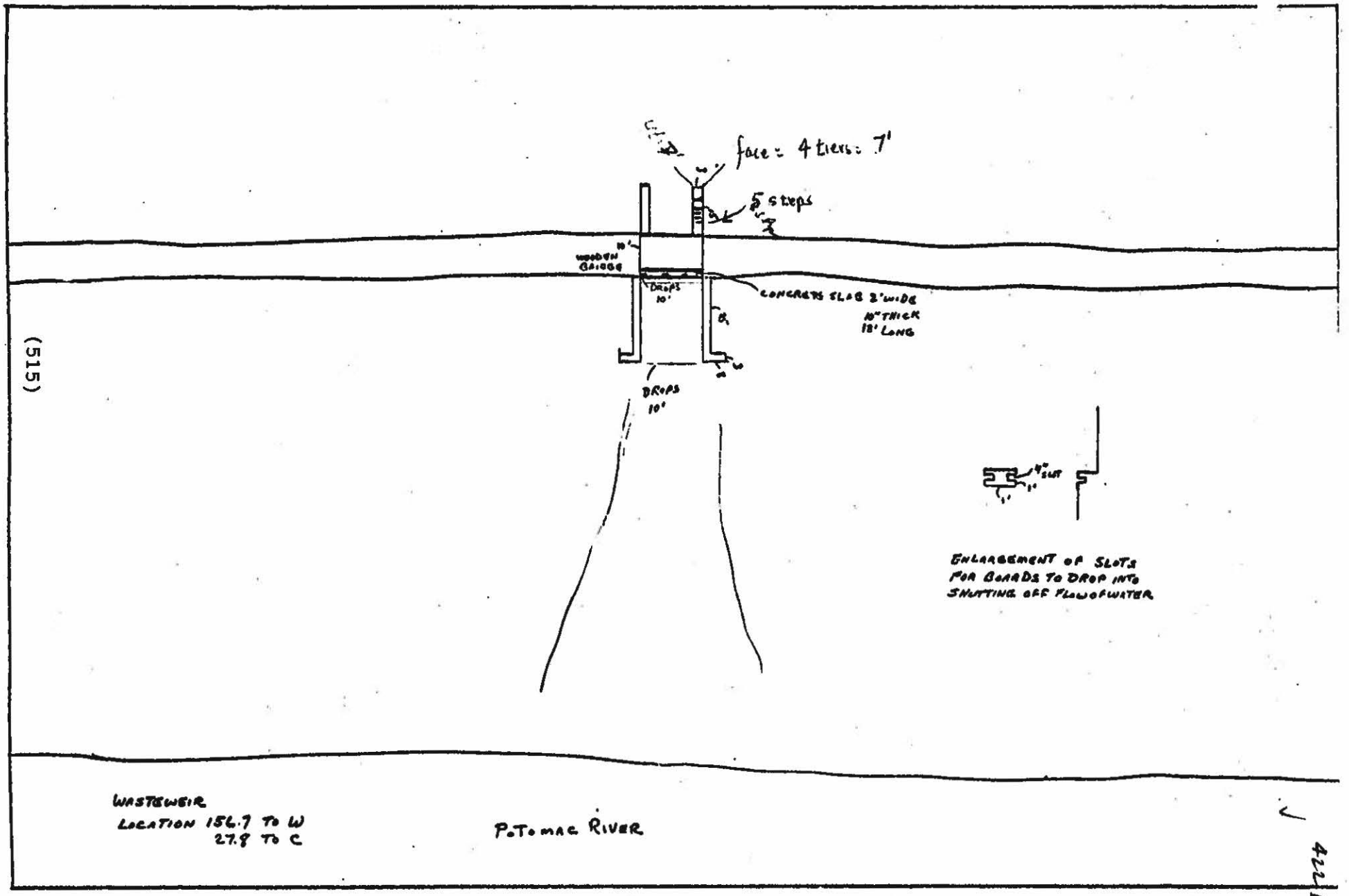
September 6, 1971
GHD

Falls Church, begin 65,810
" " , end 66,074

Pawpaw - wash weir. - 3 concrete gates under wooden bridge, boards, no paddle gates. Masonry (stone) surrounds wood.



Mitchell Cut
Wash weir


face = 4 tiers = 7'
5 steps
WOODEN GATE
DROPS 10'
CONCRETE SLAB 2' WIDE 10" THICK 18' LONG
DROPS 10'
(515)
ENLARGEMENT OF SLOTS FOR BOARDS TO DROP INTO SHUTTING OFF FLOW OF WATER
WASTEWEIR
LOCATION 156.7 TO W
27.8 TO C
POTOMAC RIVER

422b

13 vertical stones, 10 in. wide, 18 in. high under old spillway lip. Spillway in north wall of waste weir.

tains Chemung gray shale with beds striking N35°E and dip-
ping 35°SE on the east limb and 40°NW on the west limb. 200
ft. upstream is a syncline with the strike N40°E and dip
40°NW on the east limb and 60°SE on the west limb. Ripple
marks are prominent on the bedding planes.
557.35 at west end of sweep; east end of anticline limb on canal.

156.61 156.80 OUTCROP Cuts on Western Maryland Railway,
557.42 WM Ry at ~~on~~ from of canal, gray shale, dip 60° SE (into cut on NW. wall, strike parallel to canal.
where it rejoins canal, expose the axis of an anticline.
The beds strike N30° E. The dip at the base of the cut is
45°SE, but half way up the face it is 10° to 15° NW. The
anticline is in Chemung gray shale overlain by terrace
gravel up to 45 ft. thick in the upper part of the cut on
the northeast. The gravel contains rounded boulders up
to 2 ft. size in orange, silty sand.
156.81 · Old boat basin & road to old cable ferry - not seen.
156.9 - 557.58 Pureloma Run H.B.O.
156.97 - Canal widens creating on riverside of towpath
157 MP - 557.69
157.02 (157.20) OUTCROP A cut on the Western Maryland
Railway exposes Chemung gray shale with sandstone beds up
to 4 ft. thick. The beds strike N30°E and dip 45°Nw. Just

Not visible in summer.

to the west is another outcrop in a railroad cut in which the Chemung gray shale strikes N30°E and dips 60° to 70°NW. A small anticline is near the center of this exposure.

157.10 (157.27) CULVERT 211, PURSLANE RUN (Greenville Hollow) DAVIS FARM ROAD CULVERT, constructed 1838-39, 1847-49. This structure was used as a road culvert until 1922. The arch stones are cut sugary gray to white sandstone from quarries at Town Hill. The arch has a span of 14 ft. 24 ringstones and a keystone are in the face of the arch. The inner part of the arch is brick. The abutments are 5 ft. high and made of blocks of red to gray sandstone quarried in the vicinity of culvert. The parapet and coping are 2 ft. high and are now concrete. The wings are coursed rubble red and gray sandstone with some white, pebbly Ridgeley (Oriskany) Sandstone. Fossil imprints are prominent on the face of the blocks. A 15 ft. embankment is above the coping. On the berm the culvert extends under the Western Maryland

Culvert in good condition — still in use as a road culvert — + abutment — Coping and parapet = 2 ft. (5 tiers) — Spandrel = concrete — Terrace gravel in valley.

wings at right angles, 12 steps + 3 tiers = 5 ft. abutment at lower end 3 walls. Plinth beneath abutments and wings exposed at low water; wings 15 ft. long.

Railway with a concrete arch.

The site of a canal cemetery is on the low, rounded terrace along the towing path just east of the culvert. The headboards are gone and little remains to identify the site.
Canal cemetery on Md. 51 at Sulphur Spring.

157.24-157.49 (157.43-157.70) TERRACE A gravel-strewn upland, 10 to 15 ft. above the railroad grade, 55 to 65 ft. above the river, rises inland to 200 ft. above the river at the top of the hill. The gravel exposed along the railroad consists of cobbles and boulders, up to 1 1/2 ft. in diameter, in orange brown silty sand. Not visible in summer.
Terrace on towpath side, meadow and flat woodlands from culvert west M158 = 538.66

Check shovel 157.30-157.41

158.25-158.57 (158.44-158.76) TERRACE Cuts on Western Maryland Railway expose gravel 40 to 60 ft. above the river.

Not visible in summer

158.57-161.53 (158.69-161.70) OUTCROP A long section of the Chemung Formation is exposed in cuts on the Western Maryland Railway westward to Lock 67.

Diagram 3 tiers of profiles per page-each pg., 8"/1 x 14"/1 = 4" x 7", 5pages. Field notes 11/11/69.

p.10-19; 9/18/71 p 2-5, 10; 9/6/71, p 5-7, 8/8/71 p4.

Begin sketch of section.

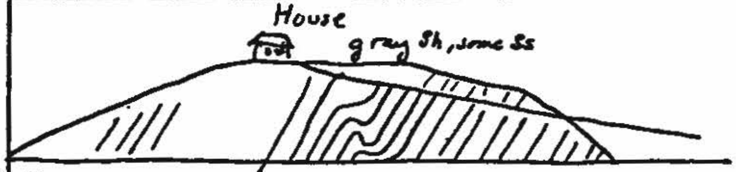
158.56 (158.79) CULVERT 212 RECKLEY FLAT, constructed
Fairplay culvert.
1846-49. The arch is hammer-dressed sandstone from a quarry
On towpath side wings are at right angles, almost buried
on Town Hill. The arch has a 12 ft. span and a 6 ft. rise
with 16 ringstones and a keystone in the face. The parapet
and coping are 3 ft. high and are concrete on the towing
path side. Limestone coping is on the berm. The wings are
parapet is concrete
coursed gray sandstone rubble. The arch is sagging on the
on berm and towpath.
west side and the culvert is filled to the top of the arch
15 ft. above coping.
(1971).

Berm wing flared: 5' 5' 2'

559.38-559.45. cut on WMRy - shale + ss. beds, 1 ft. thick, dip 30° SE.
MP159 - 559.65
159.16 - construction date on berm wall adjacent to WMRy - 1905

159.00-161.30 (159.22-161.52) EMBANKMENT BRIDGES Three
temporary bridges were built across the Potomac River to
West Virginia (Virginia) during construction of the canal
to obtain embankment material. One bridge to Coxes Island
(159.00), built in 1839, was carried away in the flood of
September, 1839. It was rebuilt and carried away again in
the flood at the end of January 1840. It was rebuilt again

21
11/11/69



131.7. 131.82
157.41 157.30

Strike 210°
dip 54° upstream

157.30

131.95 Tex to old traverse (2.50 PM)
= 157.19 At WMRy cut – shale, dip 45° upstream.
Olive brown splintery, platy shale
with Ss up to 4 ft. thick.

Old Town –
Lock 71

face and wings, lower part of lock = mainly Dor, dressed, poorly fitted; coping at groins. Some concrete in lower lock recess. North side of chamber fitted, partially cut gray brown sandstone and red brown cut sandstone, no coping.

Concrete over Dor blocks. Concrete in lock recess at upper end of lock. South side of lock is fitted rubble blocks up to 3' long x 1½ ft. high. Coping of pebbly sandstone; spillway some Dor and cut red brown sandstone.

Lock had wooden chamber faces.

250 ft. west of lock is a weir on berm side made of cut red brown sandstone.

Berm side on broad alluvial plain in Old Town area. Towpath side on alluvial plain ½ way between locks 70 & 71

in August 1840. The second bridge was to Malcolm Island, built in 1838 (160.40) and the third bridge, 1 mile east of Town Creek Aqueduct built in 1839 (161.30). They were carried away in the flood of January 15, 1840, rebuilt in August 1840; carried away again on January 8, 1846 by ice; rebuilt in the spring of 1848, and carried away, July 10, 1848 by a freshet.

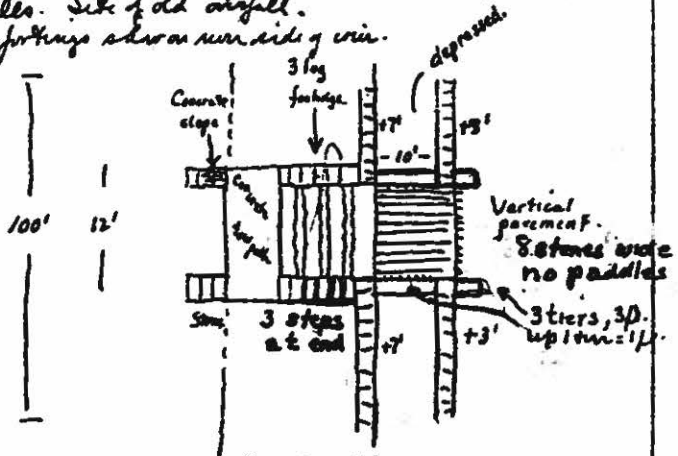
159.50 (159.72) CULVERT 213 Some construction was done on this structure in 1837, but it is questionable if it was completed. There is no evidence of the culvert now (1971). MP160 - 560.50 - opposite box culvert on W.M.Ry. (Hahn indicates culvert beneath railroad entrance; Stinchcomb not found 3 July 1977.

160.08 (160.20) WASTE WEIR The original overfall at this site was constructed in 1846-50. It was built of red and gray sandstone coursed rubble. The present waste weir is a concrete frame with 3 gates for insert boards. 3 large cross timbers are in the footing in the spillway. 560.85 with flanking spillways Not visible in 1977 Double masonry east. 161.932 (161.50) Concrete box culvert - stone retainment per Barron - not seen. Mound at this point opposite mouth of valley 150 ft. long, 10 ft. high. 263 paces east of stone box culvert on W.M.Ry.

161.53 (161.70) LOCK 67 DARKEYS LOCK 8 ft. lift, con-

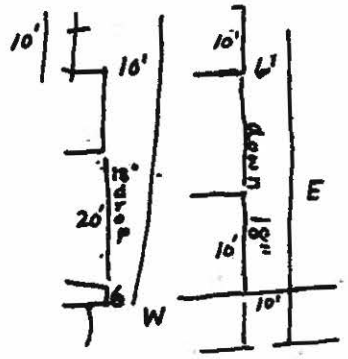
8/8/71
5

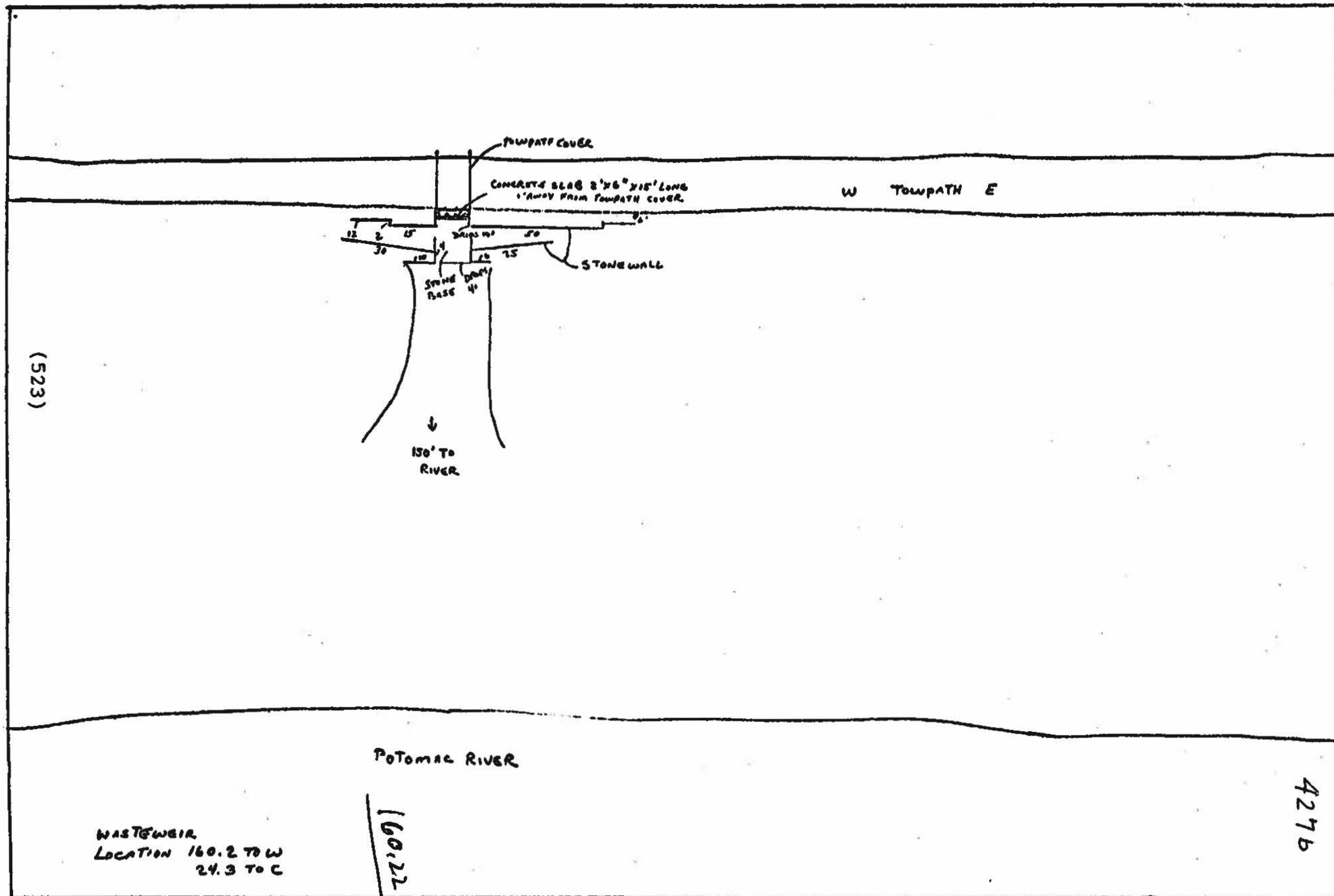
Pike odometer	
	Canal Cemetery – on towpath side just east of culvert at Kiefers – on low terrace. No Indian mounds.
205.30 (157.20)	Access point at Kiefers
206.10	Mile 158
206.85 (158.75)	Culvert – filled to arch. 10 courses and keystone show; 4 ft. concrete parapet above sandstone arch.
207.05	Mile 159
207.7	~159.7
207.95	Jr. Culvert
208.05	Mile 160.
208.25	Locks weir. Concrete 3 frame with sandstone wing walls. Site of old dam fall. Wooden footings show on near side of weir.



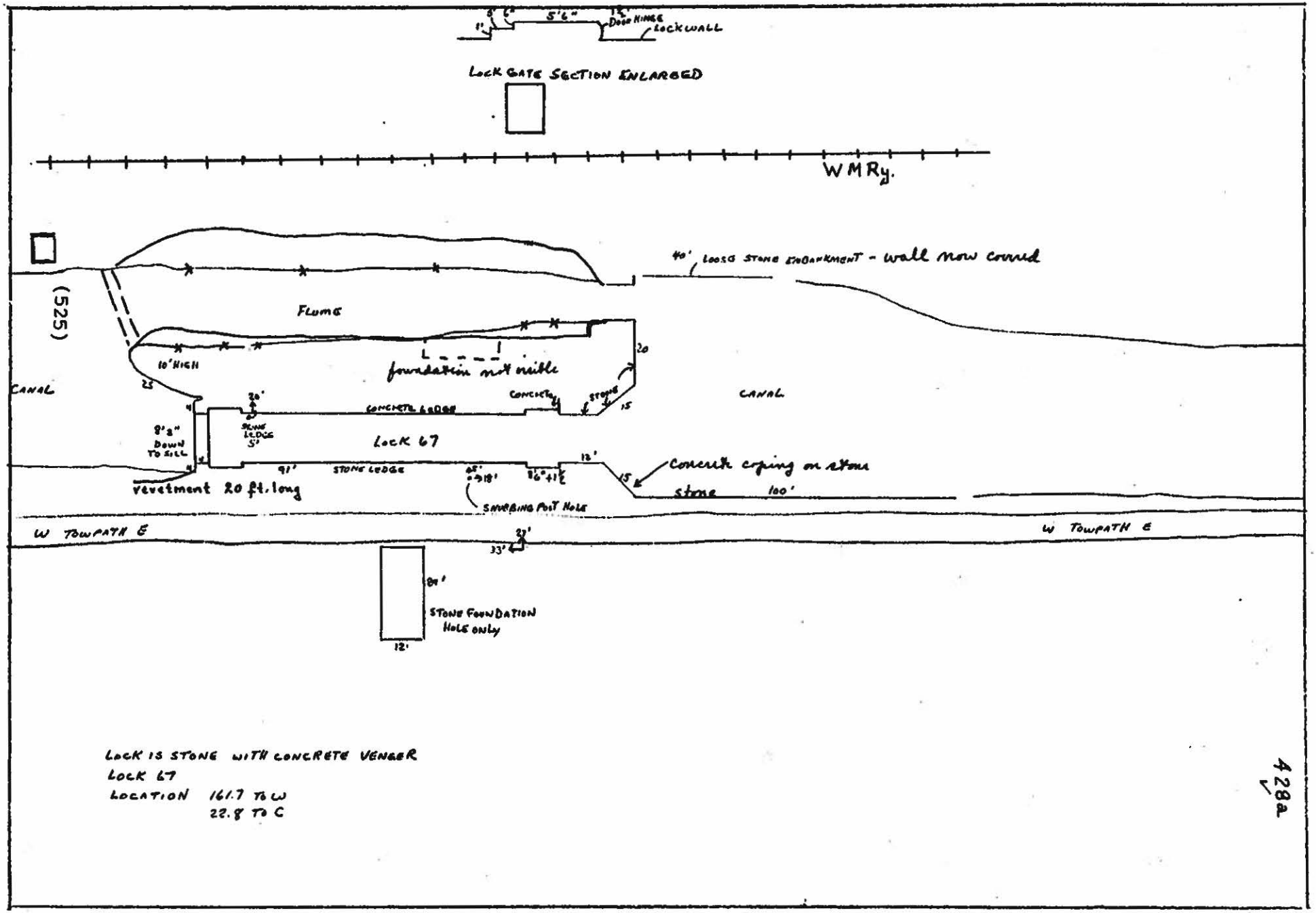
Stone mainly red sandstone laid in rubble.

160.22



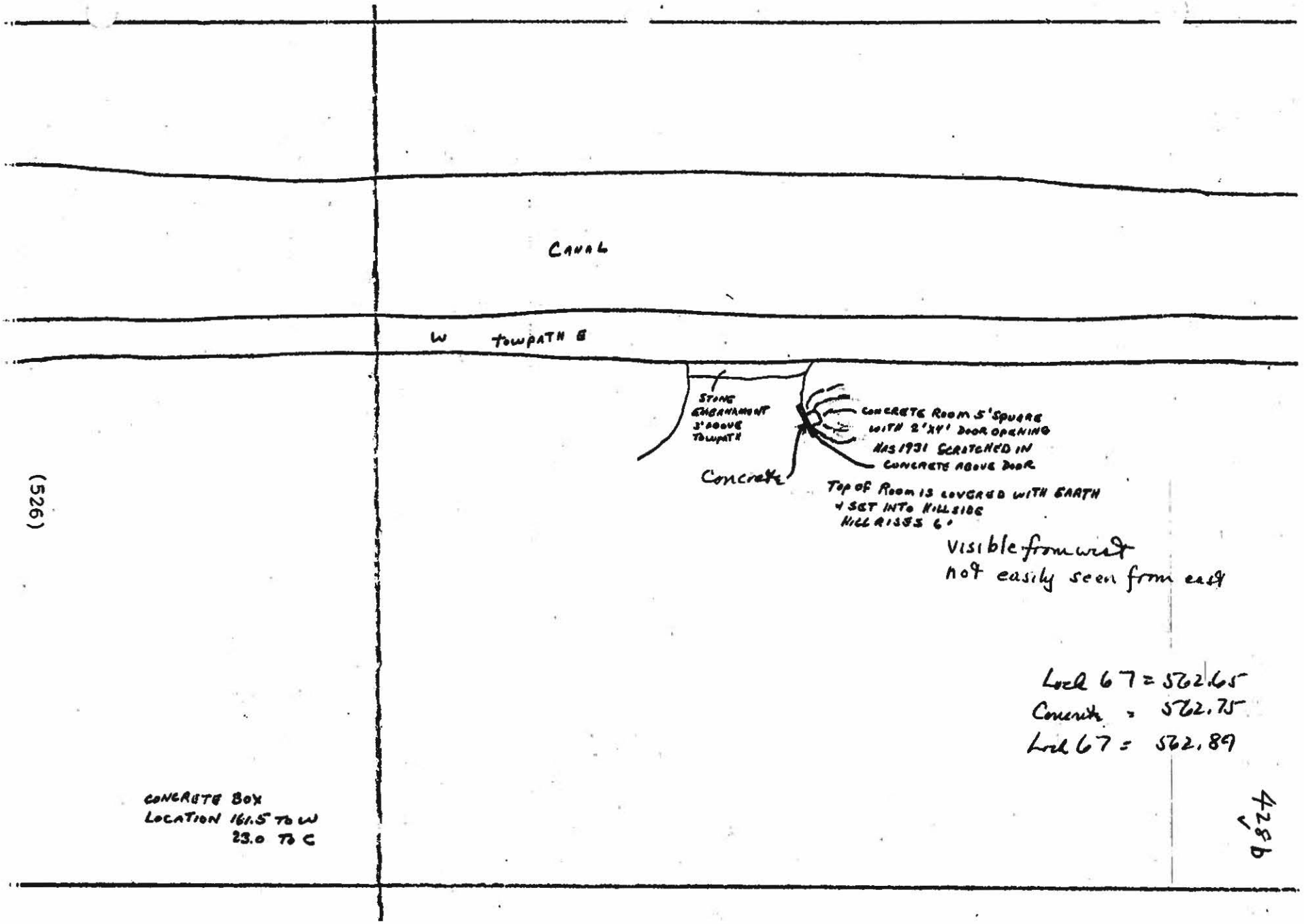

TOWPATH COVER
CONCRETE SLAB 2'X6"X15' LONG 1' AWAY FROM TOWPATH COVER
W TOWPATH E
STONE WALL
STONE BASE
150' TO RIVER
POTOMAC RIVER
WASTEWEIR
LOCATION 160.2 TO W
24.3 TO C
160.22
427b

structed 1838, 1848-50. This was originally a composite lock, but the chamber and berm coping were later faced with concrete. The rest of the lock is coursed rubble, mainly purplish red Catskill sandstone. The towing path coping is cut red purple sandstone, some pebbly gray sandstone and limestone. Coping at the circular quoins is Catskill red sandstone. The wings and the spillway for the flume at the lower end of the lock are red sandstone. Some white Ridgeley (Oriskany) sandstone is in the spillway. The flume is on the berm, 25 ft. from the lock. A 15 ft. mound on the upper berm is probably the remains of a crib fender. Notches for crib fender timbers are on the upper towing path and berm ends of the lock. Slots for insert boards of a stop gate are at the upper end of the lock. Sandstone blocks at the west end of the lock are grooved by ropes and the scraping of boats. The lockhouse was formerly along the towing path but it was carried away in the flood of March



Lock is stone with concrete venger
Lock 67
Location 161.7 To W
22.8 To C

428a


CANAL
W TOWPATH E
STONE EMBANKMENT 3' ABOVE TOWPATH
CONCRETE ROOM 5' SQUARE WITH 2'X4' DOOR OPENING
HAS 1931 SCRATCHED IN CONCRETE ABOVE DOOR
Concrete
TOP OF ROOM IS COVERED WITH EARTH & SET INTO HILLSIDE
HILL RISES 6'
Visible from west
not easily seen from east
(526)
CONCRETE BOX
LOCATION 161.5 TO W
23.0 TO C
Lock 67 = 562.65
Concrete = 562.75
Lock 67 = 562.89
428b

Page 527 is void.

1936; reddish gray sandstone rubble foundation are all that remains of the house.

161.60 (161.74) CULVERT 215 BIG RUN Constructed 1838, 562.91 1846-49. This structure served as a road culvert until 1922. 16 - checked 4/30/73 The arch has 5 tiers of brick with a ~~12~~ ft. span and a 6 ft. rise. The parapet and coping are 2 ft. high and are reddish gray Catskill sandstone coursed rubble. The wings are reddish gray sandstone rubble at right angles, 12ft. long, 9 steps. Cuts on the Western Maryland Railway and Maryland Highway 51 expose Catskill red sandstone and shale. The beds strike N35°E and dip 30° to 45°SE. Exposures of red beds are terrace gravel continue west in the railroad cuts to Town Creek. 10 ft. embankment above coping.

MP 162 • 563.18
162.1 563.21 Town Creek H.B.O.

162.18 (162.31) TOWN CREEK (no. 10) AQUEDUCT Constructed 563.53 1837-40, 1845-49. Rebuilt 1977 Willis Hatch, contractor, absconded 1838, leaving large debt. The aqueduct has a single segmental arch with a 62 ft. span and a 15 ft. rise. The arch has a 43 1/2 ft. radius and 42 ✓ ringstones and a keystone are in +Shiverbacks (not included in ringstones).

563.55 • 563.60 waste weirs; Causeway across canal between waste weirs. Canal 200 ft. wide west of waste weirs.

the face. The aqueduct is 150 ft. long between ends of the wings; archstones and skewbacks are rusticated cut black limestone, 2 ft. to 4 ft. long. The abutments are 2 ft. high above low water level and are founded on bedrock 3 ft. below the low water level. The parapet and coping are 7 1/4 ft. high with the coping 29 ft. above water and 32 ft. above the foundation. The towing path parapet is 7 ft. thick at the top and 7 1/2 ft. thick at the base. The berm parapet is 5 ft. thick at the top and 5 1/2 ft. at the base. A belt of hammer-dressed, white sandstone is on the face of the aqueduct, 1 ft. above the keystone. The outer facing of the parapet and the spandrels are scabbled, reddish purple Catskill Sandstone except above the arches where the parapet is hammer-dressed white sandstone. The inner facing of the parapet is hammer-dressed reddish brown sandstone, dark gray gritty limestone and some white sandstone. The coping is hammer-dressed coarse grained pebbly white sandstone. Butt-

resses at the junction of the wing walls and the aqueduct are scabbled white sandstone. The wing walls are scabbled, reddish purple Catskill Sandstone and some white sandstone. They are battered. The approach walls are Catskill red Sandstone coursed rubble. The limestone (Tonoloway Formation) in the structure is from Hatchs quarry, near the mouth of South Branch in West Virginia. The white sandstone (Ridgeley Formation) is from a quarry on Town Hill. The reddish brown and purple sandstone (Catskill Formation) are from small quarries along the line of the canal near the aqueduct. An iron railing was placed on the towing path side of the aqueduct in 1856 but none remains (1971). A road formerly passed under the aqueduct and was in use to the early 1900's. On the berm, the parapet east of the keystone has fallen and the buttresses have moved out from the wing walls (1971). Siliceous material in the limestone ringstones stand 1/4 inch in relief where solution has

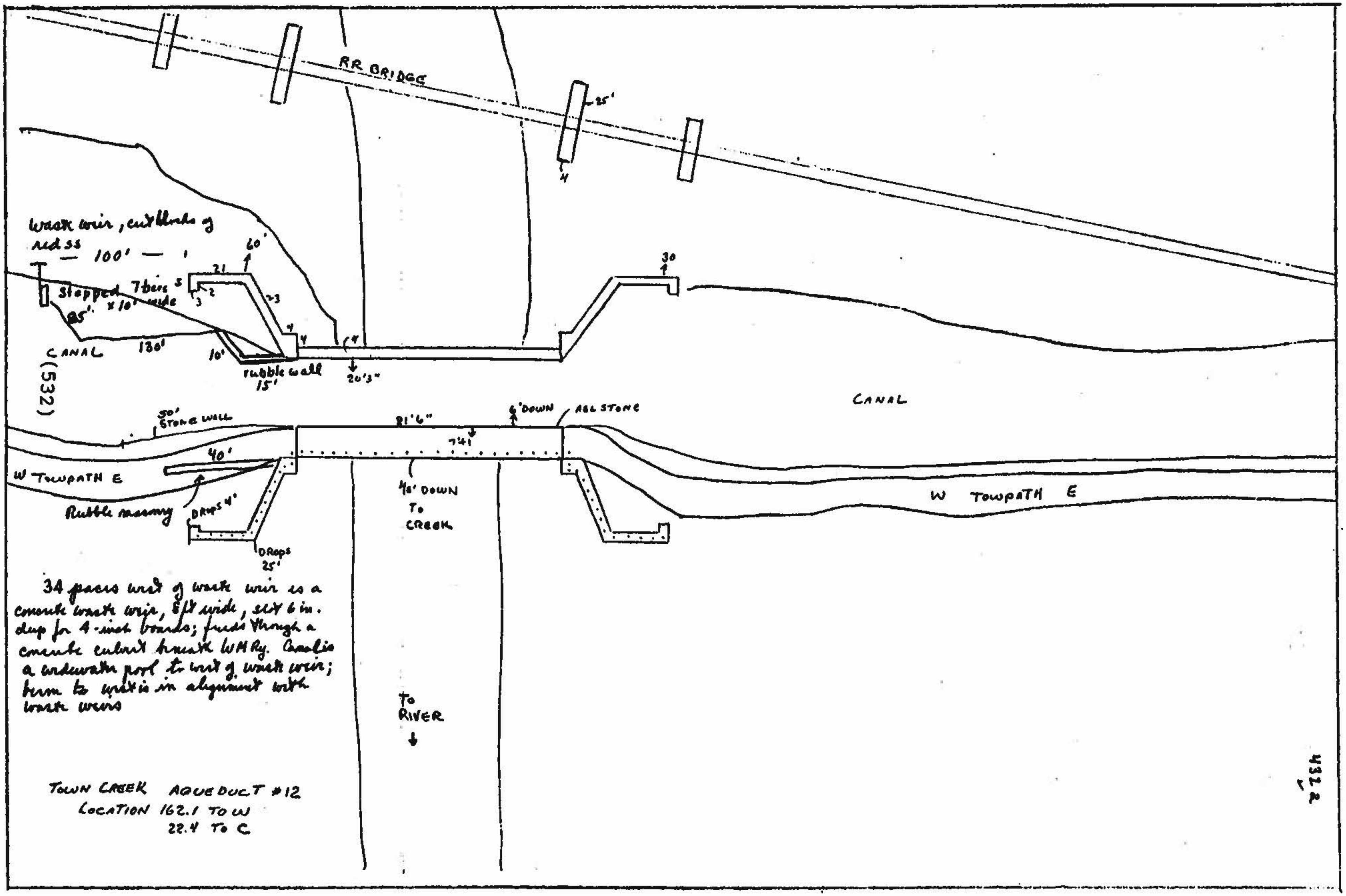
etched the more soluble limestone since the stones were cut in 1838. Willis Hatch, the original contractor for the aqueduct absconded in 1838 leaving large debts.

Western Maryland Railway Bridge no. 1474 is 100 ft. north of the canal. It has 2 short deck plate girder spans at the ends and a long deck plate girder in the center. It was fabricated by the Pennsylvania Steel Company, Steelton, Pa., in 1904. - Bridge is on a curved plan second set of plate girders to north of 1st. set = double track?

An outcrop in Town Creek above and below the aqueduct is formed of Chemung gray sandstone which strikes N40°E and dips 40°SE. [A waste weir constructed in 1846 was formerly just west of aqueduct on the berm side.] It emptied across the right bank of Town Creek. The overfall was 100 ft. long with a 16 ft. drainway. No trace of it remains now (1971). A broad flood plain area, between Town Creek Aqueduct and Lock 68, formerly was known as Harness Farm Bottom.

162.3 & Masonry waste deactivated 1905 - weir on berm, original, not retouched with concrete.
162.35 Concrete waste weir & culvert outflow on berm and under WM Ry.

432 2



34 paces west of waste weir is a concrete waste weir, 8 ft wide, set 6 in. deep for 4-inch boards; feeds through a concrete culvert beneath WM Ry. Canal is a widewater pool to west of waste weir; berm to west is in alignment with waste weirs

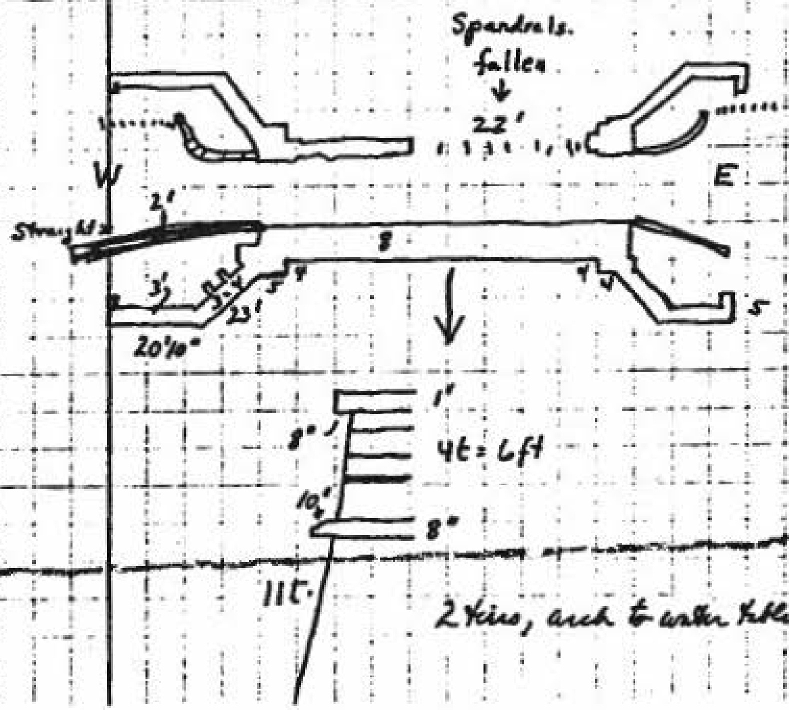
TOWN CREEK AQUEDUCT #12
LOCATION 162.1 TO W
22.4 TO C

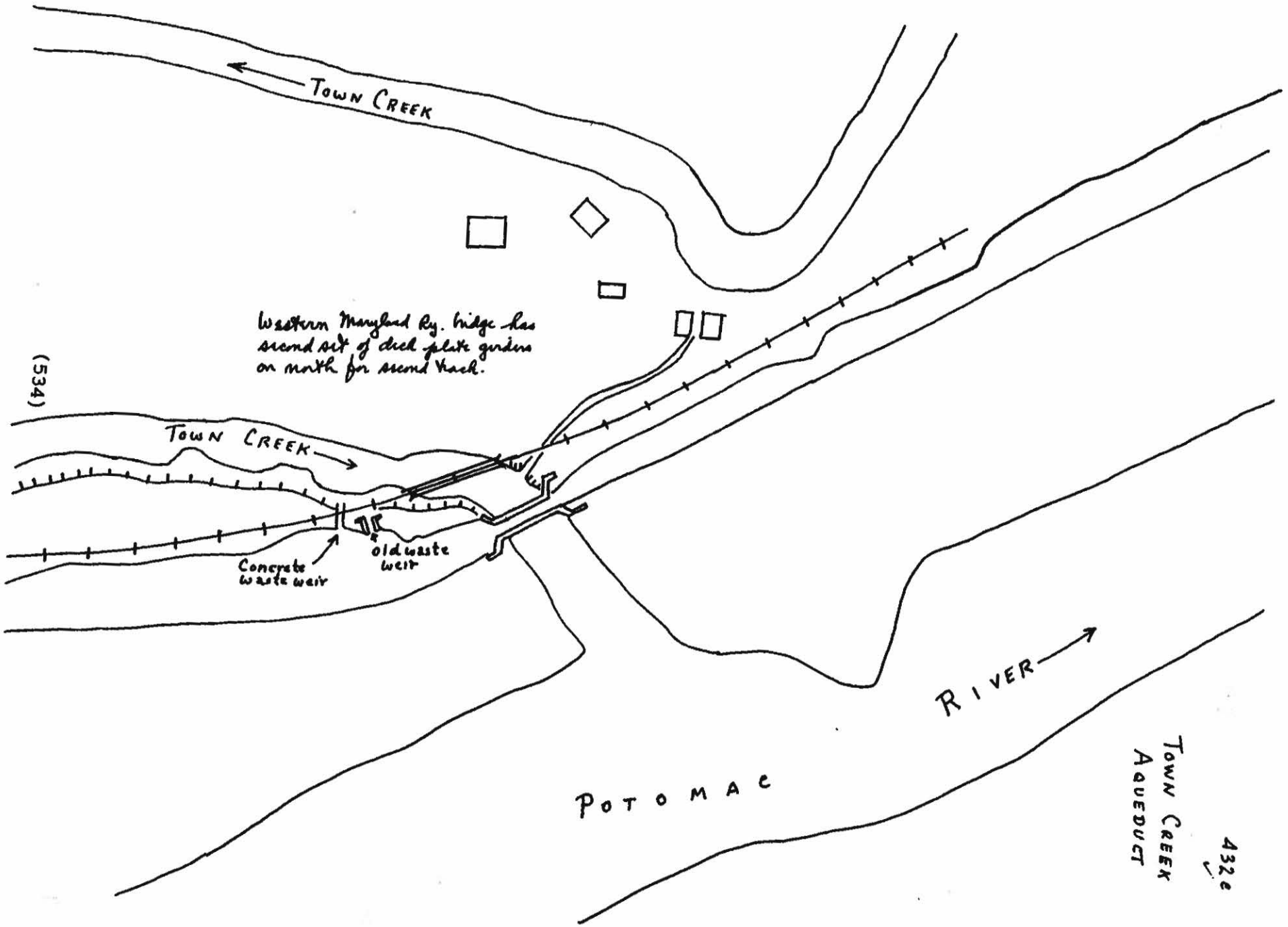
9/6/71
3.

✓ **Lock 68** - 2 gates, concrete, board, no paddles, waste on berm at front of lock under bridge. Lower extension; revetment is 50 paces long on berm.

Old gate on towpath, also some timber parts of old cribs 40-50 paces below lock. Old timbers at water level at base along extension, parallel to canal; partially covered.

Town Creek Aqueduct




TOWN CREEK
Western Maryland Ry. bridge has second set of deck plate girders on north for second track.
(534)
TOWN CREEK
Concrete waste weir
old waste weir
POTOMAC
RIVER
TOWN CREEK AQUEDUCT
432e

162.43-164.32 (162.58-164.62) **OUTCROP** A long section of Devonian rocks is exposed in the cuts along the Western Maryland Railway.

Outcrop is visible in part all along in summer.

162.80 Borrow pit from canal, cut by W M Ry - not seen.
564.15 - MP 163 *564.40 - low terrace on towpath side, extends west = high flood plain.*

Diagram of section 8 tiers, each 6" long = 3 pages each- 8"h x a4"l original → 4 x 7 reproduction
Field notes 11/11/69, p 4-7.

MP 164 - 565.36. (164.22) just west of milepost is an informal overflow, 300 ft. long with ditch to river - not seen.
164.10 - 164.34 Borrow pit from canal, cut by railroad - not seen. *565.75 End widewater, gradual reduction in width from prism which had been up to 250 ft. wide.*

164.67 (164.80) **~~LOCK~~ 68** *(Crabtree Lock)* 8.258 ft. lift, constructed 1837 to 38, 1847 to 1849. This was originally a composite lock with 1,195 perches of coursed rubble in the walls and faced with timber. It is now faced with concrete except for dense gray sandstone in the coping at the quoins. The wingwall and spillway on the lower end of the lock are hammer-dressed Ridgeley (Oriskany) Sandstone in blocks 4 x 4 x 1/2 ft. The flume is on the berm and has a concrete, 2 gate, insert board control structure at lower end beneath the bridge. The lock had a lower extension but it is now a pile of rubble 150 ft. long on the berm with remnants of parts of the timber of cribs in the revetment. Some timber from the

566.26

565.78 - low point in towpath for 300 ft., ditch to river & large swampy pool to west = Informal Overflow.

566.00 - 566.18 wide, flat area on berm.

566.20 - Causeway over prism, 4 corrugated 2' pipes.

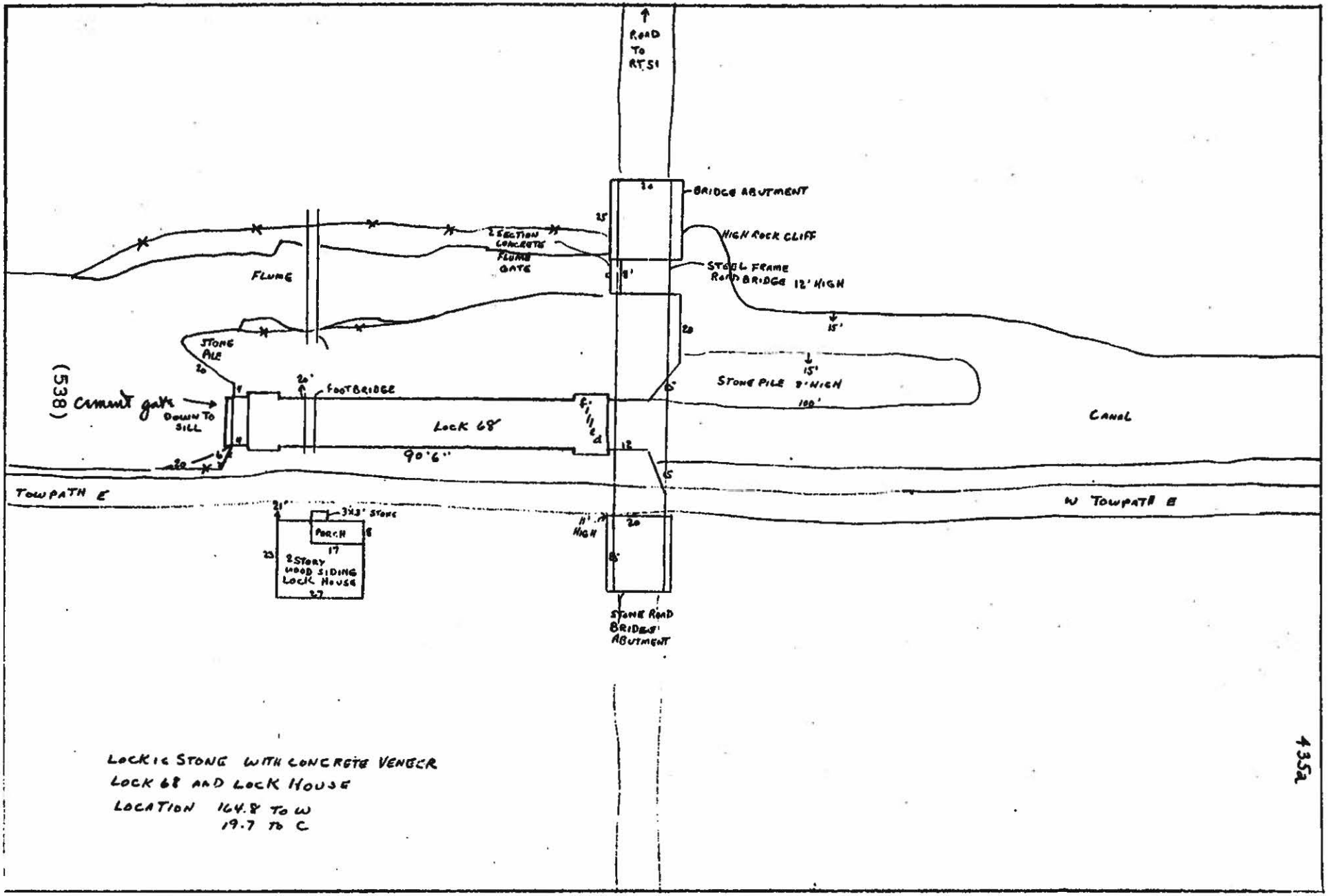
?? extension? fender?

Profile of bridge at Lock 68 = steel truss.

is at the lower end. A revetment 15 ft. long on the upper berm is the remnant of a fender crib. Sandstone blocks from the lock are on the river side of the towing path above the lock. The lockhouse is on the side of the towing path. It is a 2 story frame and clapboard structure. A pivot bridge was built over the lock in 1850. The gates of the lock and the bridge were burnt by the Confederates on February 3 and July 25, 1864. A new timber fixed bridge, 72 ft. long was constructed over the lock in 1865. It was rebuilt as an iron truss in 1869 and was replaced by a Warren iron truss span built in 1913 by the Oswego Bridge Co. The truss is 54 1/2 and 14 1/2 ft. long on the north. The abutments for the bridge are Ridgeley (Oriskany) gray sandstone from a quarry on Patterson Creek in West Virginia. The road over the bridge gave access to a ford across the Potomac River at the mouth of the South Branch. A feeder dam was planned on the South Branch, 1 airline mile above its mouth, in 1839.

The feeder was planned to follow along the west bank of South Branch to an aqueduct across the Potomac. Virginia, however, rejected a guarantee to a loan of $150,000 to construct it in 1851 and the plan was dropped. A pump was substituted for the feeder to augment the supply of water. The first pump was constructed in 1855 to 1857 behind the lockhouse at Lock 68. Two steam engines ran the pump and raised the water 24 ft. from the well which was connected to the river by a culvert. The pump was unsatisfactory and was out of repair in 1862. It was scrapped in 1867 and the boiler sold in 1868. The site of the pump was 200 ft. SSW of the lockhouse on a stone cribbed, low mound, 20 ft. in diameter.

An outcrop of black sandy, brittle, fractured shale (Marcellus Formation) is at the north abutment of the bridge. The bedding is indistinct. To the north along the private road the beds strike N10°E and dip 60°E in the same formation. Dark gray to olive gray crumbly shale (Needmore Formation)


ROAD TO RT 51
BRIDGE ABUTMENT
HIGH ROCK CLIFF
STEEL FRAME ROAD BRIDGE 12' HIGH
2 SECTION CONCRETE FLUME GATE
FLUME
STONE PILE
(538)
cement gate
DOWN TO SILL
FOOTBRIDGE
LOCK 68'
90'6"
Filled
STONE PILE 9' HIGH
CANAL
TOWPATH E
W TOWPATH E
3X3' STONE
PORCH
2 STORY WOOD SIDING LOCK HOUSE
11' HIGH
STONE ROAD BRIDGE ABUTMENT
LOCK IS STONE WITH CONCRETE VENEER
LOCK 68 AND LOCK HOUSE
LOCATION 164.8 TO W
19.7 TO C
435a

crops out on the berm side of the lock.
Potomac Forks H.B.O. at Lock 68

164.72 (164.85) WASTE WEIR An overfall, 60 ft. long, built of coursed rubble on a timber foundation was formerly at the ravine just west of Lock 68. There are no remnants now (1971)? Two ravines are visible 200 ft. of lockhouse.

164.77-164.18 (164.90-165.31) OUTCROP Ledges on berm are formed of Ridgeley Sandstone in beds up to 20 ft. thick. A broad anticline with minor flexures is in the center of the exposure. The beds strike N40°E to N45°E and dip 38°SE on the east and 34°NW on the west. The sandstone is white with brown stain, fine grained and the upper part is fractured. It forms spines of rocks at the top of the outcrop. The anticline is also prominent in the cliff along the Baltimore and Ohio Railroad across the river. A flood plain is 15 ft above the river and a terrace is 25 ft. higher on the West Virginia side of the river north of 164.91(165.00).
poorly exposed in summer.
Good outcrop of Dor on north segment of canal west of Lock 68 to 566.61

Widewater from Town Creek Aqueduct to causeway just below Lock 68.

Diagram of anticline
8"x8" → 4"x4"
Field notes 11/11/69 p.2.

MP165: 566.41

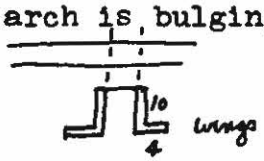
165.26 (165.40) BASIN A small basin is on the berm at 566.78 the curve in the canal.

Basin triangular in plan

berm on low embankment west of basin.

165.30 (165.44) CULVERT 216 Constructed 1846-49. The 568.88 original culvert had a brick arch but it was carried away in a freshet in 1887. It was rebuilt with the arch made of hammer-dressed white sandstone on the face and bricks in the barrel of the culvert. The arch has a 6 ft. span and a 3 ft. rise with 10 ringstones and a large keystone in the face. Abutments are 1 1/2 ft. high and the parapet and coping are 4 ft. high. Wings are at right angles to the face and are falling. The face of the entire culvert, except the arch, is coursed Ridgeley sandstone rubble. A 20 ft. embankment is above the coping. The arch is bulging out and sagging (1971).

brick lined



165.53-166.30 (165.67-166.44) TERRACE A rolling, gravel-strewn terrace is 20 ft. above the river on the north side of the canal. The canal is cut into the terrace west of 165.61. A similar terrace is on the West Virginia side of the river.

MP 166 567.41/567.60 odometer adjustment

165.90 (166.06) CULVERT 217 SEVEN SPRINGS RUN Constructed 567.68 Crisap's Mill Culvert 1847-49. The arch is sugary gray Ridgeley Sandstone with an 18 ft. span and 5 ft. rise. 20 + shiverbacks ringstones and a keystone are in the face of the arch. brick lined The parapet and coping are 2 ft. high. All of the structure is coursed rubble, Ridgeley white sandstone, except for the archstones. The culvert was originally planned with 2 arches with a span in each.

wings at right angles to face, 10 ft. long, 4 steps, 6 ft. vertical end face

Berm on low embankment from train to Lock 69.

166.13 (166.31) WASTE WEIR 567.82 This is a concrete frame with 3 gates for insert boards. It has rubble sandstone walls. The date 1920 is in the concrete. no paddles Inscription in concrete: 1920 I.C. Wilson; 1920 W.M. Burgoyne 1924 "__H".

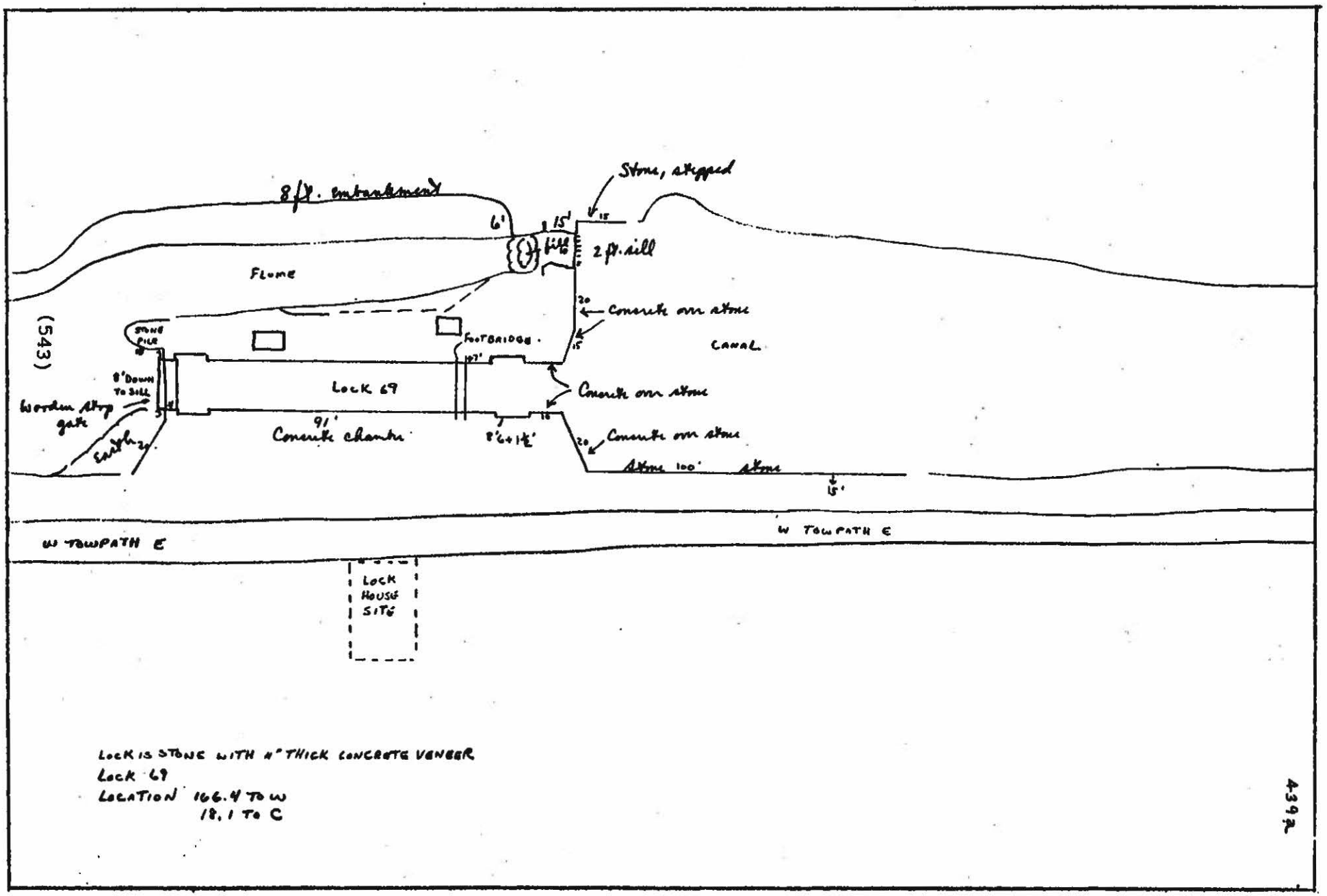
166.14-166.33 (166.32-166.51) TERRACE A cobble strewn

terrace is on the river side of the towing path. Rounded boulders up to 1 ft. size from the terrace are in the towing path.

166.27 (166.47) LOCK 69 8 ft. lift, constructed 1838, 569.04 Twiggs Lock 1847-49. Originally this was a composite lock but most of lock now is faced with concrete. The coping at the lower circular quoins is hammer-dressed white Ridgeley Sandstone. The area below the lower recesses is faced with sandstone rubble. The lower berm wing wall and the spillway of the flume are roughly dressed Ridgeley Sandstone blocks. A 15 ft. revetment is on the upper berm and is possible the remmamt of a crib fender. The flume is on the berm and is 10 ft. wide and 7 ft. deep. A sandstone revetment is along the lower 15 ft. of the flume. Blocks of coping from Lock 69 are scattered on the berm west of the lock. Lock extended on lowerend according to Prentice, see evidence 3 July 1977.

An embankment along the berm is 7 ft. high. Outcrops of the Mahantango Formation are in the hill on the side of

3 July 1978 mileage on Aspen Oldtown 3979 Pawtaw 3990.7



Lock is stone with 4" thick concrete veneer
Lock 69
Location 166.4 To W
18.1 To C

4-39-2

p 440a - 478 addenda from observations 12 Oct. 1975.

the towing path between Locks 69 and 70. It is gray-brown, platy shale. There is no lockhouse at Lock 69. Several canal boats were wunk with stone at the tails of Locks 69 and 70 after the canal ceased operations in 1924.

Marshall shows lockhouse on towpath at mid lock - no evidence

Boat basin at upper end of lock, 0.4 miles west of lock. Canal 80 ft. wide, Lock 69 to Lock 70

166.51 (166.71) LOCK 70 OLDTOWN 8 ft. lift, constructed 1837, 1847 to 1849. Originally this was a composite lock but most of the lock is now faced with concrete except for the lower wings which are Ridgeley Sandstone in blocks up to 2 x 3 x 4 ft. and the coping on the towing path. A 15 ft. revetment on upper berm is probably the remnant of a crib fender. The concrete at the head of the lock has impressions from old crib timbers. The lockhouse is on the upper towing path side and is 2 story frame and clapboard. The spillway to the flume on the berm is now walled up. A timber bridge was constructed over the lock in 1849 with 17 ft. clearance above the water level of the canal. It rested on stone abutments. It was rebuilt in 1886 as a

No insets in recess, no wings at head of lock

Footbridge over lock.

old one reported burned in 1906

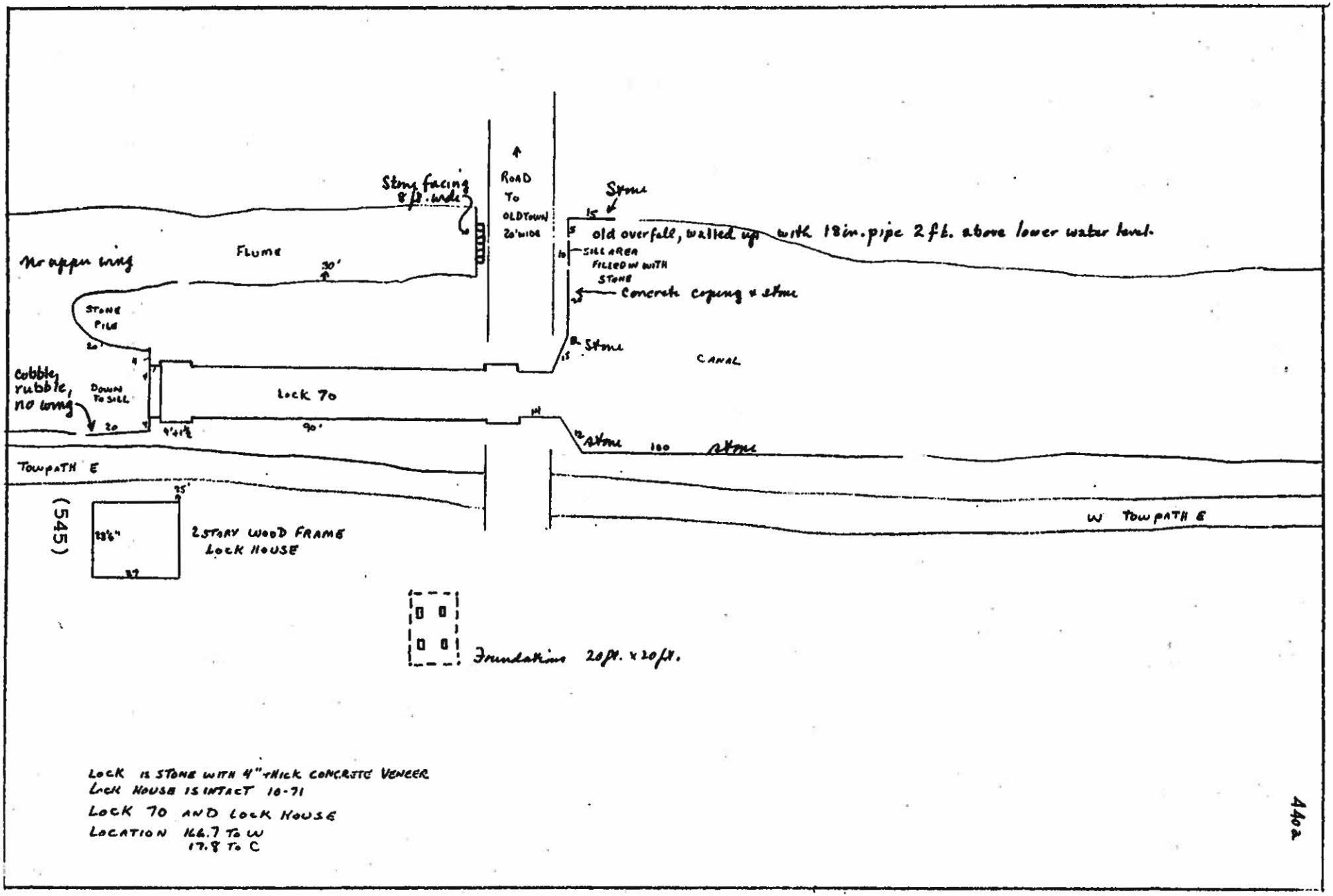
20' wide, 15 ft. from canal

Old mill on north side of the Potomac, east of road at Oldtown Bridge.

3 July 1978
568.21 End bike mileage
12 Oct. 1975
Bike mileage
493.75

Fells Ck 95,231
8,085
Oldtown 95,373

3 July 1978
Aspen mileage



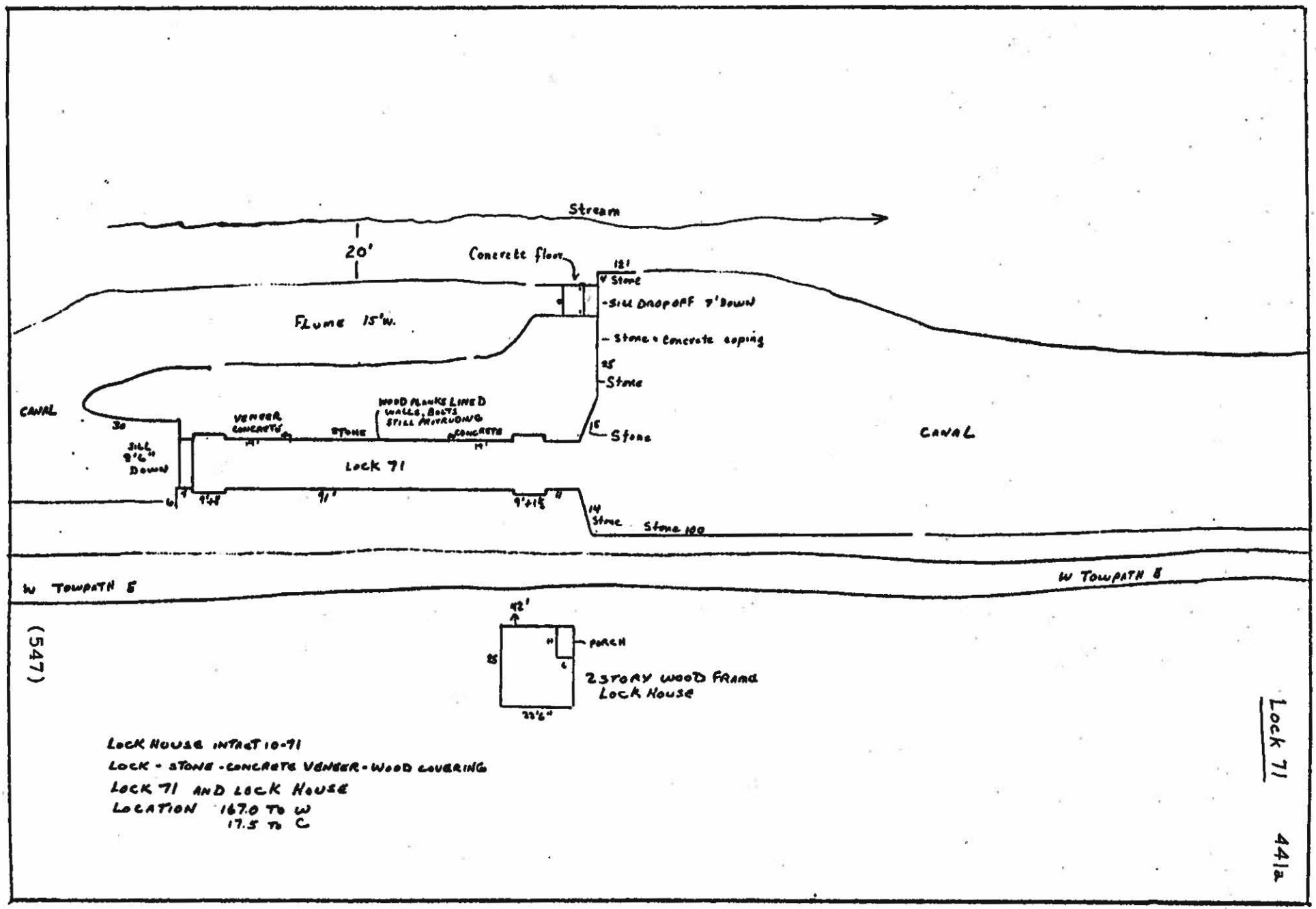
LOCK IS STONE WITH 4" THICK CONCRETE VENEER
LOCK HOUSE IS INTACT 10-71
LOCK 70 AND LOCK HOUSE
LOCATION 166.7 To W
17.8 To C

440a

burned 1906
rebuilt 1906 as Warren Truss. } Truss removed 1924. similar to Lock 68, deck bridge supported by I beams

single span, open Warren truss. Blocks of coarse grained sandstone along the towing path are from the lock. 700 ft. west of lock are 10-inch rounded boulders in the towing path. These are from adjacent terrace deposits. Picnic area. Boat basin just west of lock.

166.83 (167.06) LOCK 71 8 ft. lift, constructed 1837, 1847-50. Originally this was a composite lock. The lower end of the lock and the lower wings are rough dressed blocks of Ridgeley Sandstone. Some concrete facing is in the lower recessed. The berm side of the chamber is partially dressed, coursed gray brown Ridgeley Sandstone and reddish brown Catskill Sandstone. The towing path side of the chamber is coursed rubble blocks of brown gray sandstone. The coping on the towing path side is white pebbly Ridgeley Sandstone. There is no coping on the berm. The upper recesses are faced with concrete. Bolts for the frame of the timber facing are in the chamber. The flume on the berm is 35 ft. from the lock. It is 10 ft. wide and has a 2 gate waste



(547)

Lock House Intact 10-71

Lock - Stone - Concrete Veneer - Wood Covering

Lock 71 and Lock House

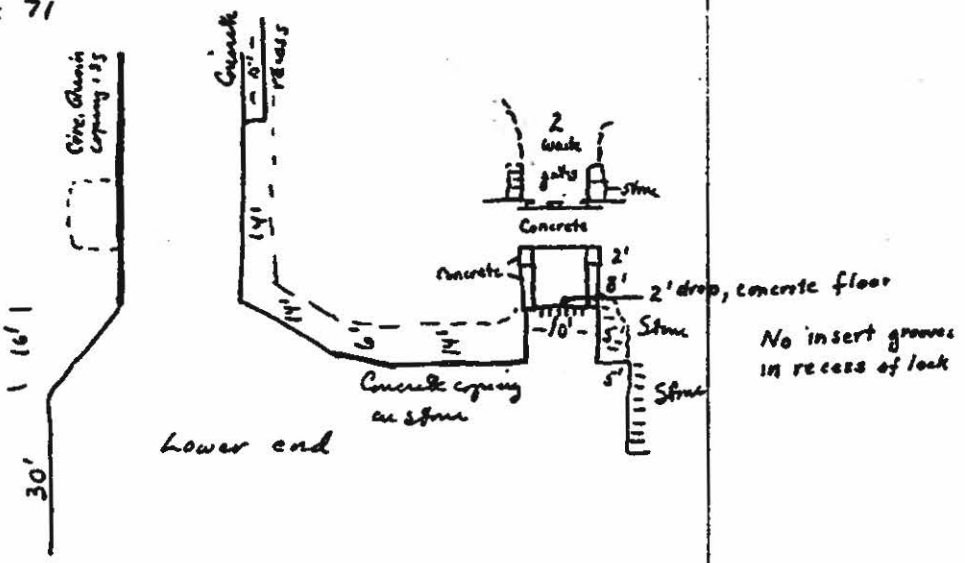
Location 167.0 To W
17.5 To C

Lock 71

441a

8/1/71
JF

Lock 71

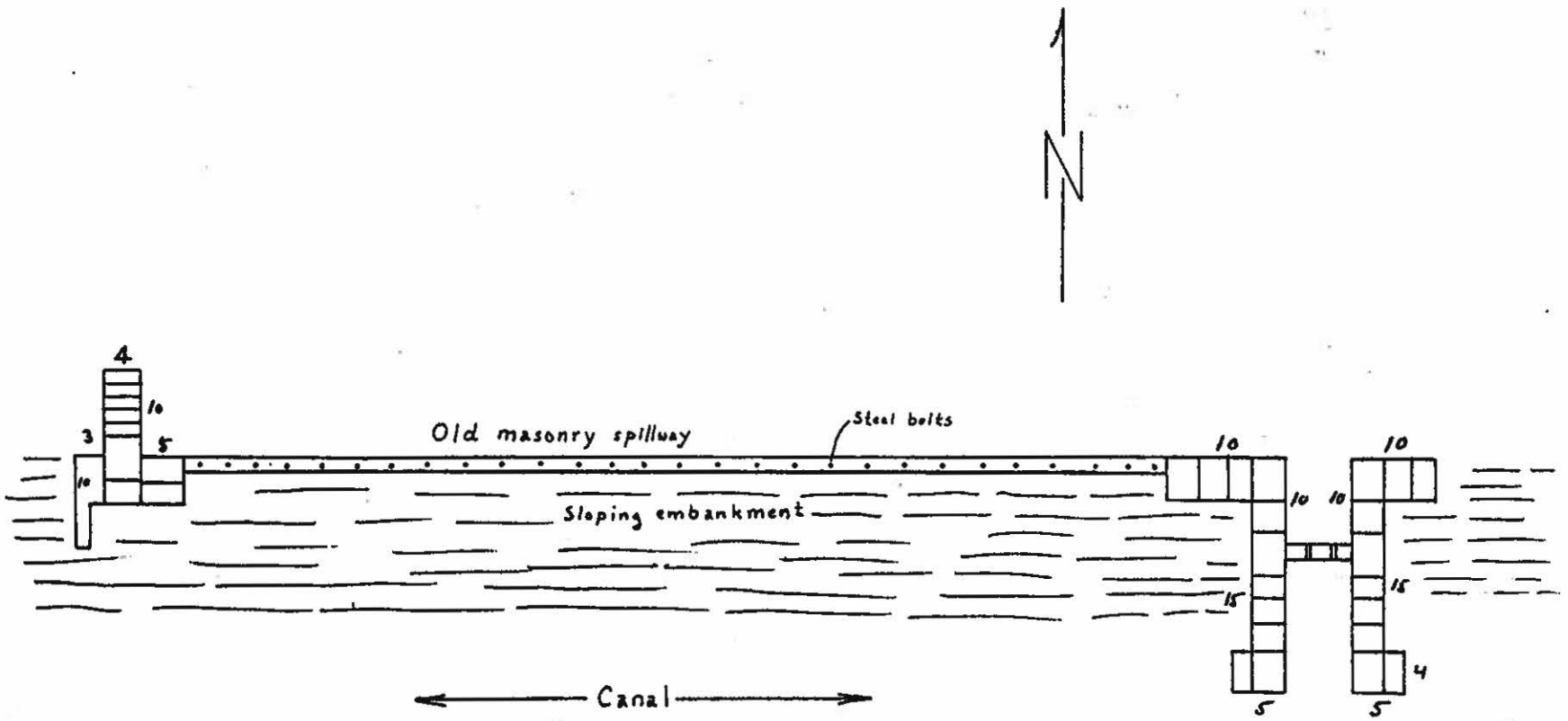


River cobbles in towpath 400 yds east'y Lock 71.
10" size, subangular & subrounded sandstone

✓ Spring Gap – post office

✓ Mt. Tabor – ½ mi NE Spring Gap on Md 51
– pay phone, groceries, gas, snacks

✓ Pay phone on Md 51 1½ miles west'y Spring Gap.



WASTE WIER

West of Lock 71

0 20 40 ft.

166.88 (167.11)
494.12

10·12·75

441c

MP167 = 494.05

~~structure, a concrete frame with insert boards,~~ at ~~the lower~~ end. Bolts for timber fenders are on the lower wings. A revetment 20 ft. long on the upper berm is probably a remnant of a crib fender. A slot for stop gate boards is in the stone on the towing path side at the upper end of the lock and in the lower sills on the berm. They are covered by concrete on the berm side.

Walls Lock 71

Berm embankment 7 ft. high between locks 70 & 71

The lockhouse on the towing path side is a 2 story, frame, clapboard structure.

166.88 (167.11) WASTE WEIR This is a concrete fra me 494.12 structure with 3 gates for insert boards. The wings are limestone at right angles to face. scabbled sandstone (Ridgeley). The wast weir replaced old culvert no. 218 and an overfall 100 ft. long, with a 16 ft. drain opening, constructed in 1849. Masonry spillway 117 ft. long adjacent to waste weir

167.06 Crump Mill, site of tail race

167.72 (167.95) ALUM HILL The deep cut is in Marcellus shale along the line of a former shallow valley. The cut is 50 ft. deep at the north end, 32 ft. at the center, and 58 ft.

494.25 - 3 ft. concrete culvert on berm at base of canal
494.55 - Begin curve - road crossing
494.70 - Old piers for Crump Bridge near top of cut. (550)

at the south end. The shale is dark gray to black, fissile and splintery with partings spaced 1/4 inch. Occasional beds of fine grained sandstone up to 1 inch thick are mixed with the shale. The shale weathers brown and some beds are stained red on the surface. White coatings of gypsum (Calcium Sulfate) are on the lower beds near the towing path. Dense black shale beds up to 1 1/2 inches thick, in the center of the cut, contain disc-shaped concretions up to 6 inches in diameter and 1 1/2 inches thick. Crumbly shale in a 12 inch zone of vertical fracture planes is 200 ft. from the south end of the cut. Numerous irregular fracture planes are also at the south end of the cut. Shale in the south half of the cut weathers to splinters 8 to 12 inches long. At the south end the shale forms small chips and splinters. 200 ft. south of the cut is an outcrop of thin bedded shale (Marcellus) which strikes N65°E and dips 88°NNW.

Strike N 70°E, dip 3° to SE.

A timber bridge formerly crossed the canal at the

north end of the cut. It was 100 ft. long, 15 ft. wide and
Strike N65°E, Dip 15° to SE.
16 ft. above water level. Constructed in 1839, it collapsed on November 23, 1839 as a wagon enroute to Cumberland with beer kegs crossed; one man and a horse were killed. It was rebuilt in 1840 and a new timber bridge was placed in 1848. This was destroyed by the Confederates on August 25, 1864, but was rebuilt after the war. The bridge was in place
burned about 1910
until the beginning of the 20th Century. The original bridge carried a flume for water to Cresaps Mill.
494.80-Highest point in cut
494.65 to 494.90 Pine trees along slope adjacent to towpath
494.90- sandstone ledge
495.00- curve to left; shale fences on upper slope above here to 495.25.
MP 168. 494.06

167.78-167.93 (168.00-168.15) OUTCROP Marcellus black shale with beds striking N40°E and dipping 10° to 30°SE is exposed on the berm. A broad flood plain is on the river side of the canal extending to 170.64; a similar but smaller flood plain is on the West Virginia side of the river.
494.25 steephead on towpath side, 100 ft. long, V alley on berm, no culvert.
494.45 Pond on berm; WM Cy. comes in on berm from NE.

168.38 (168.60) OUTCROP A 60 ft. bluff on the berm is
495.65
formed of Mahantango dark gray to olive gray, crumbly shale.

The bedding is hidden by fractures. The rocks strike N30°E and dip 60° to 80°SE. A similar but smaller outcrop is to the west. At 168.48 a ledge on the berm, 20 ft. high, contains dense highly- fractured, gray sandstone with 4 ft. of shale (Mahantango Formation). A smooth joint face trends N85°W and dips 70°N. A secondary joint trends N20°W and is vertical. Molds of fossils are prominent on the smooth faces of the joints. Crumbly gray shale on the east side of the outcrop is below the sandstone. The contact between the shale and sandstone strikes N30°E and dips 10°NW. Shale crops out to the west along the canal and the railroad in small discontinuous exposures.

168.74 (168.96) FOUNDATIONS Two foundations are on the river side of the towing path. They are built of partially dressed cobbles from terrace gravels. One foundation was for a bridge, the other probably for stock chutes.

168.93 (169.13) CULVERT 221 Constructed 1846-49. The

face of the arch is hammer-dressed sandstone with bricks inside the barrel of the culvert. The span is 6 ft. and the rise 3 ft. 10 ringstones and keystone are in the face of the arch. The abutments are 4 ft. high. The parapet and coping are 1 1/2 ft. high. Wings are at right angles to the face of the culvert. The culvert, except for the arch is constructed of coursed gray, fine grained sandstone rubble.

168.93 (169.15) TERRACE DEPOSITS Large rounded boulders of gray sandstone up to 2 ft. in diameter, are in the stream below the towing path.

168.93-169.93 (169.15-170.15) FLOOD PLAIN Rolling meadows on the river side of the canal rise towards the level of the canal forming a terrace extending west. Numerous pine trees on the berm and on the hills to the north of the canal are typical of vegetation on the barren, thin soils derived from shale.

497.25 Shale ledges on berm cut of canal; dip horizontal to 1° W. (upstream). Shale is gray, splintery. Berm cut is at level of towpath; cut 10 ft. high on north side of trench, 20 ft. wide, cut 300 ft. long.

169.97 (170.19) OUTCROP Ledges on the berm contain Braller (Woodmont) and Harrell gray shale. The shale is splintery and strikes N30°E, dips 5°NW.
MP107 : 497.05

170.15 (170.33) CULVERT 222 Constructed 1846-49. The
497.37
archstones are cut gray sugary sandstone. 46,000 bricks are in the inner arch in the barrel of the culvert. The span is 6 ft. and the rise 3 ft. 10 ringstones and a keystone are inthe face of the arch. The coping are 1 1/2 ft. high. Spandrels and the parapet are coursed gray sandstone rubble. The culvert is filled to within 2 ft. of the top of the arch. (1971).

20 ft. embankment above coping; north side of culvert is against WM Ry culvert. brings canal culvert out at right angles 10'

170.17 (170.35) OUTCROP Ledges on the berm contain Wood-
497.40
mont-Harrell gray shale and sandstone in beds up to 6 inches thick. The beds strike N20°W and dip 36°SW.

170.45-171.09 (170.61-171.25) TERRACE Brushy slopes and woodlands on the river side of the canal extending west are

up to 40 ft. above the river. A small area of terrace is also on the berm. At Culvert 223 (224?) on the river side of the canal is a prominent terrace knoll (497.82) on which is located a barn. The high flood plain merges with the terrace at canal level in this area. 500 ft. east of Culvert 223 (497.80) are rounded boulders of sandstone, up to 3 ft. diameter, on the side of the towing path.

170.66 (170.80) (497.85) CULVERT 224 KELLEYS ROAD CULVERT (Cunningham Culvert; Culvert at Alona Station) Constructed 1846-49. The structure was used as a road culvert until 1922. The archstones are hammer-dressed, gray sandstone. The arch has a 10 ft. span and a 5 ft. rise, with 16 ringstones (including abutments) and a keystone in the face of the arch. The arch in the barrel of the culvert is formed of 62,200 bricks. The abutment s are 5 ft. high and the parapet and coping are 2 ft. high. Except for the arch, the culvert facing is coursed gray sandstone rubble. The culvert was originally planned to have 2 arches of 6 ft. span each.

10 ft. embankment above coping, wings at right angles 18 ft. long; 4 steps, 1 ft. each, 7 ft. front face.

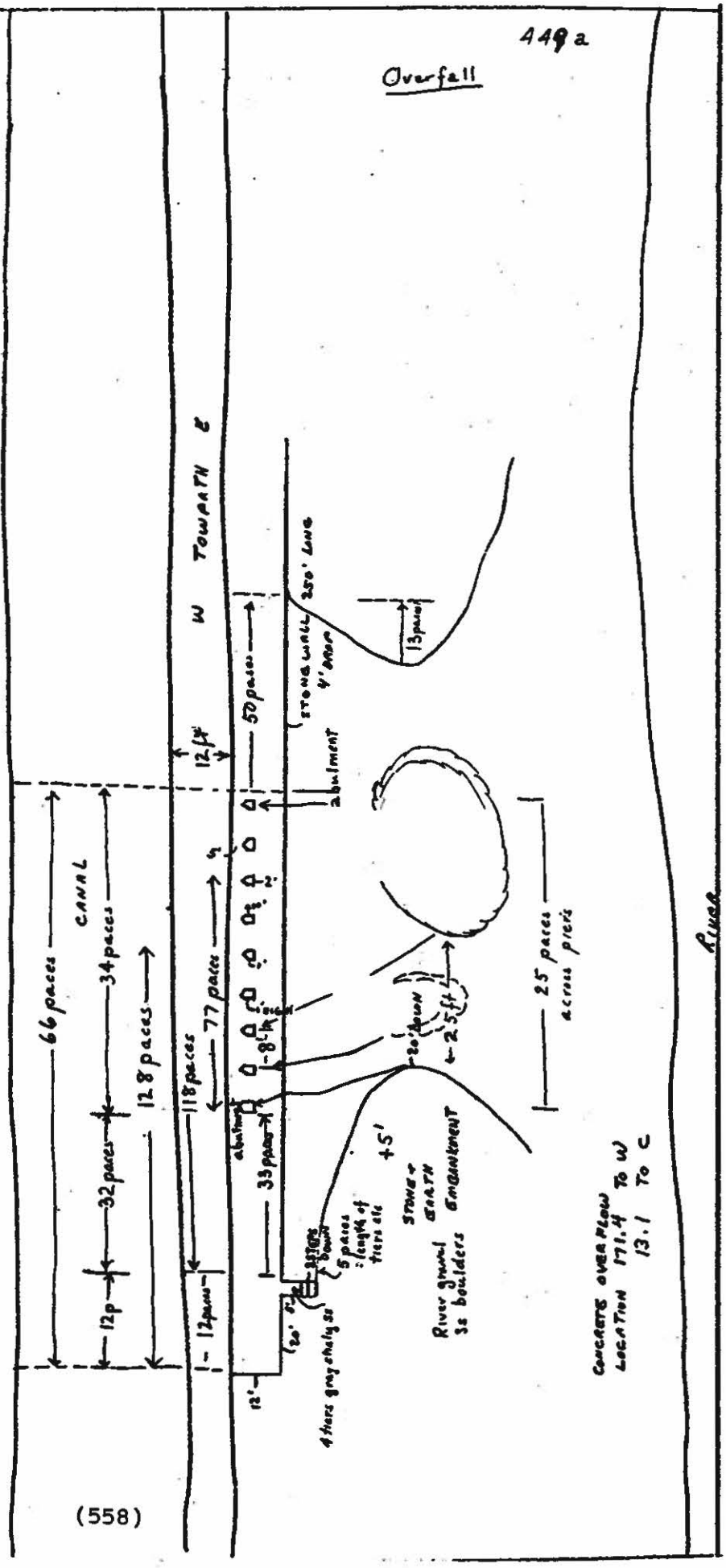
Pile of bricks, 20 feet from towpath on riverside, 100 ft. west of culvert; low spot, no 449
revetment on towpath for 150 ft. west of culvert. Berm on embankment 200 ft. east and west of culvert. Stream in ditch on berm west of culvert; culvert face same on berm as on towpath

171.05 (171.27) TERRACE DEPOSIT Rounded boulders, mainly sandstone, up to 3 ft. in diameter are on the river side of the towing path.
498.25 3 ft. boulder on side of towpath
498.30 - 498.35 Low spot on towpath, 100 ft. long, no revetment
MP171 498.05

171.17 (171.40) OVERFALL Constructed 1849. The structure
498.45
is 100 ft. long with a 16 ft. drain. The spillway is 1 ft. below the level of the towing path. It is built of coursed Ridgeley Sandstone rubble, some Catskill brown sandstone and limestone; 581.1 perches of stone and 250 ft. of 18 inch coping are in the spillway. 12 inch coping is in the wings. The towing path formerly crossed the overfall on a wooden bridge resting on 7 concrete piers.
Iron bolts and nuts along top.
Stone aqueduct, rough face, 3 skins, each 18 in. high; coping 10 in., sugary gray ss.

171.45 (171.67) OUTCROP A cut on the Western Maryland
498.72
Railway exposes Brallier (Woodmont) and Harrell Shale. The beds strike N30°E and dip 10° to 15°Se. The flood plain on the West Virginia side of the river grades southward to a terrace 40 ft. above the river.

Overfall

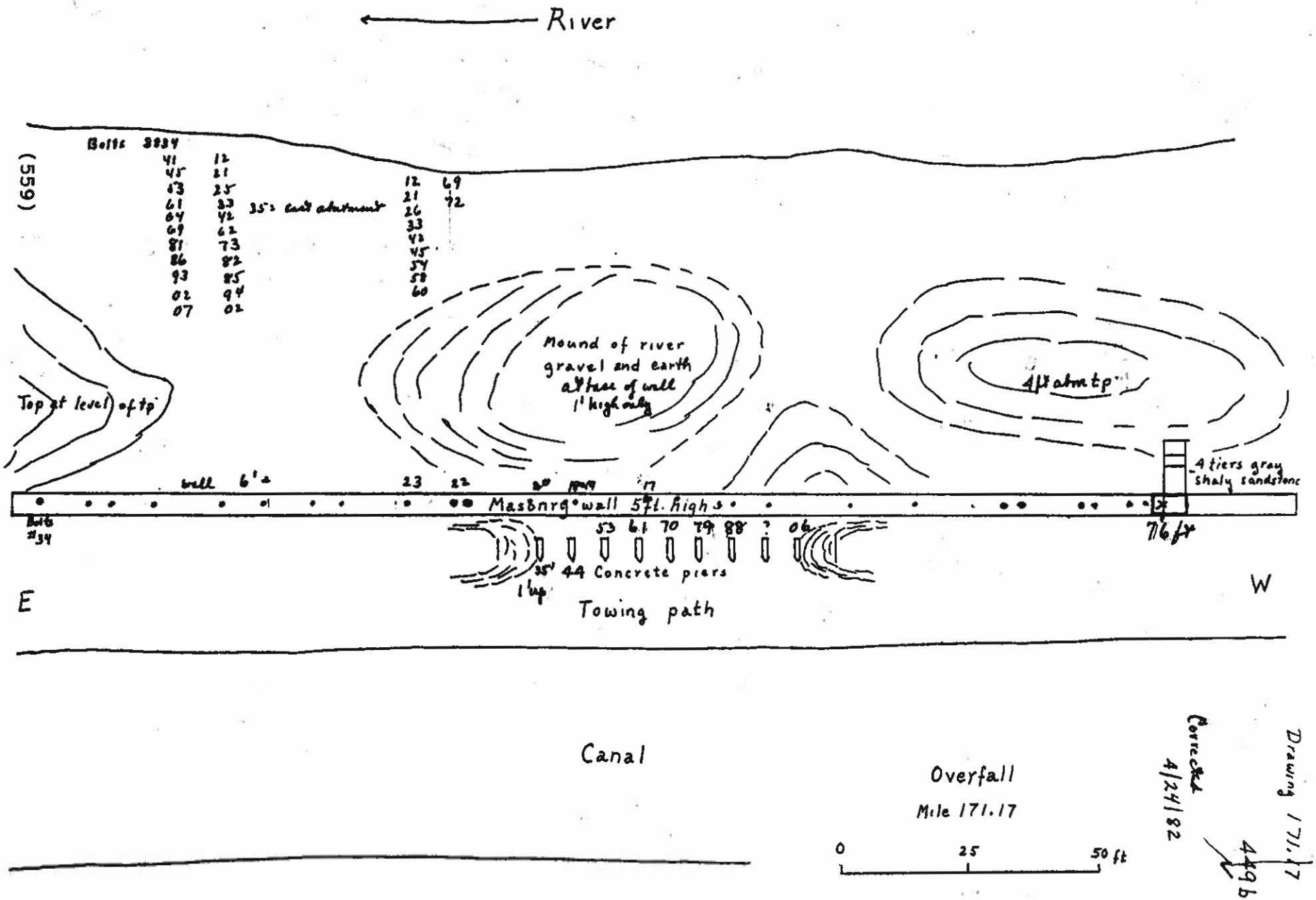


Rubble at bridgeway is gray ss and pebbly ss.

2ft. rubble ss piled on top of cut wall at bridge pier

Piers 1ft. high

On each end of abutments path is on earth built up 1ft.


River
(559)
Bolts 3834
41 45 63 61 64 69 81 86 93 02 07
12 21 25 33 42 62 73 82 85 94 02
35' east abutment
12 21 26 33 42 45 54 58 60
69 72
Mound of river gravel and earth at face of wall 1' high only
4½ abm tp
Top at level of tp
4 tiers gray shaly sandstone
Masonry wall 5ft. high
Brig #34
53 61 70 79 88 06
76 ft
35' 44 Concrete piers
1' up
E
W
Towing path
Canal
Overfall
Mile 171.17
0 25 50 ft
Corrected 4/24/82
Drawing 171.17
449b

171.48 (171.70) OUTCROP A bluff on the berm is formed of Brallier (Woodmont) and Harrell Shales in beds up to 6 inches thick. The beds strike N15°E and dip 5° to 10°ESE.

171.60 (171.82) 498.65 Culvert? - no evidence seen.

171.60-171.84-171.96) OUTCROP Brallier (Woodmont) and 498.72-499.00 Harrell olive gray shale in beds up to 1 ft. thick are exposed in a cut along the Western Maryland Railway and in a bluff below on the berm of the canal. A small cave, 4 ft. high and wide, extending back 4 ft. in an anticline is near the western end of the exposure.

Diagram- exposure along WMRy. 14"x8" →7"x4" 3 tier profile.
Field notes 11/23/69 p6; 4/30/71, p3.

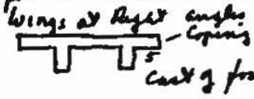
MP 172 499.04

171.88 (172.02) CULVERT 228 BRICE HOLLOW Constructed 1838-39, 1846-49. This structure served as a road culvert until 1922. The archstones are hammer-dressed, gray sandstone. The segmental arch has a 12 ft. span and a 6 ft. rise with 18 ringstones (including shoulders) and a keystone in the face. There are 95,936 bricks in the inner part of the arch in the barrel of the

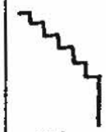
bricks at right angles, 12 ft. long, 6 steps, 5 ft. fan wind.

culvert. The parapet and coping are 2 ft. high. The face of the culvert, except the arch stones, is coursed gray sandstone rubble.

18 ft. embankment above coping, this to W M Ry culvert. Wings at right angles



Each tier is 10 in.



171.97 (172.11) <u>OUTCROP</u> Well-bedded, olive gray shale, Mahantango Formation is exposed in a cut on the Western Maryland Railway and on the berm of the canal. The beds strike N20°E and dip 35°ESE.

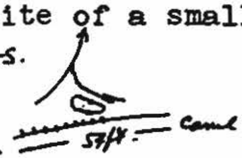
172.19 (172.33) <u>OUTCROP</u> A bluff on berm contains dense gray sandstone (Mahantango Formation) in beds 10 ft. or more thick. The beds in the western part of the outcrop are highly fractured. The beds strike N40°E and dip 30°SE. Joints strike N60°E and dip 80°NW; n20°W, dip 80°SW.

499.40

outcrop 150 ft. long

172.38 (172.52) <u>ALKYRES BASIN</u> This is the site of a small basin on the berm of the canal.

499.45-499.50 Basin begins at west end of outcrop, 200 ft. across N-S.



499.75 - west end, overfall, 30 paces, stone revetment for about 100 paces to east

172.70 (172.81) possible informal overflow, 54 ft. long, W&t west ... [illegible]

172.59-172.85 (172.70-173.00) <u>EMBANKMENT BRIDGE</u> A temporary bridge across the Potomac was built curing construction

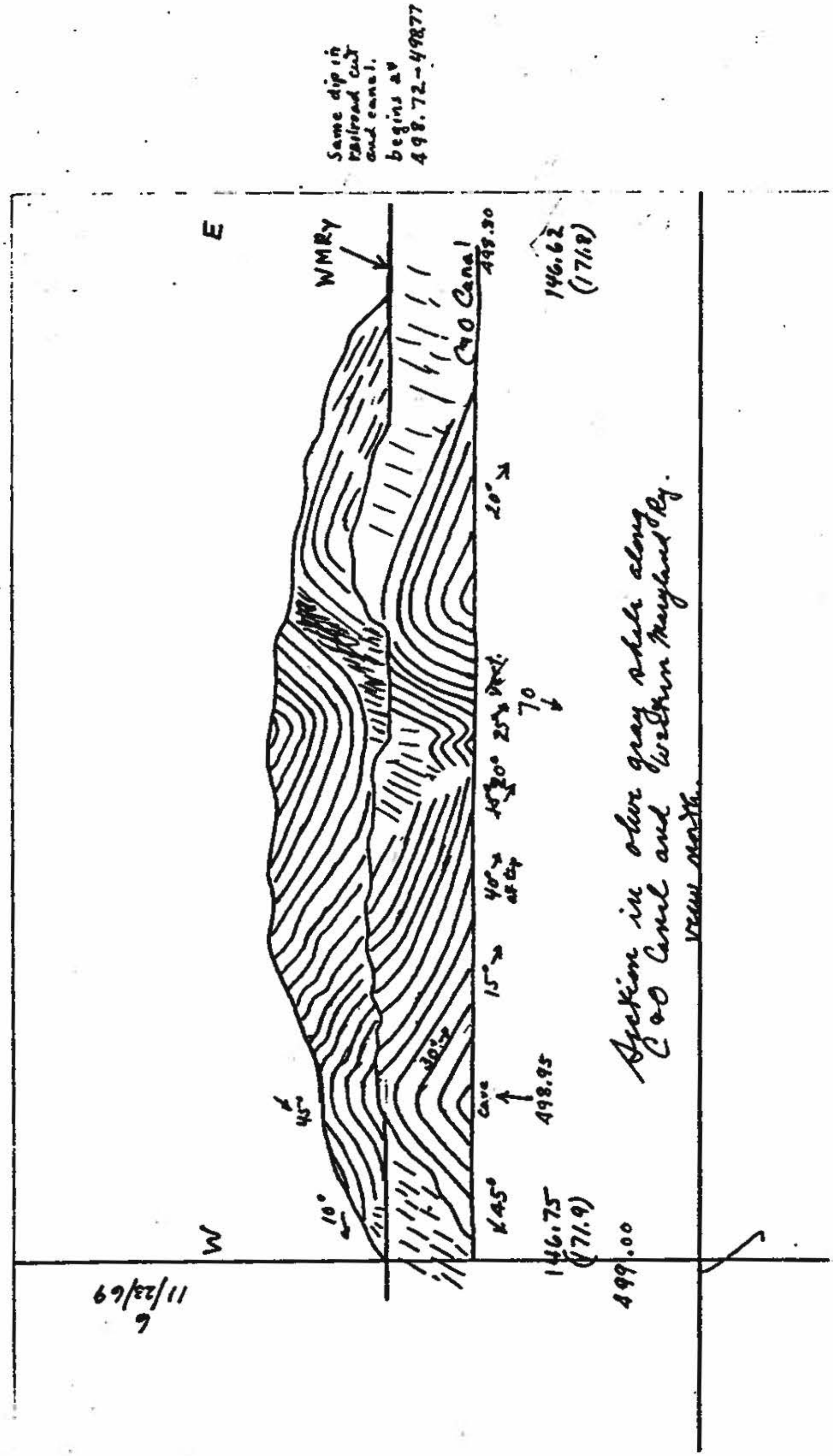
of the canal, 1839-40 to, obtain embankment material from West Virginia (Virginia).
499.76 - at east end of overfall and beginning of outcrop

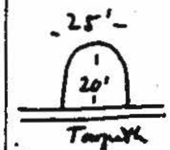
172.59 (172.73) OUTCROP An anticline in a ledge on the berm is formed of massive gray, glassy, medium-grained Ridgeley Sandstone in beds 1 to 10 ft. thick. 66 ft. of the sandstone is exposed and it is underlain by fossiliferous, deeply weathered limy sandstone and shaly sandstone, 20 ft. thick. Gray, thin bedded, fine-grained Coeymans-Keyser Limestone are at the base with solution openings up to 6 inches high. 35 ft. of the limestone is exposed. The beds strike N20°E and dip 20°ESE on the east limb. The strike is N25°E and the dip 35°WNW on the west limb. Joints strike N5°W, dip 80°W; N80°W, dip 70°N.

Diagram- 8"x8" → 4"x4" 1 profile
Field notes 11/23/69 p8.

172.65 (172.80) EMBANKMENT BRIDGE A temporary bridge across the Potomac River was used during construction in

Mile 171.8


Same dip in railroad cut and canal. begins at 498.72–498.77
E
WMRy
C&O Canal
498.90
146.62
(171.8)
20°
70
25° Vert.
20°
40° at top
15°
30°
Cave
498.95
45°
10°
45°
W
146.75
(171.9)
499.00
11/22/69
Sketch in olive gray shale along C&O Canal and Western Maryland Ry.
view north.



1839 to obtain material for embankment from West Virginia (Virginia).

172.80 (172.95) 499.91 - 25 ft. along river, possible breakwater between canal-river and end of anticline; rubble and earth.

MP173 - 500.05. [500.00 end of revetment, train derail end of anticline to MP173, up to 150 ft. wide

173.02 (173.17) <u>OUTCROP</u> A low ledge on Maryland Highway

173.01 (173.16) 500.09 Remains of barge, bow + stern section; only 2 or 3 planks remain.

51 contains Needmore gray shale. The beds strike N30°E, dip 30° to 40°Se. The east end of the Spring Gap Recreation area is on the river side of the canal.

500.15 - 500.40 Spring Gap Recreation area, entrance 500.35 Boat ramp, fireplaces, picnic tables, camping, toilets.

173.07 (173.19) <u>OUTCROP</u> A low ledge on Maryland Highway 51 is formed of Needmore gray shale which strikes N30°E and dips 30° to 40°SE.
500.22

173.13 (173.21) <u>CULVERT 230 SPRING GAP</u> Constructed 1846-48. The arch has a ~~6~~ 4 ft. span and a ~~3~~ 2 ft. rise. It is now covered by a steel culvert on the towing path side and only the sandstone coping shows. The berm side is covered by a concrete highway drain. The inner part of the arch in the barrel of the culvert is constructed of 28,786 bricks.
500.31

No wings show. 10 ft. embankment above coping.

173.37 (173.38) <u>OUTCROP</u> A low ledge on Maryland Highway
500.38 - 500.45

51 contains Needmore gray shale which strikes N40°E and dips 30° to 40° SE.

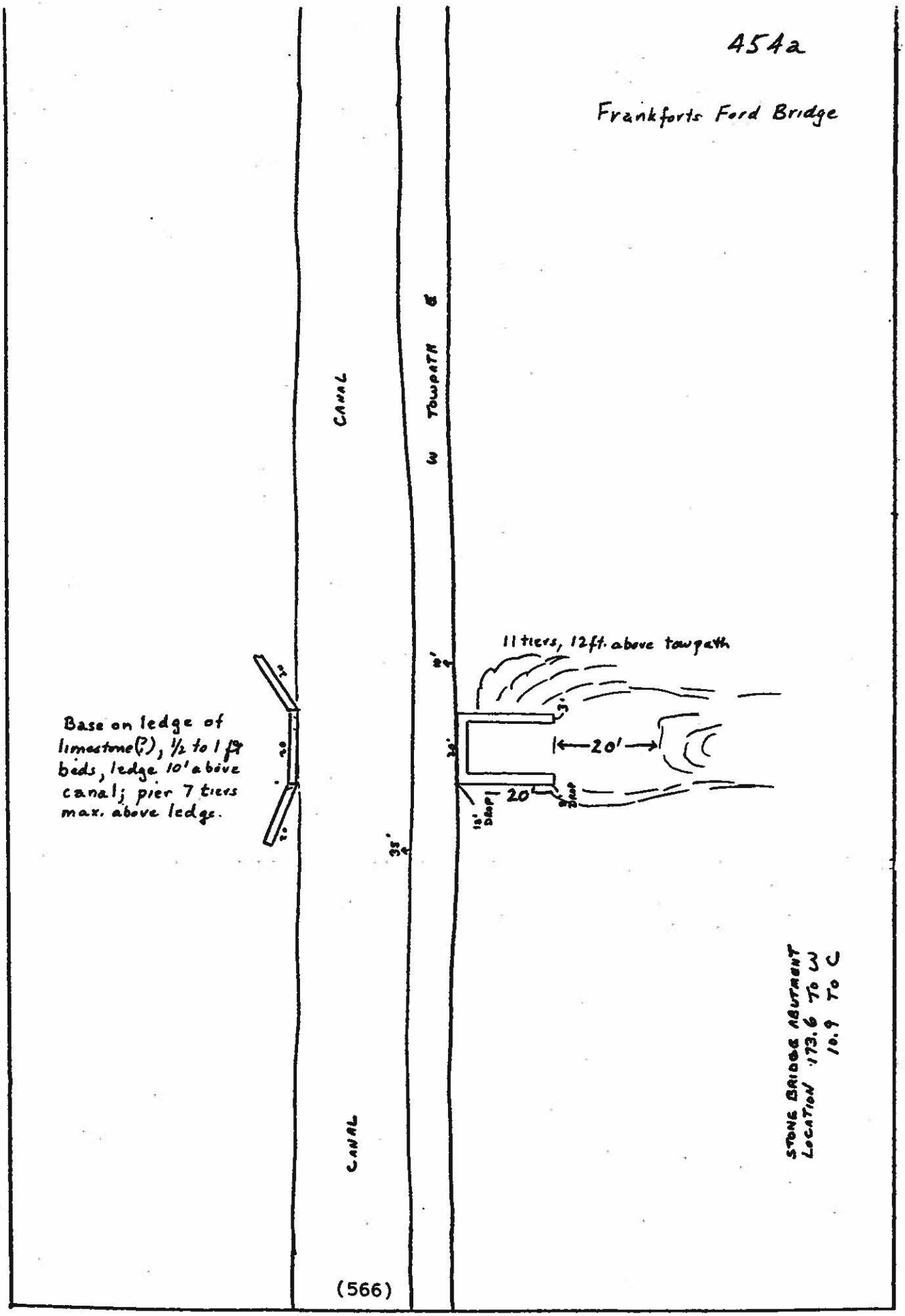
173.47-173.57 (173.47-57) OUTCROP Ledges on Maryland Highway 51 and on the berm of the canal are formed of Ridgely Sandstone. The beds strike N40°E and dip 45°SE on the east limb of an anticline. On the west limb the dip is 33°NW. A prominent strike joint dips 57°SE.

173.57 (173.57) BRIDGE (FRANKFORTS FORD) Abutments on the towing path and on a ledge on the berm are the remnants of a bridge constructed in 1849. It was a timber span 64 ft. long. The abutments are rough dressed blocks of Ridgeley Sandstone from a quarry on Patterson Creek in West Virginia. The bridge was destroyed by the Confederates on February 2, 1864 and was rebuilt later.

173.61 (173.61) CULVERT 231 COLLIERS RUN Constructed 1846-48. The arch stones are hammer-dressed gray Ridgeley

454a

Frankforts Ford Bridge



Sandstone. The arch has a span of 12 ft. and a rise of 6 ft. 18 ringstones (including abutments) and a keystone are in the face of the arch. 84,250 bricks are in the inner part of arch in the barrel of the culvert. The parapet and coping are 2 ft. high. The parapet, spandrels and coping are rough cut Ridgeley Sandstone. (bring at right angles to face, 10 ft. long, stepped; 10 ft. embankment at coping.)

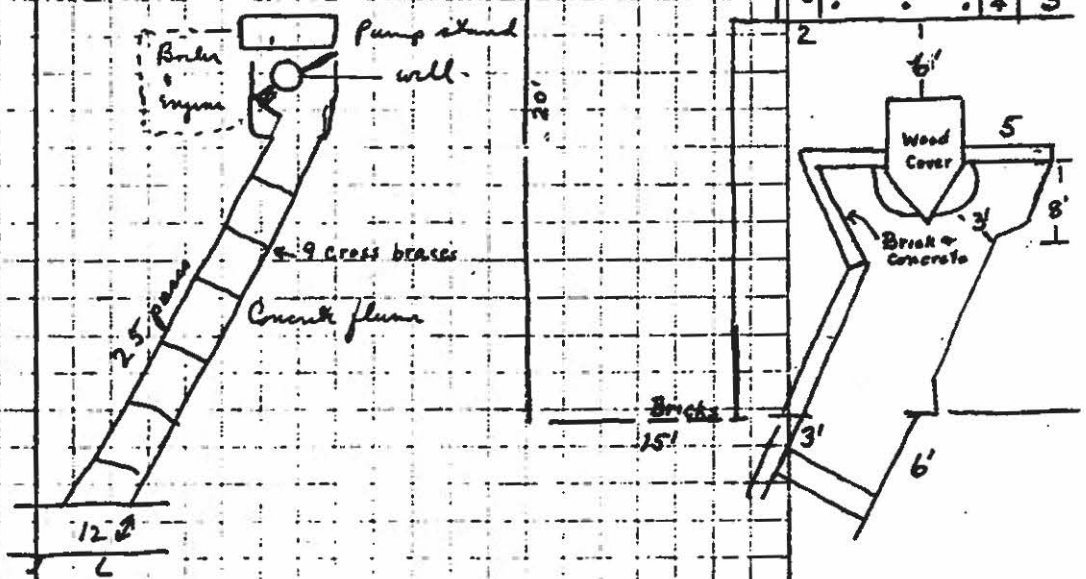
500.72 begin embankment on turn
501.04 = MP 174

173.98 (174.13) PUMP This facility was constructed 1873 501.16 to 1874 as a supplementary feeder to the canal. The remains of the structure is 50 ft. southwest of the towing path. The boiler and pump machinery house were side by side. The pump was on cement foundation with footings of sandstone and bricks. The brick boiler room and engine house were on the southeast side of the pump. A well for the pump, 6 ft. in diameter, that was on the canal side of the pump is now covered by wood. It was connected with a concrete trunk leading to canal and with a culvert 6 1/2 ft. high, 6 ft. wide to the river. The centrifugal pump was 2 ft. 8 inches

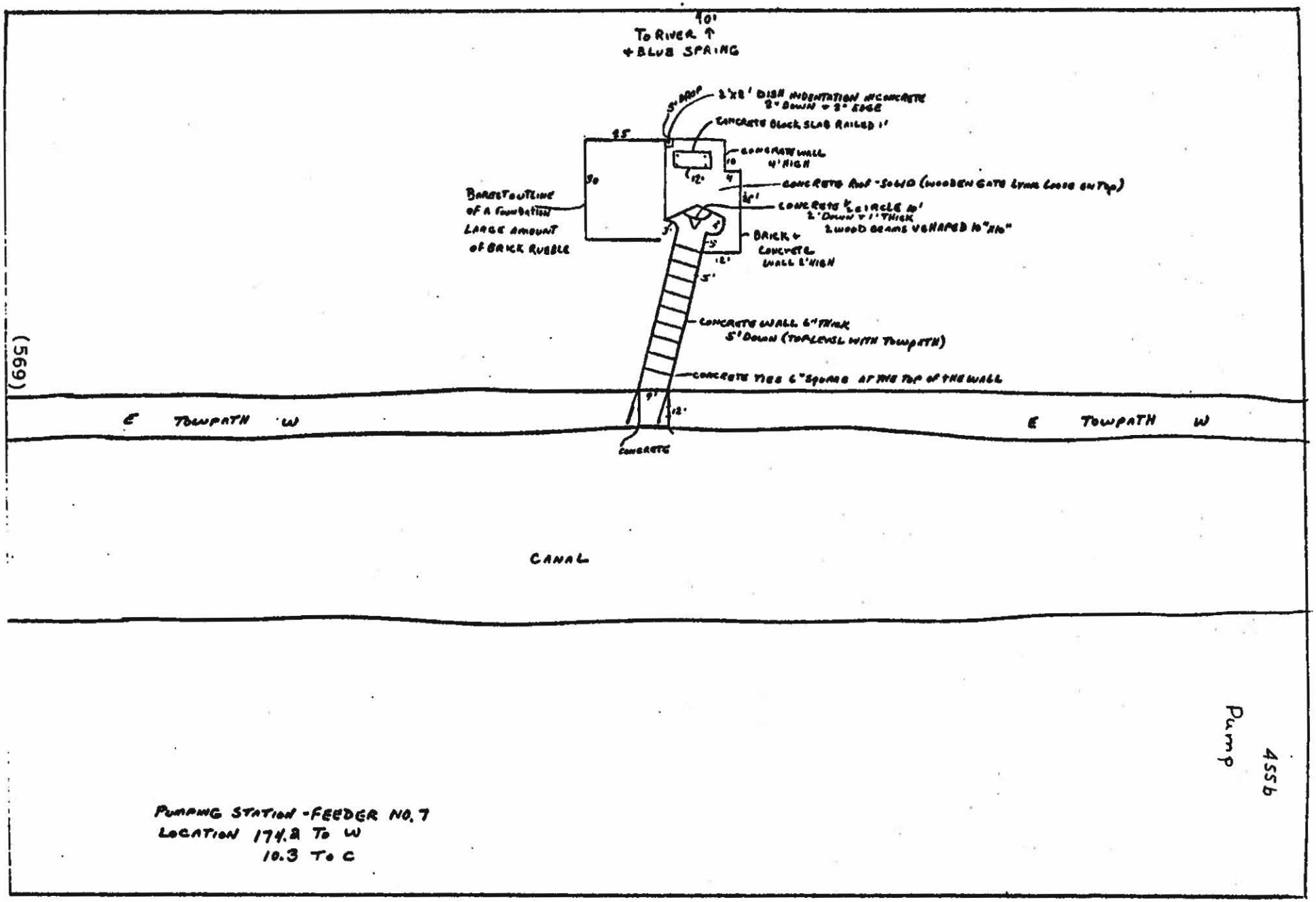
May 1, 1971
GHD, Orville Crowder

Pump near Lock 72.

Brick on downstream side was engine house & boiler room.
Pump on cement foundation at rear side of pump hole.
Well cased with wood, well connects to concrete trunk leading to canal.



Lock 72 – concrete stand for fuel tanks for pump engine



Pumping Station - Feeder No. 7
Location 174.2 To W
10.3 To C

in diameter on a vertical shaft. It was driven by a pair of overhead, vertical, non-condensing compound stem engines at the top of the well. The cylinders were 14x14 inches and the engine was geared 2 to 1 to the pump shaft and delivered 66 h.p. per engine. The engines were built by Thomas F. Rowland, Continental Works, Greenpoint, N.Y. The tubular boilers were built by Basshor and Company, Baltimore, Md. The pump could raise water 22 ft. 5 inches at a rate of 27.3 cfs.; maximum capacity was 12,000 gpm.; The boiler and machinery were designed to use cheap coal and were not designed for efficiency as they were used. The initial cost of the installation was $20,504.40. The steam engine was replaced by an internal combustion engine during World War I. The machinery and boilers were sold for scrap in

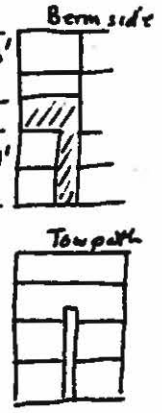
Moores Hollow culvert not located; may be upstream quarry weir.

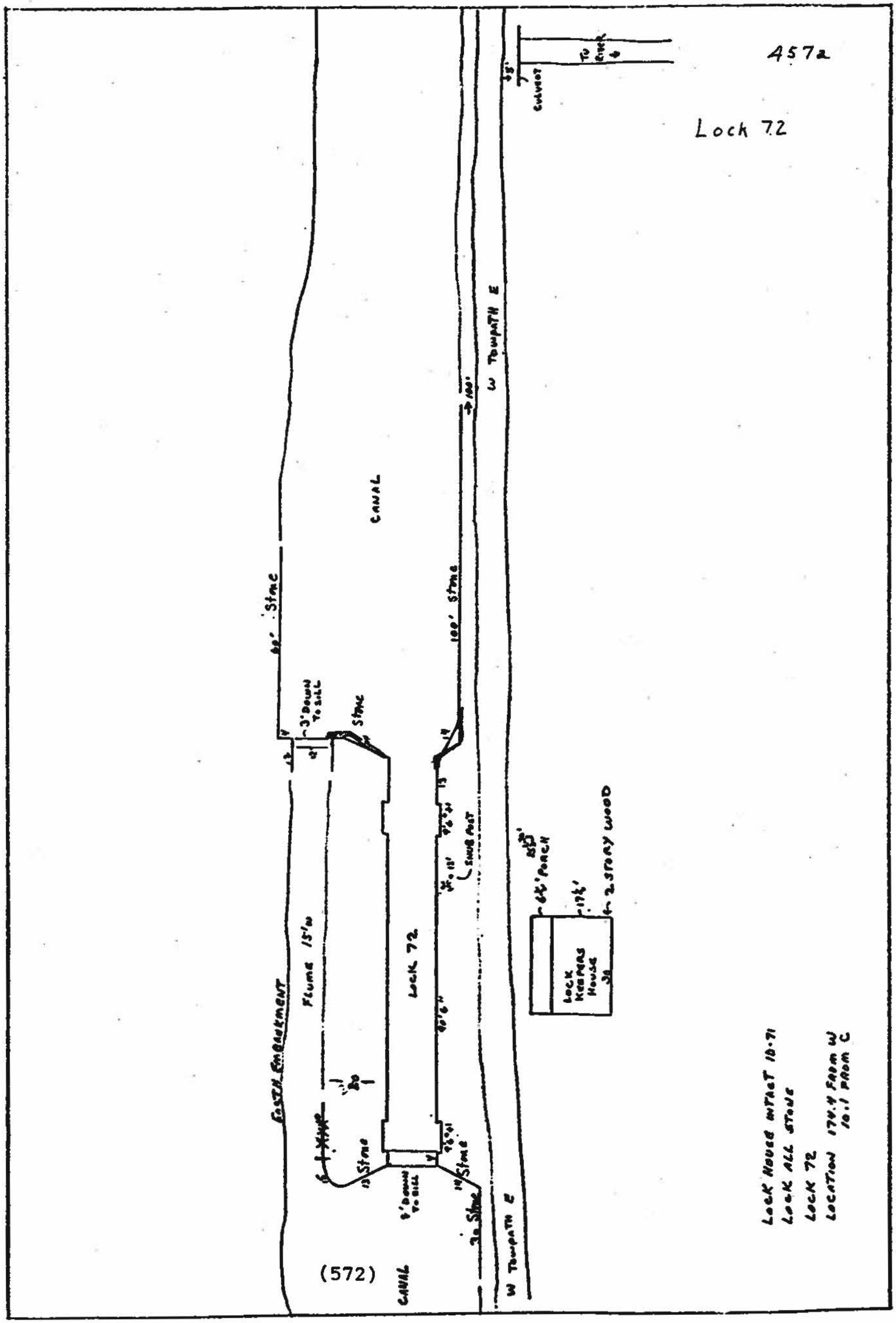
174.12 (174.24) 501.30 WASTE WEIR The concrete frame has 3 gates for insert boards; footings and wings are sandstone rubble. A date, 1911, is in the concrete. An outcrop of Ridgeley

No paddles, wings at right angles, 10 ft. long on canal side, 12 ft. long on river side.

Sandstone is along Maryland Highway 51. Beds are 1 to 10 ft. thick and strike N40°E, dip 45°E.
501.39 Blue Hole; stairplank at towpath leads 150 ft. south to spring.

174.26 (174.39) LOCK 72 9 ft. lift, constructed 1837-39.
501.41
The face is mainly hammer-dressed, with some cut, gritty dark gray limestone. Fossils are prominent in the limestone in the coping. Wings are coursed limestone rubble. The flume is on the berm 20 ft. from the lock. The spillway to the flume is on the lower berm wing and is 10 ft. wide, 2 ft. deep with a 9 ft. drop at the front. A pile of round-
Recess, lower 2 stones, inset 4 in. = 3 ft.+ high; upper gate 3 stones high = 4 ft.
ed boulders is at the base. A footbridge is over the lower part of the lock. Slots for stop gate boards are above the breast. Part of the miter frame shows in the upper recess.
footbridge on lock.
Bolts on the upper berm wing were for a timber fender. The lock gates were damaged by Confederate forces on February 2, 1864. The lockhouse is on the side of the towing path. It is a log frame with plank siding, 2 stories high with Ridgeley Sandstone rubble in the foundation. Concrete forms on




457a
Lock 72
TO RIVER
CULVERT
W TOWPATH E
CANAL
100' STONE
STONE
3' DOWN TO SILL
FLUME 15'W
LOCK 72
EARTH EMBANKMENT
SHUB POST
2 STORY WOOD
PORCH
LOCK KEEPERS HOUSE
STONE
8' DOWN TO SILL
W TOWPATH E
(572)
CANAL
LOCK HOUSE INTACT 10-71
LOCK ALL STONE
LOCK 72
LOCATION 174.4 FROM W
10.1 FROM C

the berm were formerly bases for the fuel tanks for the pump below the lock.

An outcrop on the Western Maryland Railway exposes an anticline in medium to thin bedded gray Keyser Limestone. The beds strike N40°E and dip 10° on each flank. Blue Spring, one of the largest in Maryland, is on the river shore, 200 ft. southeast of the lock.

174.33-174.41 (174.48-174.56) OUTCROP A cut on the Western Maryland Railway exposes Ridgeley gray sandstone which strikes N30°E, dips 40°SE on the east limb of an anticline and 45°NW on the west limb which is exposed in the berm of the canal. A prominent vertical, transverse joint cuts the rock. Strike joint dip is 50°Nw. An exposure of dark gray, Keyser Limestone is in a low bluff on berm.

174.55-174.83 (174.70-174.98) OUTCROP There are intermittent exposures on the berm and on ledges along Maryland

501.51-501.58

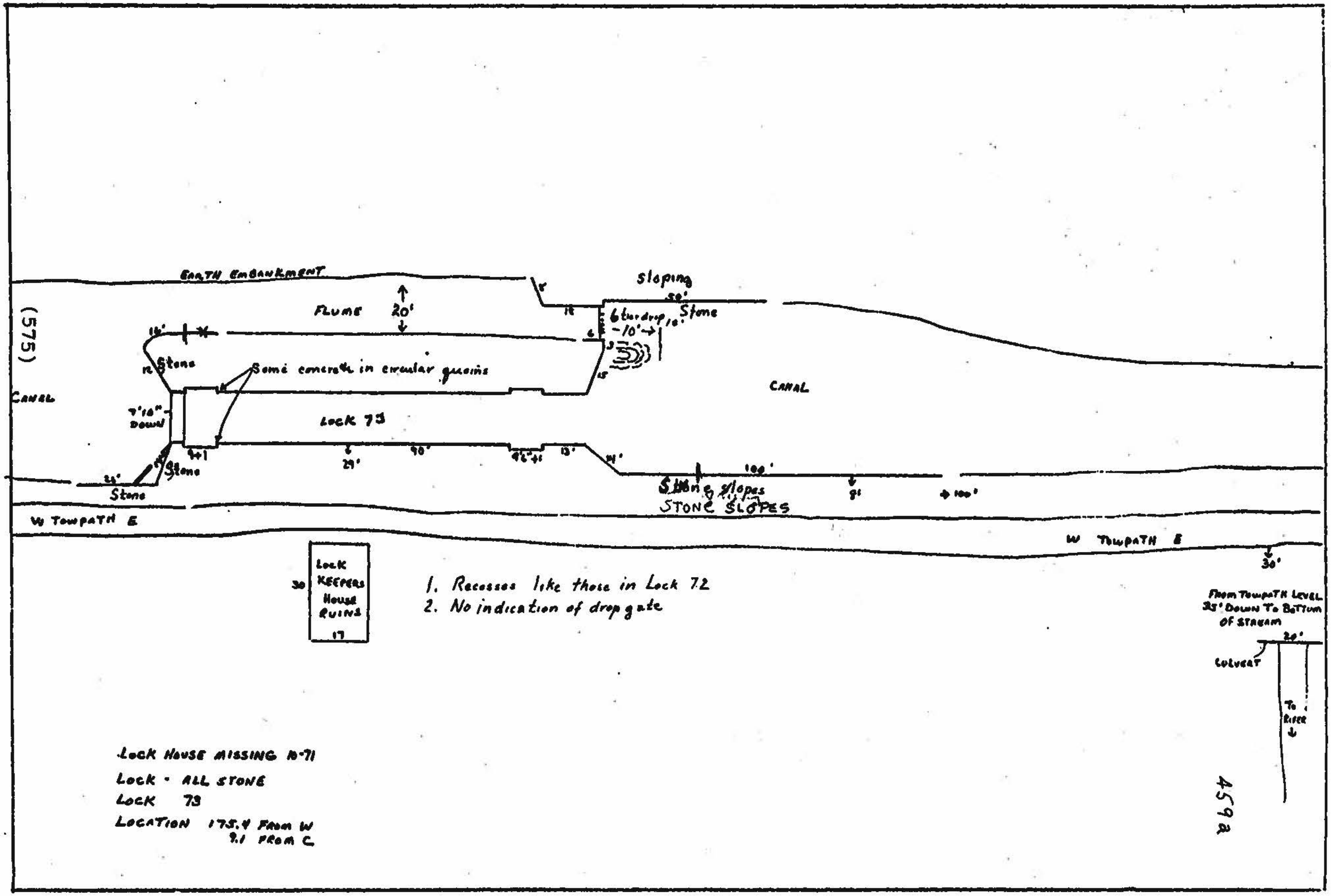
Highway 51 of Ridgeley Sandstone. Beds 4 ft. thick and strike N25°E, dip 25°NW. A prominent joint strikes N30°W and dips 80°SSE.
501.85 outcrop in berm cut, Oriskany (Dor) beds up to 4 ft. thick; at 501.95 joints dip 10° towards canal, strike parallel to canal; poor exposure, dip of beds not certain continues to 502.02
MP 175: 502.04

174.81 (174.96) CULVERT 233 MOORES HOLLOW Constructed 1838-39, 1849. This culvert with a 4 ft. span is now buried by silt. not located
502.08 - 502.10 + 502.22 strike at right angle to canal; dip 70° upstream in Dor.

175.19 (175.30) CULVERT 234 Constructed 1838-40. The
502.38
semicircular arch is cut gray limestone with a 6 ft. span and a 3 ft. rise. There are ~~6~~ 12 (incl. abutments) ringstones and a keystone in the face of the arch. The abutments are 1 ft. high and the parapet and coping are 2 ft. high. The face stones are rough dressed sandstone. The spandrels are concrete on the
wings at right angles, 10 ft. long, 3 steps + 6 ft. face at end; same on berm. Limestone exposed in stream, gray, strike at right angles to canal, dip 30° upstream. 12 ft. embankment above coping.
west part of the arch on the towing path side.
502.40 steep head valley, 30 ft. (13 paces) wide = overfall?

Iron Mountain H.B.O. just at east end of lock.

175.24 (175.34) LOCK 73 9 ft. lift, constructed 1838-40,
502.43
1849; rebuilt 1869. The face is cut and hammer-dressed limestone from Evitts Creek Quarry. A drop gate installed


(575)
EARTH EMBANKMENT
FLUME
20'
Sloping
50'
Stone
6 ft drop
-10'->
Stone
Some concrete in circular grooves
CANAL
CANAL
7'10" DOWN
LOCK 73
29'
90'
100'
Stone slopes
STONE SLOPES
8'
100'
Stone
Stone
W TOWPATH E
W TOWPATH E
30'
LOCK KEEPERS HOUSE RUINS
30
17
1. Recesses like those in Lock 72
2. No indication of drop gate
FROM TOWPATH LEVEL 35' DOWN TO BOTTOM OF STREAM
20'
CULVERT
TO RIVER
LOCK HOUSE MISSING 10-71
LOCK - ALL STONE
LOCK 73
LOCATION 175.4 FROM W
9.1 FROM C
459a

in the upper recess in ? . Remains of piling for this gate are below the breast wall. same as lock 72. Bolts for timber fenders are on the lower and upper wing wall. Slots for stop gate insert boards are above the breast wall. The flume is on the berm and ends in an overfall spillway on the lower berm wing, 8 ft. wide. A pile of rounded cobbles and boulders, No bridge over lock. up to 2 ft. diameter, is below the spillway. A pivot bridge was formerly over the middle of the lock. Remains of sandstone rubble and cobbles of the foundation for the lockhouse are on the towing path side. Boat basin upstream of lock, canal 80ft. wide.

175.30 (175.43) 502.50 BRIDGE BALTIMORE AND OHIO RAILROAD BRIDGE no. 65. The abutment on the towing path is gray, banded, micaccous granite gneiss capped with concrete. The berm abutment is quartzite and limestone with a top tier of granite capped by concrete. The through plate girder span was placed over the canal in 1923 and was fabricated by McClintic-Marshall, Pittsburgh, Pa. Previous to this the span was an

asymmetrical pony (open) Pratt truss placed about 1907. This replacing an older through Pratt truss. The original bridge was a timber truss. The railroad bridge over the Potomac River, 300 ft. south of the canal, was built in 1901 by the American Bridge Company. It consists of 2 deck Pratt trusses with one deck plate girder approach on the north. The original bridge of 3 covered timber spans was erected in 1842 and burnt in 1861 by the Confederates. A 3 span, Bollman deck truss with 10 panels per truss was built in ?? The north abutment is hammer-dressed limestone and granite and the south abutment is hammer-dressed limestone. The piers are granite and limestone.

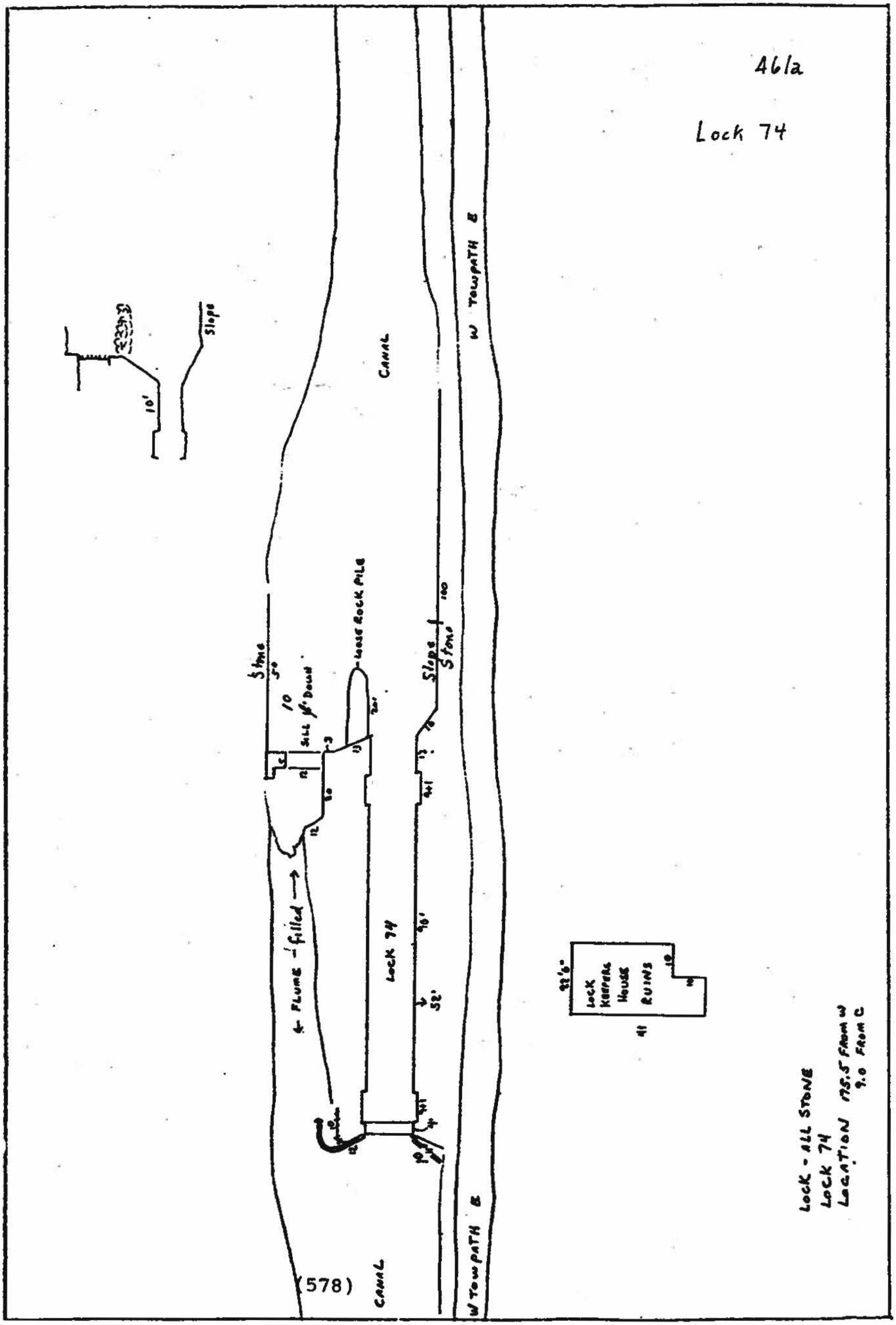
175.35 (175.50) LOCK 74 10 ft. lift, constructed 1838-40, 1849; rebuilt 1869. The face is hammer-dressed and cut limestone from Evitts Creek quarry. Fossils of large coral heads are prominent in the coping. The coping on the south west side is packed with fossil shells forming a coquina.

502.55 North Branch picnic area south side both. Parking, tables.

From same source as Lock 72.

461a

Lock 74


CANAL
W TOWPATH E
Slope
10'
Stone
SILL 10' DOWN
LOOSE ROCK PILE
Slope
Stone
100
← FLUME - filled →
LOCK 74
90'
32'
LOCK KEEPERS HOUSE RUINS
22'6"
LOCK - ALL STONE
LOCK 74
LOCATION 175.5 FROM W
9.0 FROM C
(578)
CANAL
W TOWPATH E

9/4/71
8

✓ **Lock 73** - Breast wall at head of recess. Slot above breast.

No pulley holes. Strut of gate at center of recess and post in circular quoin look like piling.

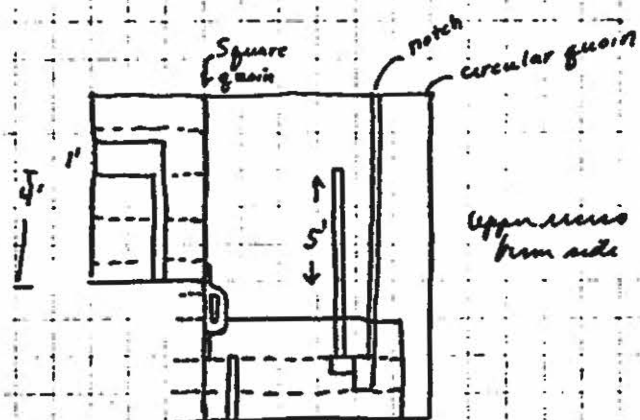
4" sub-recess in upper and lower recess.
No upper or lower extension.

Chamber 91 ft. long upper circular quoin to lower square quoin. No bridge on lock.

✓ **Lock 74** - Pulley and piling in upper recess. Pulley at berm on level with breast wall top. 2 slots on berm side just up from circular quoin. Notch for gears at base of slots.

Drop gate formerly in upper recess.

Breast wall at head of recess. Slots above breast.



No upper or lower extension

Some blocks are pebbly. A drop gate was installed at the head of the upper recess in 1875. An iron pulley and piling remain. A notch for gears and slots for control rods are in the recess. The circular quoins in the upper recess are covered by a 2 ft. concrete extension which has slots for an insert board stop gate. Lock had a drop gate in upper recesses.

The flume is on the berm, 15 ft. from the lock, and has an overfall spillway 8 ft. wide at the front of the lock. Blocks of limestone in the spillway have veins of quartz pebbles 1/2 to 2 inches wide with pebbles up to 1/4 inch in diameter. These blocks also have masses of fossil shells (coquina); some Ridgeley Sandstone blocks are in the spillway. Solution erosion to a depth of one inch is on the face of limestone blocks in the spillway. A pile of cobbles 15 ft. long is on the upper berm with timbers embedded in it. This is the remnant of a crib fender. A similar but smaller pile of cobbles, 12 ft. long, is on the lower berm.

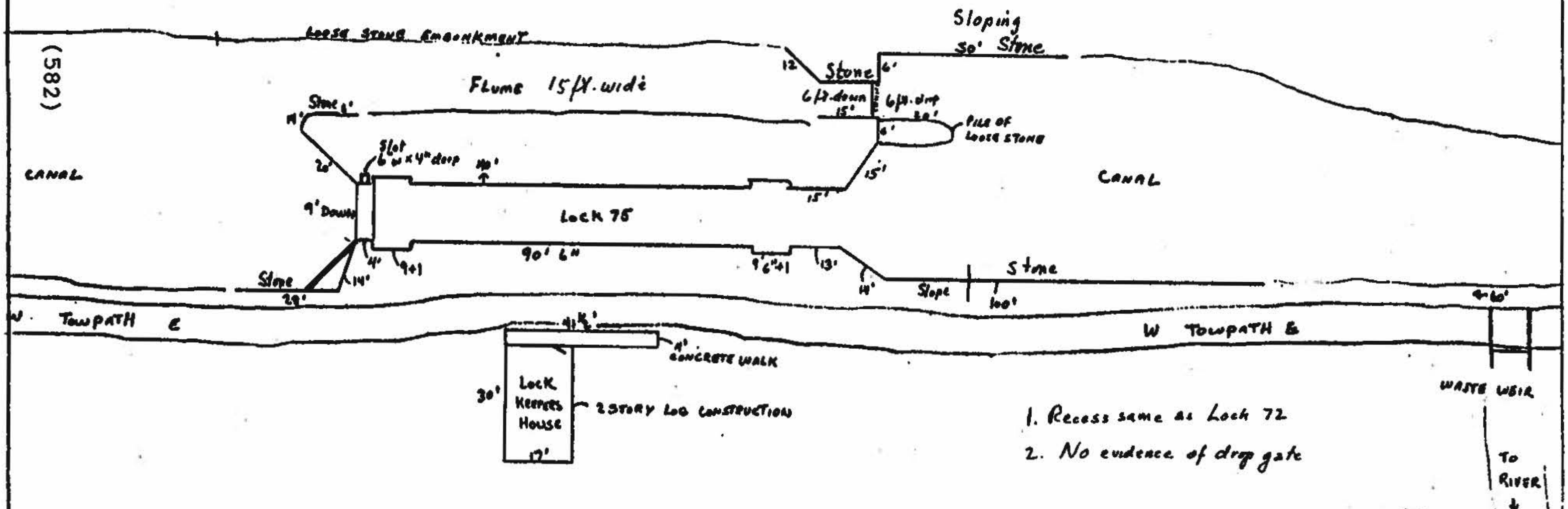
Bolts on the face of the wings on the upper and lower berms formerly held timber fenders. A pivot bridge was formerly over the center of lock. The lockhouse is on the side of the towing path. It is a frame structure on a rubble foundation A small shanty was formerly on the berm at the drop gate. Boat basin above lock. Road bridge over upper end of lock.

175.49 (175.63) 502.65 WASTE WEIR This structure is a concrete frame with 3 gates for insert boards. The spillway boards are in place. post 1896. No paddles, wings at right angles, 10 ft. long on prism side, 15 ft. long on riverside; 5 ft. drop at end of spillway, river side.

175.53 (175.67) 502.70 ~~LOCK~~ LOCK 75 Lift 10 ft., constructed 1838-40, 1849, rebuilt 1869. The drop gate at the upper recess was installed in 1875. The face of the lock is cut and hammer-dressed limestone from Evitts Creek quarry; coquina and pebble streaks are in the blocks in the lower wing wall, towing path side. Slots for an insert board stap gate are at the head of the lock. The flume is on the berm, 15 ft. from the lock. An overfall spillway of the flume is on the

463a

Lock 75



1. Recess same as Lock 72
2. No evidence of drop gate

(582)

LOCKKEEPERS HOUSE INTACT 10-71
LOCK + LOCK WALLS - ALL STONE

Lock 75
LOCATION 175.6 FROM W
9.9 FROM E

lower berm wing. It is 8 ft. wide and 3 ft. deep. A pile of rounded cobbles and boulders is at the base of the spillway. Iron hinges, square quoins and piling in the upper recess are remnants of the drop gate structure; bolts for timber fenders are on the lower face of the lock, towing path side and on the upper berm. A low pile of stone on the lower berm is probably the remnant of a timber fender crib. The lockhouse, along the towing path, is clapboard over logs on a rubble sandstone foundation.

MP176-503.02

175.88 (176.02) SETTLING PONDS Several large settling basins are on the flood plain below the canal. They were built by the Pittsburgh Plate Glass Company in 1857 to service its plant on the berm side of the canal. A brick pumphouse is on the berm of the canal.

176.36 (176.50) VAN METERS FERRY A ferry crossed the Potomac near here in the 18th and 19th centuries.

503.50 farmhouse + barn on terrace bordering towpath; good view of Knobby Mtn. straight ahead.

176.56 (176.70) OUTCROP A low ledge of Brallier (Woodmont)-
503.70
Harrell gray shale is on the berm. The beds strike N40°E and dip 16°SE.

176.79 boat basin - small

176.88 (177.02) HIGH FLOOD PLAIN The meadow on the river side of the canal is a high flood plain. A terrace, 40 ft. above the river, is on the berm. Power line crossing, cover begins 504.30

MP177. 504.61

177.12 (177.29) CULVERT 235 Constructed 1837-41. The
504.51
arch stones are cut limestone. The arch has a 4 ft. span and a 2 ft. rise. The parapet and coping are 1 1/2 ft. high and are hammer-dressed sandstone. The culvert is filled with gravel to the keystone (1971). brings at right angles, length?

Berm on Embankment 504.30 - 504.75

177.52 (177.70) PIPELINE CROSSING The flat on the river
504.75 Columbia Transmission Corporation 504.75 to 505.20 North of mountains from
side of the canal is Mexico Farm. A ferry formerly crossed the river to the north. A gas pipeline crosses beneath the canal at this point.

MP178. 505.04

178.12 (178.30) WESTERN MARYLAND RAILWAY BRIDGE no. 1610.
505.33

This is a through, plate girder bridge fabricated by the Pennsylvania Steel Company in 1905. The railroad cuts to 505.35 the east expose Brallier (woodmont) -Harrell gray shale overlain by cobbles in a silty sand matrix. A road crosses the canal on a concrete roadway over 4 steel culverts.

178.24 (178.42) ROAD CULVERT 3 steel culverts, each 4 ft. 505.45 in diameter, with concrete facing are in the bed of the canal. Berm on low embankment 505.40 –

178.67 (178.85) ROAD CULVERT 2 concrete culverts, each 6 505.90 ft. in diameter, carry a road over the canal. A facing of Ridgeley Sandstone, rubble, concrete and brick border the culverts.

MP 179. 506.22

179.82-179.09 (179.00-179.27) EMBANKMENT The berm of the canal is on embankment in this section. Kirkendalls Ferry over the Potomac River was formerly near here.

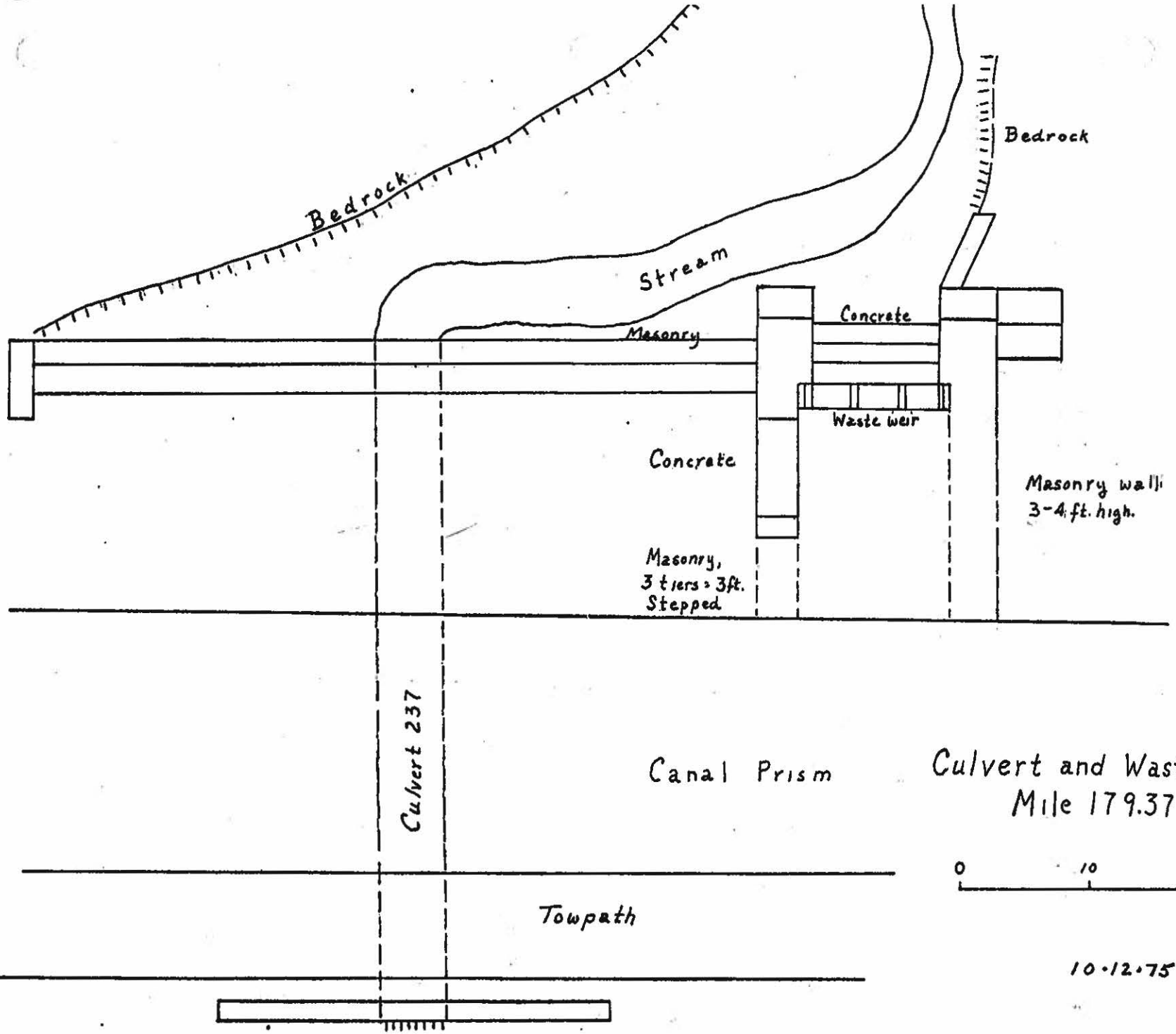
179.03 (179.14) CULVERT 236 Constructed 1839-40. The 506.15 arch stones are hammer-dressed, dark gray to black, crystal- Right angle wings, 8 ft. long.

line limestone. The arch has a span of 5 ft. and a rise of 2 ~~1/2~~ ft. 6 ringstones and a keystone are in the face of the arch. Fossil corals are prominent in the limestone. The concrete parapet is 2 ft. high and abutments are 1 ft. high. The spandrels and wings are concrete with some Ridgeley Sandstone blocks in the upstream wing. A pile of cobbles and boulders up to 1 ft. size, mainly sandstone, are on the downstream side of the parapet.

Burn embankment ends at 506.25

179.29 (179.37) 506.36 CULVERT 237 AND WASTE WEIR Constructed 1838-41, 1849. The arch is hammer-dressed limestone with a 5 ft. span and a 2 1/1 ft. rise. 8 ringstones and a keystone are in the face of the arch. The abutments are 1 1/2 ft. high. No wings - straight face A drop of 5 ft. below the pavement is at the mouth of the culvert on the towing path side. The parapet and coping are 2 ft. high. The coping is hammer-dressed limestone. The spandrels and parapet are roughly dressed Ridgeley sandstone with casts of fossils prominent in the

10 ft. embankment above coping.

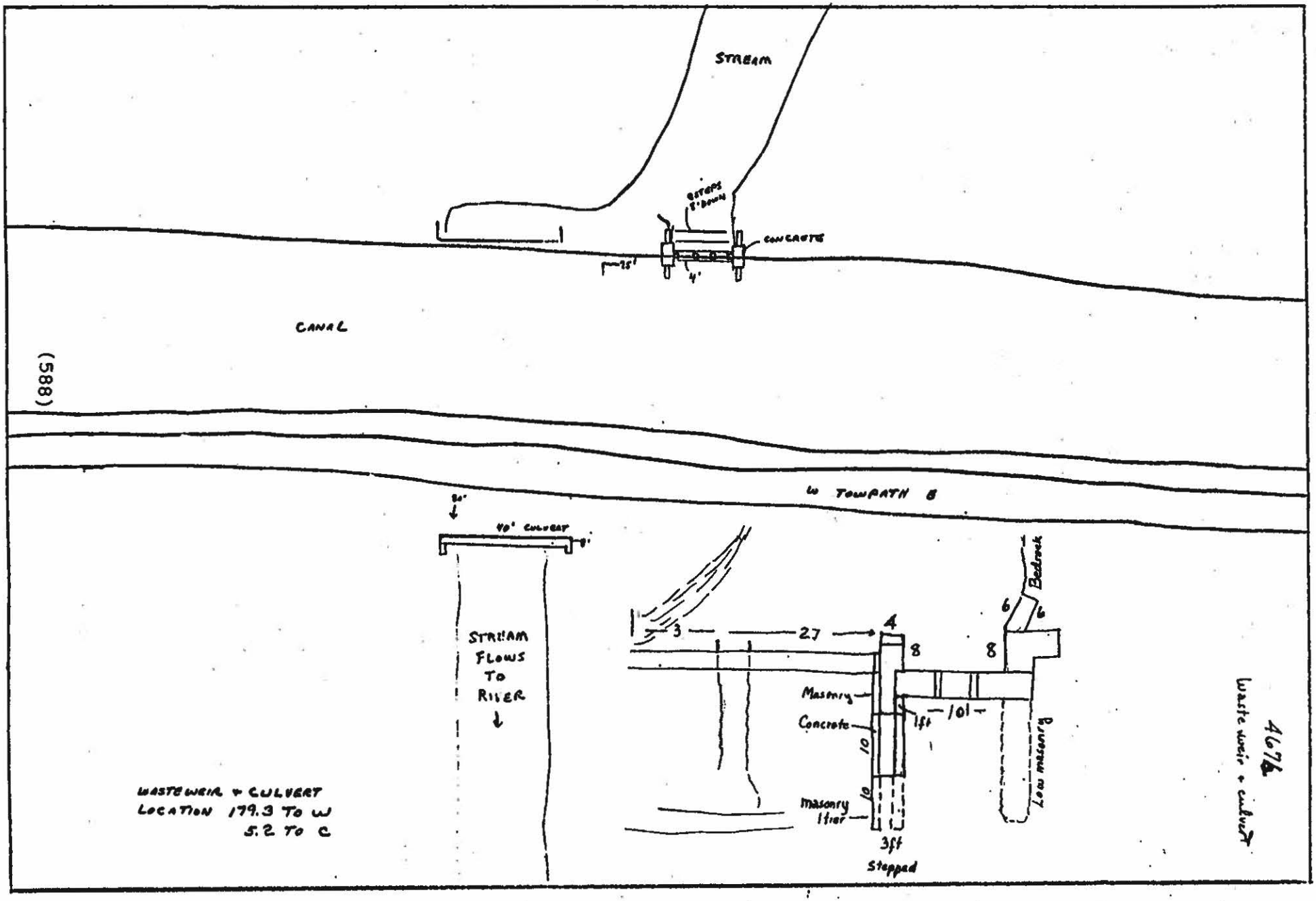


(587)

Culvert and Waste
Mile 179.37

10·12·75

4674


STREAM
STEPS 1' DOWN
CONCRETE
75'
4'
CANAL
(588)
W TOWPATH E
40' CULVERT
STREAM FLOWS TO RIVER
3
27
4
8
8
6
6
Bedrock
Masonry
Concrete
1ft
10'
10
10
Masonry 1 tier
Low masonry
3ft
Stepped
WASTEWEIR + CULVERT
LOCATION 179.3 TO W
5.2 TO C
467
Waste weir + culvert

blocks. There is some concrete in the spandrels. A wall on the berm is 9 ft. high (above the culvert arch) and is mainly Ridgeley sandstone. The arch stones on the berm are hammer-dressed limestone on which the siliceous material stands out 3/8 inch in relief from weathering. The waste weir on the berm is on the downstream side of the culvert. It was originally an overfall with a 12 ft. drain but is now a concrete frame with 3 gates for insert boards. The waste weir is bordered by sandstone rubble walls. no paddles An outcrop of Brallier(Woodmont)-Harrell shale is in the ravine east of the culvert. The shale is dense, gray, platy with interbedded sandstone beds up to 2 inches thick. 60 ft. of the rock is exposed. The beds strike N15°E, and dip 62°NNW. A strike joint and a joint trending N45°W, are both at right angles to the beds. Rebuilt without waste weir. 1986?

179.45 (179.52) OUTCROP A ledge on the berm contains 506.55 Brallier (Woodmont)-Harrell shale. The rocks are thin bed-

Towpath Culvert 236 to 506.50 good, cracked shale.

ded, gray shale and sandstone. The beds strike N20°E and dip 50°WNW. A low flood plain is on the West Virginia side of the river rising inland to a 40 ft. terrace at the base of a hill.

179.95 (180.00) CULVERTS Box culverts are on the berm under the Baltimore and Ohio Railroad yards. They are concrete with openings 2 ft. high x 1 1/2 ft. wide. Power lines cross canal at this point.

506.90

506.95 ~ 506.98 striphead, 30 ft. wide on riverside of towpath.
179.9 Evitts Creek H.B.O.
MP 180 507.00 - power line crossing

179.99 (180.04) CULVERT 239 Constructed 1838-40. The arch is hammer-dressed, dense, gray limestone. The arch has an 8 ft. span and a 4 ft. rise. 12 ringstones and a keystone are in the face. The abutments are 2 1/2 ft. high. The parapet and paving are coursed Ridgeley Sandstone rubble.

507.05

7° recheck this

2 tiers

Barrel culvert third ± B.O RR culvert
Wings at right angles, 4 steps, 8 ft. face at end; revetment of river cobbles on south (downstream) side. Paving = vertical blocks. 10 ft. embankment above coping

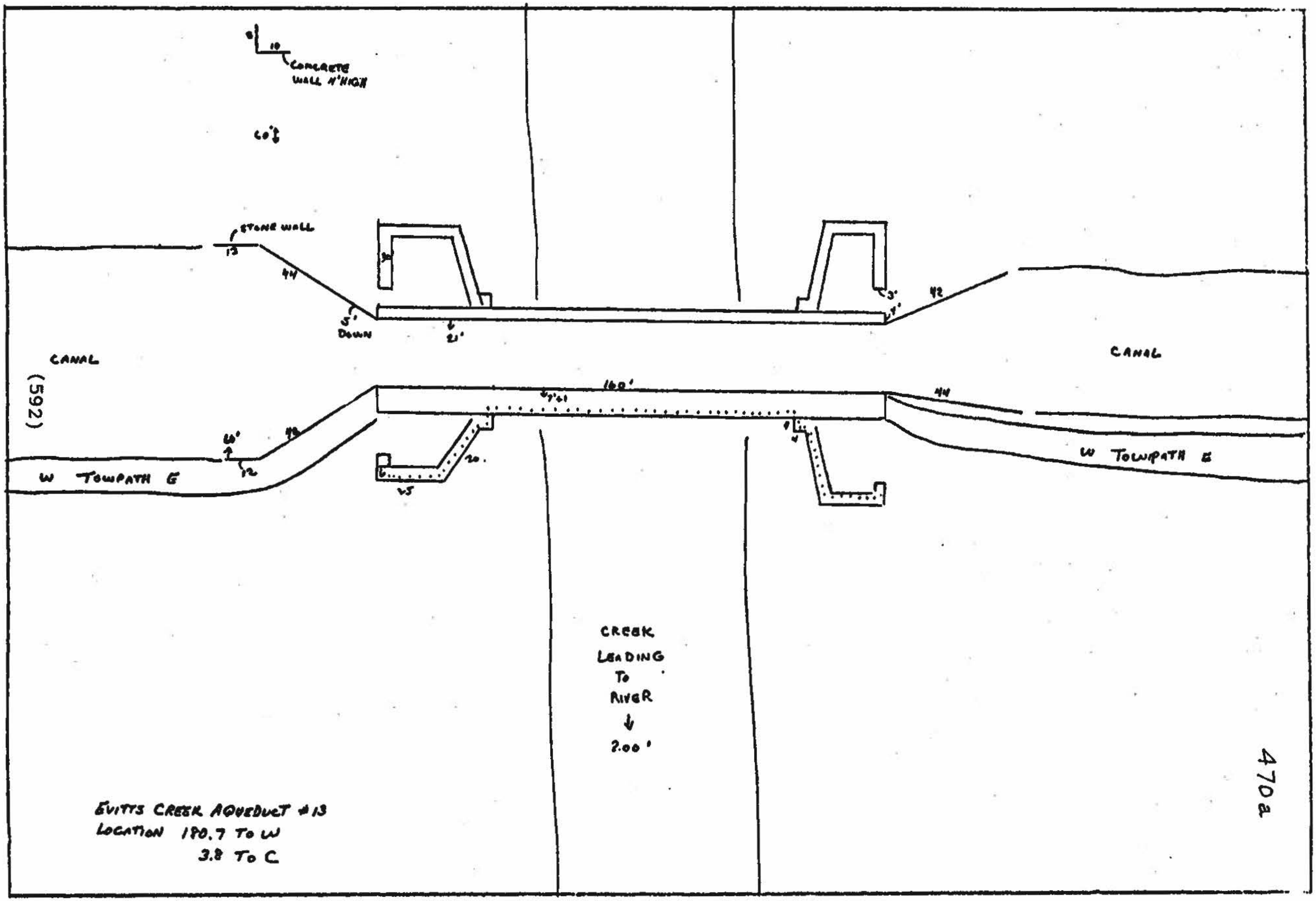
179.99-180.63 (180.04-180.68) TERRACE The canal is on a terrace 30 ft. above river level in this stretch.

507.18

507.18-507.32 Canal filled on berm to right of towpath, 10 ft. channel remains

507.40 stripped, no sign of revetment or depressed towpath., 120 ft. long.
507.48 stripped, 40 ft. wide
507.40 – 507.55 basin 150 ft. wide
507.55 - berm on embankment – extends to Evitts Creek Aqueduct.

180.61 (180.67) EVITTS CREEK (No.11) AQUEDUCT Construct-
507.67
ed 1838-40, 1849. The aqueduct has a single segmental arch with a 70 ft. span and a 14 ft. rise. 50 ringstones and a keystone are in the face of the arch. The aqueduct is 160 ft. long between the ends of the wings. The parapet and coping are 7 ft. high with the top of the coping 27 ft. above stream level and 34 ft. above the foundation. The parapet is 7 ft. wide at the top and 7 1/2 ft. at the base on the towing path side. It is 5 ft. wide at the top and 5 1/2 ft. at the base on the berm. The waterway is 21 ft. wide. A 6 inch belt is a foot above the keystone at the face of the aqueduct. The arch stones, skewbacks, water table, coping and the inside of the parapet are cut stone. The spandrels and other face stones are scabbled. The stone is compact, fossiliferous Tonoloway Limestone from a quarry 3 miles up Evitts Creek. The limestone is siliceous with globs of reddish brown iron oxide up to 4 inches

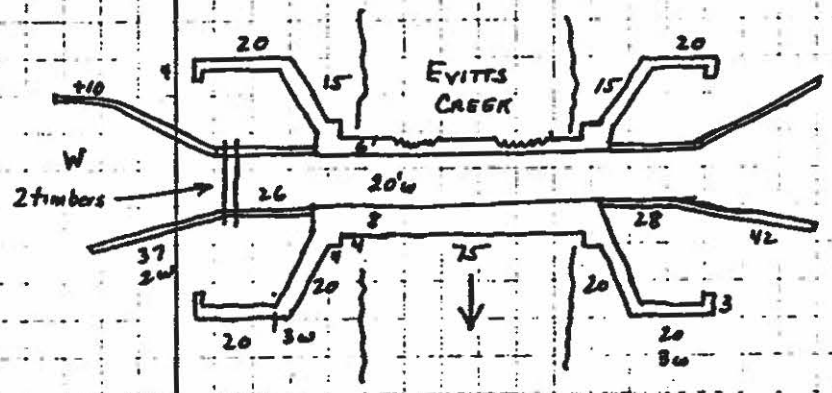

CONCRETE WALL 4' HIGH
10
60'
STONE WALL
13
44
30
5' DOWN
21'
3'
42
CANAL
CANAL
160'
44
W TOWPATH E
W TOWPATH E
12
20.
45
CREEK LEADING TO RIVER
2.00'
EVITTS CREEK AQUEDUCT #13
LOCATION 180.7 TO W
3.8 TO C

470b

Sept. 4, 1971
1.

Falls Church – begin 57,756 35' parking at
" " – end 58,034 Cumberland

✓ WM Ry at Cumberland – curved bridge = # 1656
No number on bridge over canal

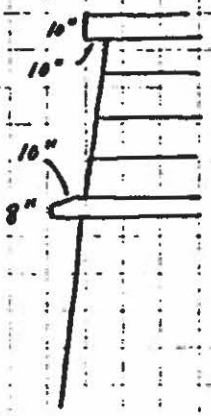


Under Repair 1975.

Brim blocks contain silicified corals
Stubs of old railing 1½" high. 2 on east end are cut through by ropes. Some 6" stubs.
Coping broken off on line of rails; rails in holes 6" deep.

9/4/71
2

Evitts Creek Aqueduct cont.



Better; similar on face and wings

Arch to water table = 1 ft = 1 ft.
Parapet 4 ft = 6 ft.
Coping 1 ft.
Abutment to top of arch = 13 ft.
Facing is scattled stone except arch.
Arch and stone; — Y — between ringstones.

Edge of coping is broken off center and west part of towpath. Berm side, east and west parts of facing and face of arch have fallen; center intact.
Edge of coping on wings has also cracked off.

in diameter on some of the faces. Blocks on the berm have silicified corals. A tramway was used to transport the stone from the quarry to the aqueduct. The face stones have fallen from the north (berm) side of the spandrels and abutments. The Baltimore and Ohio Railroad yards to the north were built in 1952-1960 at a cost $9,000,000. The concrete arch bridge carrying the yards over Evitts Creek was built in 1956.

Diagram- 6"h x 8"w → 3"h x 4"w plan of aqueduct
field notes 9/4/71 p1.

MP181: 508.00

180.79-181.04 (180.85-181.10) OUTCROP A ledge on the berm
507.85-507.97
intermittent to 508.12
is formed of Brallier (Woodmont)-Harrell shale with thin sandstone beds. Several sandstone beds are up to 2 ft. thick at 180.95. The beds strike N40°E and dip 35°SE. Several minor flexures are exposed in the ledge. Intermittent exposures of the shale occur west of 180.95.

181.35 (181.40) CULVERT 240 Constructed 1839, 1848.
508.25 lining at right angles, stripped.

This structure was used as a road culvert until 1922. The arch is hammer-dressed, dark gray limestone with a ~~12~~ 10 ft. span and a ~~6~~ 5 ft. rise. ~~18~~ 16 ringstones and a keystone are in the face of the arch. The abutments are 1 ft. high and the parapet and coping are 1 1/2 ft. high. Wings, spandrels, parapet and coping are coursed Ridgeley Sandstone rubble with prominent molds of fossils on dressed surfaces. Flood plain deposits at the culvert are 4 ft. deep. Imbricated shale and sandstone slabs in the lower part of these deposits are covered by 2 ft. of gray silt. 15 ft. embankment above coping: berm side of culvert tied to B10 culvert. incl. skewbacks.

181.45 Modern culvert 4 ft. diameter., concrete sewer box, replaces brick one, 3 ft. sewer lines: 508.30

181.35-181.66 (181.40-181.71) **BASIN** The broad, reed covered area was formerly a boat basin.
Begins 100 ft. west of Culvert 240, ends at 508.65

508.45 - 508.50 ball park & playground

181.75 (181.80) **SEWAGE Pollution Control PLANT** The sewage Treatment plant for the city of Cumberland, constructed 1957, is adjacent to the towing path. Thistle Ferry formerly crossed the river to south of the canal. Expanded in 1975, $9,260,000
508.50 - 508.72

508.80. Offutt Street - vista to east of mountains; Begin C&O Condos area

Towpath Begin crushed stone surfacing (crushed shale).

Cliffs of Brallier (Woodmont)-Harrell shale and sandstone are on the West Virginia side of the Potomac River. The beds strike N30°E and dip 10° to 15°SE. Large rounded boulders of sandstone, up to 3 ft. size, are on the towing path west of sewage plant.

182.15 (182.20) WESTERN MARYLAND RAILWAY BRIDGE No.1628.
509.20

This is a through plate girder, single span over the canal and was fabricated by the Pennsylvania Steel Company, Steelton, Pa. Bridge no. 1625 over the Potomac River, 1,000 ft. to the southwest has 4 deck plate girder spans on concrete piers. The bridge was fabricated by the Pennsylvania Steel Company, Steelton, Pa., in 1904. Rounded cobbles and boulders, mainly sandstone, up to 2 ft. in diameter, are in the towing path. Between the canal and the river is an old trash dump forming a flat top mound rising downstream to 10 to 15 ft. high at the Western Maryland Railway.

Wiley's Ford

182.60 (182.65) CULVERT 241 Constructed 1848. The semi-
509.63

circular arch is hammer dressed limestone with a span of 4 ft., and a rise of 2 ft. The parapet is 2 ft. high and is coursed sandstone rubble. The culvert is filled to the arch (1971). Virginia Avenue on the east side of the culvert
wings at right angles - buried.
509.62
crosses the canal on a single steel culvert 15 ft. in diameter fitted between sandstone blocks from the abutments of a bridge that formerly crossed the canal here. The bridge was constructed 1838-40 and 1848-49. It was covered timber lattice (Town) truss with a span of 64 ft. on high stone abutments. The approaches were very steep and impracticable for automobile traffic. The bridge over the Potomac River at Wileys Ford to the south is 3 deck girder spans, reinforced with trestle bents and towers. 2 ft. corrugated steel pipe just upstream of culvert drains canal.

Removed about 1909 when a 3 span, Pratt truss bridge on concrete piers & abutments was placed over river. Pony truss placed over canal on old piers there. Bridge over river removed after flood of 1936. Steel & span on W.Va. end. Pony truss over canal also removed and culvert placed in prism.

Receivers accts of damage 1889 does not show any damage to bridge at Wiley Ford. C&O may not have been held responsibility for bridge. HPS - Bearss The Bridges/RR, indicates a c. 1890 date for lattice truss.

Check Md SRC for 1906-1910 for date of Construction of Pratt Bridge.

182.60-183.05 (182.65-183.10) TERRACE The flat area on the berm is a terrace 20 ft. above the river.

182.90 (182.97) WESTERN MARYLAND RAILWAY BRIDGE No. 1631.
509.95

MP 183 509.99 Crushed shale on towpath ends at milepost, Towpath earth, hard, stony rough upstream. (598)

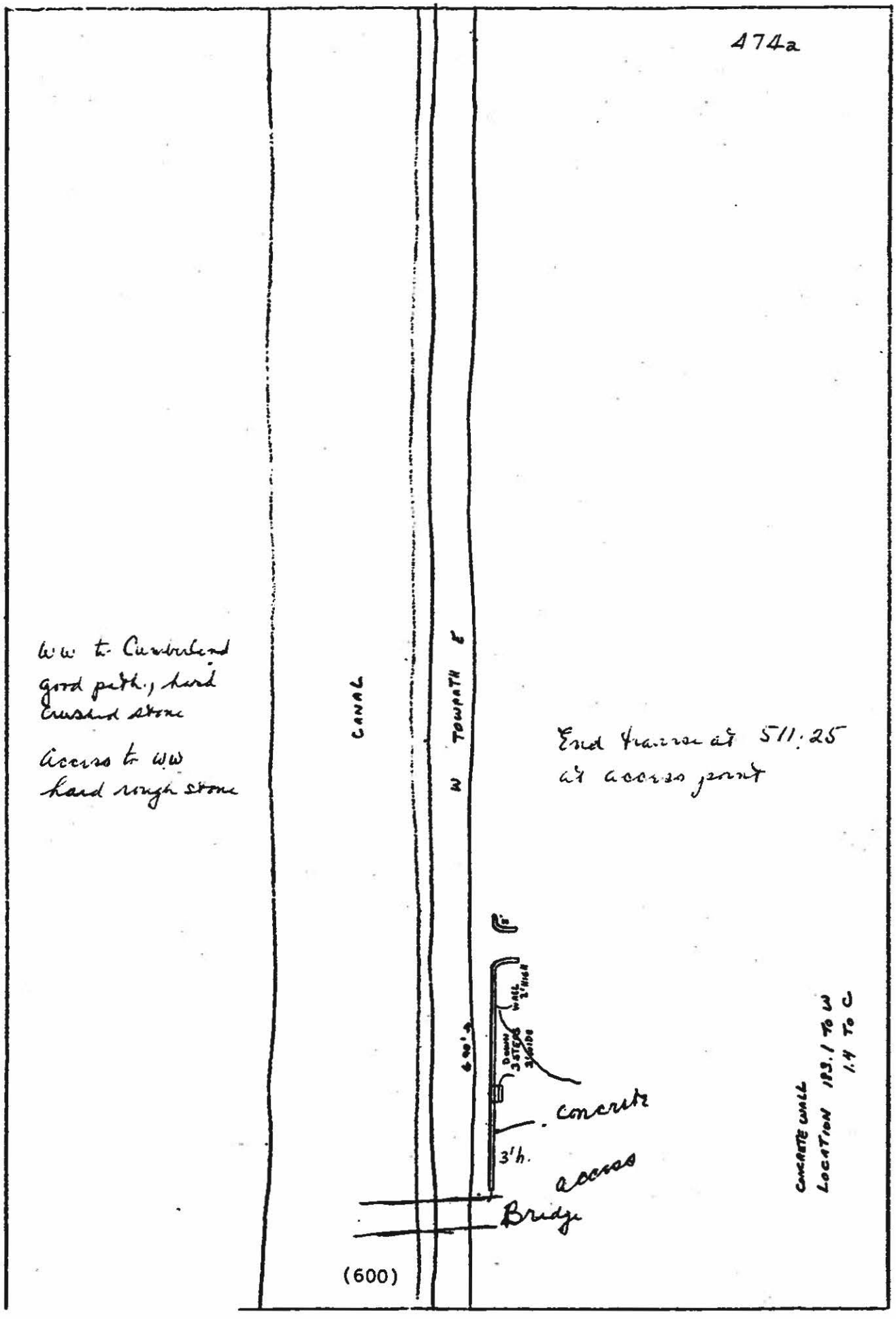
~~This is a through plate girder, single span over the canal,~~ fabricated by the Pennsylvania Steel Company, Steelton, Pa., in 1904 - date checked on bridge plate. Bridge no. 1635 over the Potomac River, 800 ft. to the west, is 4 deck plate girder spans on concrete piers. It was fabricated by the Pennsylvania Steel Company, Steelton, Pa. in 1904. The flat topped mound on the north side of the railroad is formed of spoil from the Knobbly Mountain tunnel of the Western Maryland Railway on the West Virginia side of the river.

182.98 (183.05) FLOOD PLAIN The flats along the river are flood plain terraces and are 20 and 40 ft. above the river on the berm side of the canal.

510.10 Access point, Elizabeth Avenue.

183.09 (183.16) POWER AND GAS LINES A single, 12 inch gas line of the Cumberland and Allegheny Gas Company, Columbia Gas - system of Maryland crosses beneath the canal. A terrace is 40 ft. above the river on the berm. A large steel building is on this terrace. + power lines.

510.22



WW to Cumberland good path, hard crushed stone

Access to WW hard rough stone

End transom at 511.25 at access point

183.20 (183.27) 510.38 **HIGH GUARD GATE** Constructed 1849. The coping is concrete with scabbled Ridgeley sandstone blocks in the rest of the face. Some limestone rubble is in the base along the towing path. The main gate was on the west side (towing path) side with a water level control gate on the berm. The sandstone was from a small quarry on the berm. The lock was used to retain water in the Cumberland basin when the rest of the canal was drained.

Waste weir in canal bd? - no.

Diagram 8"x8" → 4"x4" field notes 9/14/71 p4.

183.43 (183.50) 510.55 **WASTE WEIR** The original stone overfall, 60 ft. long, was constructed in 1849 across the mouth of a ravine. The limestone and sandstone coursed rubble of this structure forms the base for the present concrete structure, which is 150 ft. long. gates.

8"x8" → 4"x4" diagram waste weir

Boat basin west of waste weir and at waste weir 80-100 ft. wide.

9/4/71
5.

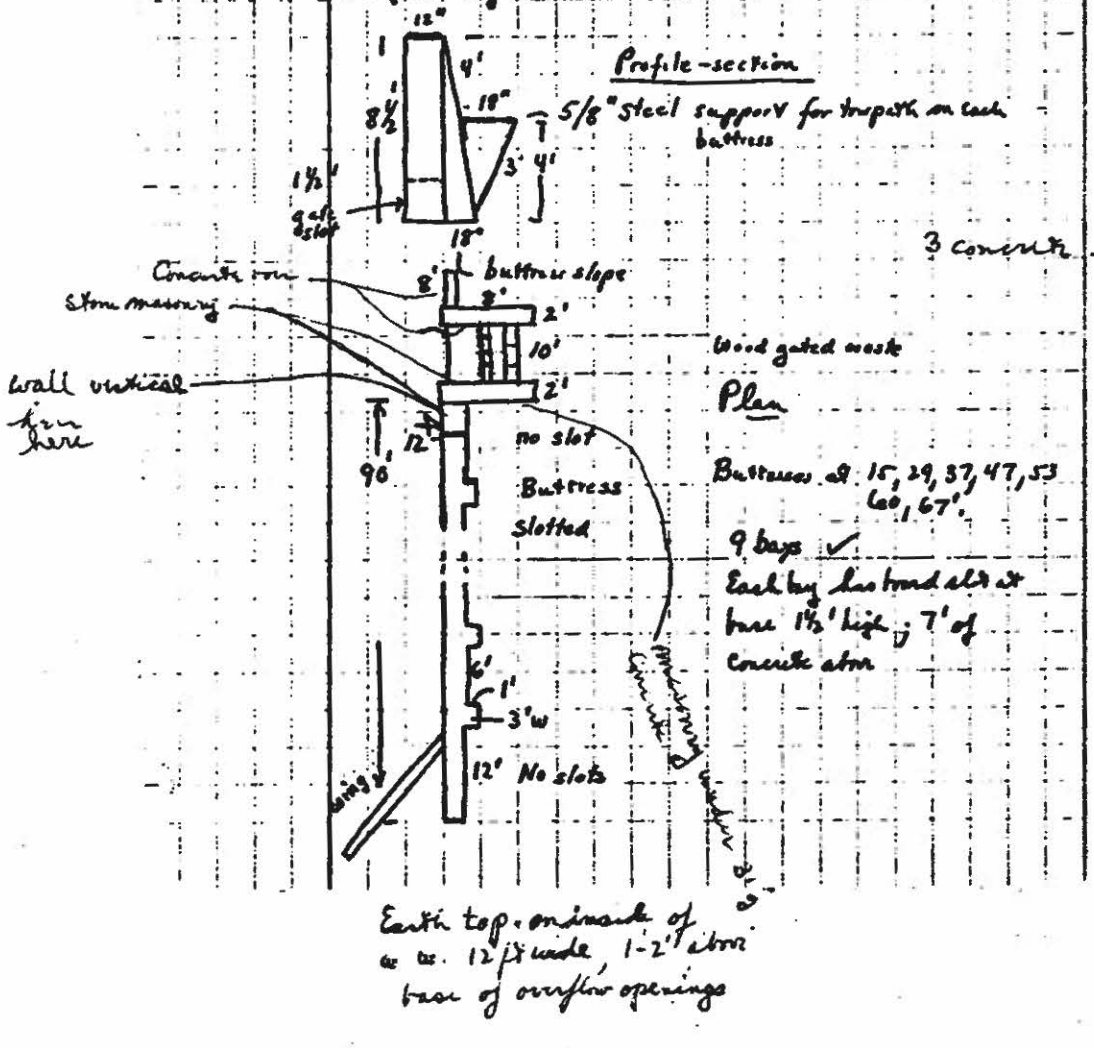
Waste weir - 1st. south of Cumberland

150 ft. long - concrete

At north end - 3 gate concrete waste, boards, at base of weir

Masonry wings, & walls at waste. No paddle gates.

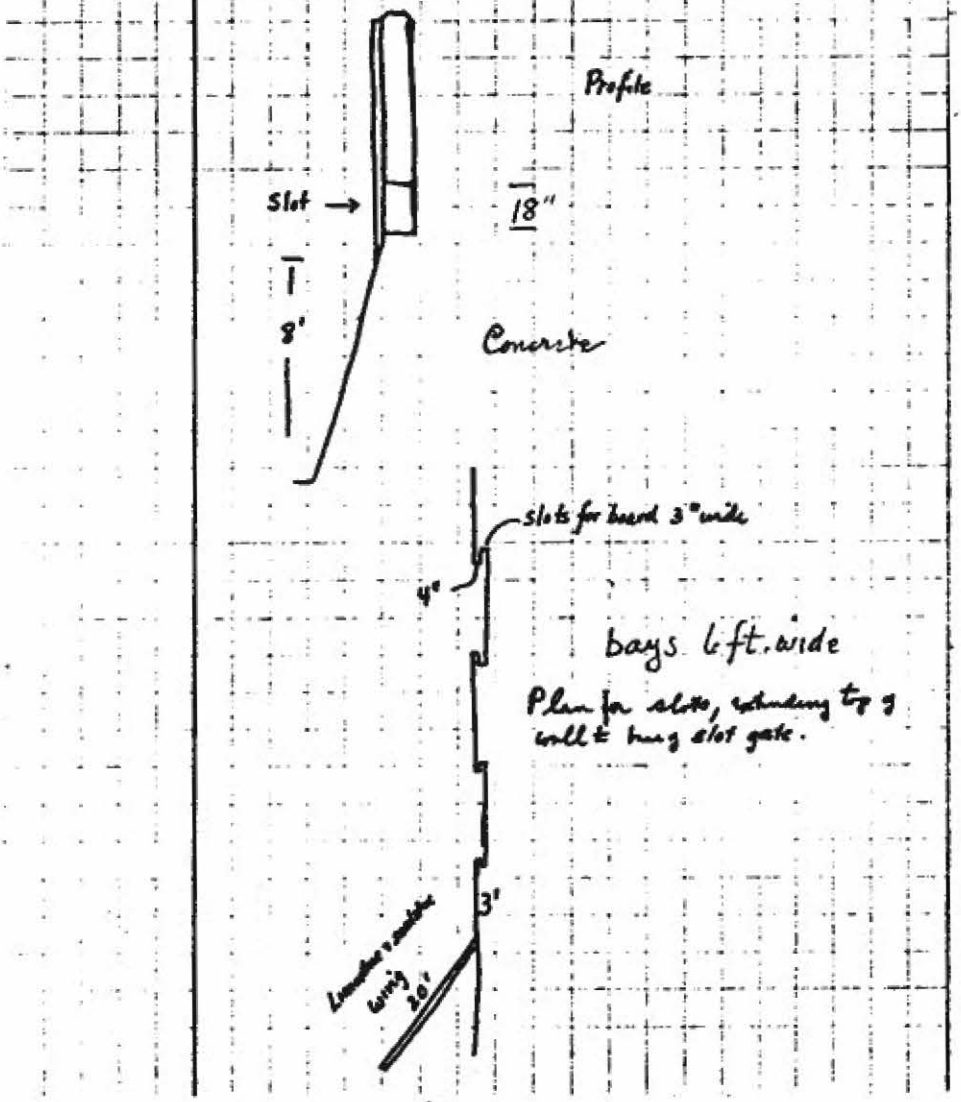
Gates 8-9 ft. high. Sandstone and limestone lower wall 12 feet high.



3 concrete board gates, no paddles
Timber inserts

9/4/71
6.

Wash, 1st. south of Cumberland

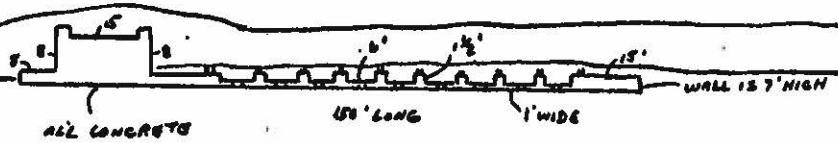


475c

CANAL

W (609)

W TOWPATH E



W TOWPATH E

POTOMAC RIVER

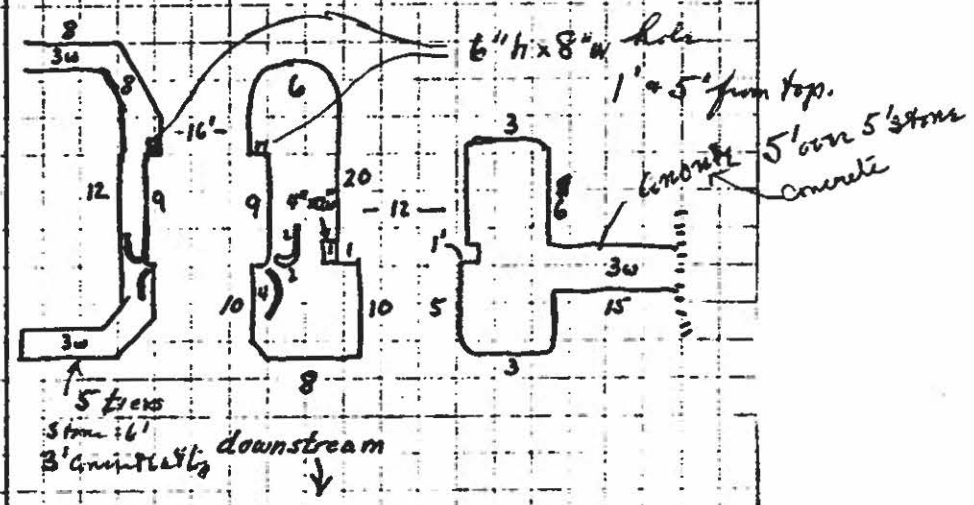
CONCRETE OVERFLOW
LOCATION 183.7 TO W
.8 TO C

9/24/71
4

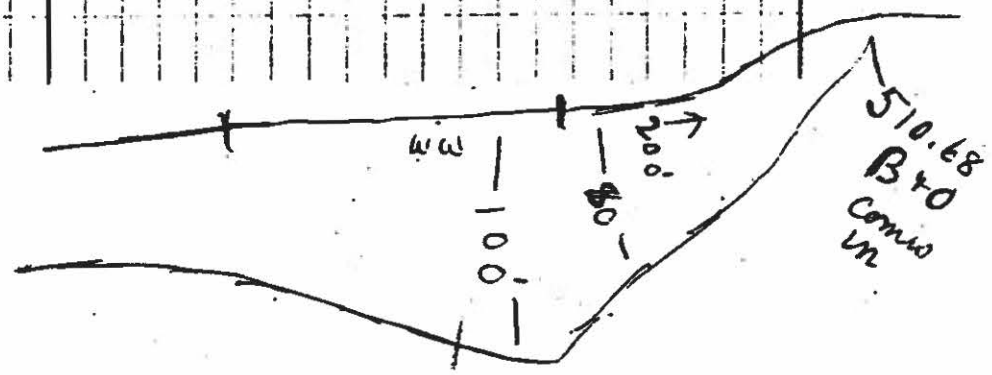
A75d

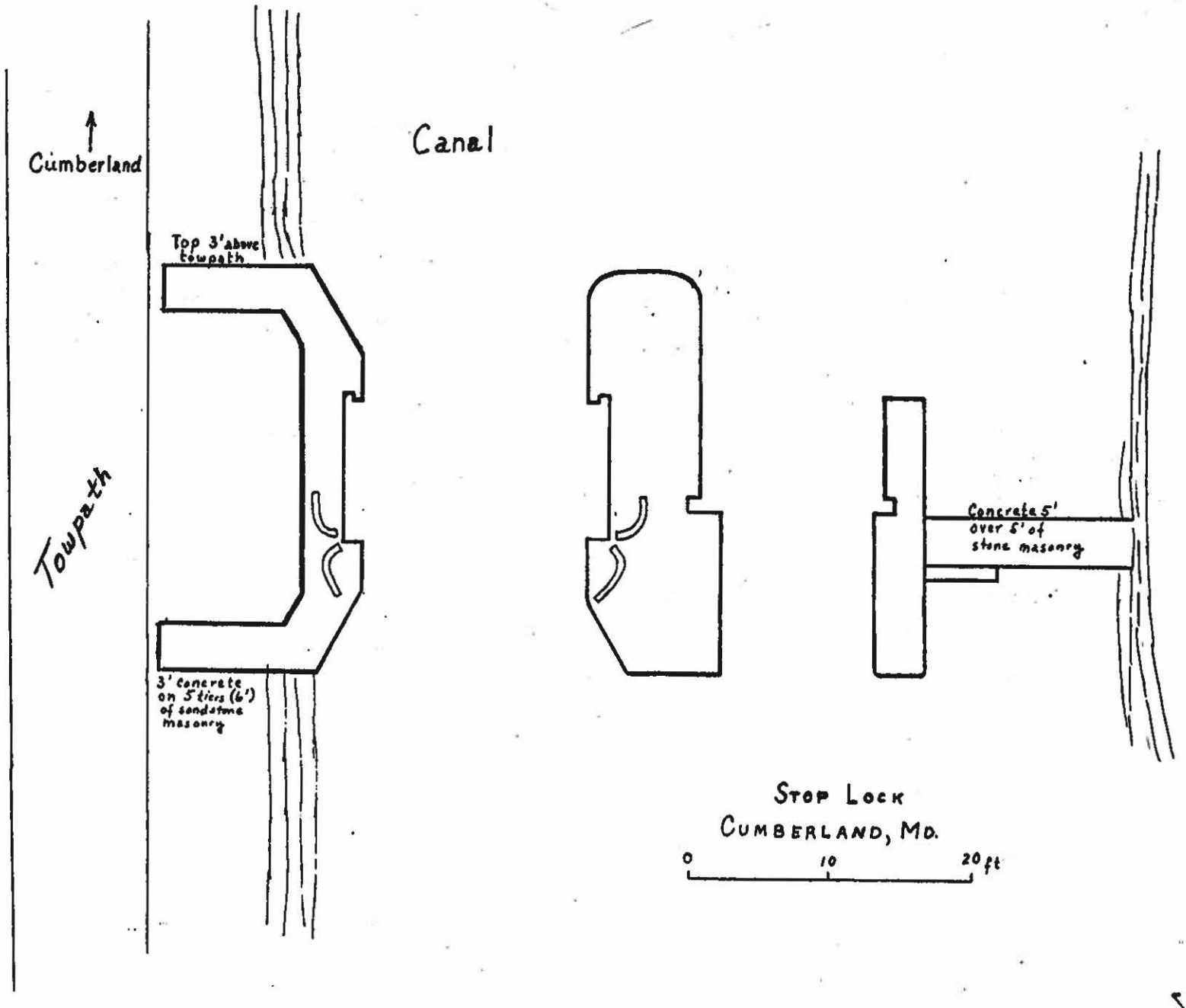
Cumberland and Allegheny Gas Co. (Columbia Gas Co.) pipeline at Cumberland above Elizabeth Street.

Stop Lock -



Scabbled Onskany sandstone, some limestone rubble. Lock is stone masonry from base to towpath level, then concrete above



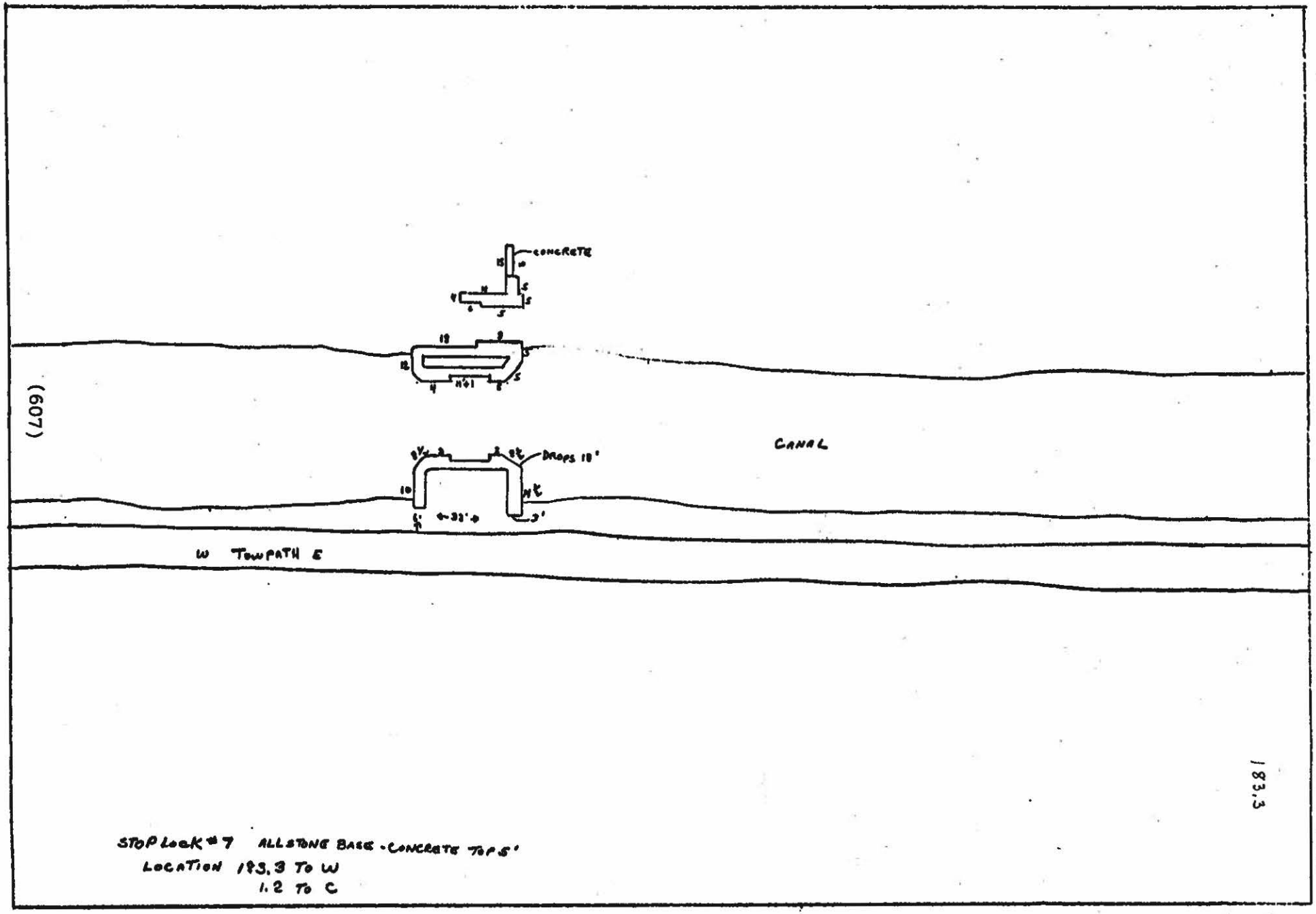


STOP LOCK
CUMBERLAND, MD.

0 10 20 ft

(606)

475e



STOP LOCK #7 ALLSTONE BASE - CONCRETE TOPS'
LOCATION 183.3 To W
1.2 To C

4175f

The canal now ends at the waste weir. The last mile of the canal has been filled and serves as a flood abatement embankment. The river side is faced with gray limestone rubble; the path continues on the embankment. At this point the canal was formerly 100 ft. wide forming a basin for barges. Scenic vista across river to mountains and upstream to Cumberland + gap at Wills Creek; ledges of Tuscarora sandstone = Town Hop.

183.78 (183.90) RETAINING WALL The wall between the railroad and the path is built of limestone blocks.

183.53-188.83 (183.60-184.00) OUTCROP A low bluff east of the path, at the base of the Baltimore and Ohio Railroad is formed of Brallier (Woodmont)-Harrell olive-drab shale. The shale is thin bedded, platy with beds 1/8 thick. The beds strike N20°E and dip 15° to 20°ESE. A terrace, 60 ft. above river level, is east of the railroad and is covered with gravel in a matrix of orange-brown sand.

184.30 (184.40) DAM No. 8 Constructed 1838-40, 1848-49. The dam was 400 ft. long and the crest was 17 ft. high, 6 1/2 ft. above the canal level. The height of the dam was raised 1 ft. in 1857-1858. The structure cost $102,522 and was mainly hammer-dressed Tonoloway limestone from Evitts Creek quarry. The backing was from quarries in West Virginia near the dam. The pool formed behind the dam was 2 miles long. Only the abutments remain on both sides of river and the dam was removed by U. S. Army Corps of Engineers as part of flood abatement program in 19 .

The area to the east of the canal in the vicinity of the dam was a large basin which was filled in after the canal ceased operations in 1924.

14"lx8"w ⟶ 7"x4"- plan of basin, etc.

GUARD LOCK Constructed 1838-42, 1848. The 2 locks set side by side are hammer-dressed limestone from Evitts

Creek quarry. The working inlet lock had an 8 (6 m.?) ft. lift. The other lock was a 13 ft. high water guard lock. A lock-house was formerly between the locks on the river side of the towing path. Western Maryland Railway B ridge no. 1656 across the Potomac at this point is a curved, through, plate girder structure with 2 tracks. The 6 spans over the river were fabricated in 1912. There are 4 short, concrete, slab spans over the inlet locks. A second bridge carries a siding over the inlet locks and it consists of 2 deck plate girder spans.

The freeway bridge to the west over the railroad and the river is 3 deck plate girder spans with deck plate girder approaches. A 2 span bridge, with tied through steel arches carries W. Va. Highway 28 over the Potomac River to the west.

+ mule bridge
+ Wills Creek basin.

William E. Davies
1917-1990

Memorial to William E. Davies
1917-1990

The enthusiasm, ebullience, curiosity, competence, and dedication that so characterized Bill Davies melded to create an outstanding engineering geologist, explorer, speleologist, teacher, and public servant. The exciting adventures, productive achievements, and humorous incidents shared with Bill provide his numerous friends and colleagues with warmly nostalgic and treasured memories.

Bill Davies was bom on Christmas Eve 1917 in Cleveland, Ohio, to William R. Davies and Florence (Koch) Davies. He and a younger brother, Jack, shared a close family relationship with many devoted aunts, uncles, and cousins. There were nearly weekly gatherings of the clan via travel on the rapid transit that sparked Bill's lifelong interest in railroads.

The Davies family moved to East Orange, New Jersey, when Bill was about 12 years old. Their house on Maple Avenue backed up to the commuter railroad tracks of the Delaware Lackawanna and Western Railroad, where Bill monitored the conversion of the line from steam to electricity. He read everything available about the D.L. and W. Railroad as well as the Pennsylvania and Baltimore and Ohio railroads. Later, in response to a high school (Carson Long Institute, New Bloomfield, Pennsylvania) assignment, Bill, his brother, and a friend, George Hicks, surveyed the dug but unfinished five tunnels of a proposed route of the Susquehanna River and Western Railroad between Harrisburg and Pittsburgh. This route would cut several hours off the running time of the Pennsylvania Railroad between the same two cities. That project was Bill's first engineering study, resulting in his first research paper. It was at this time that Bill met Frank Tressler, an attorney and amateur geologist who introduced him to the many outcrops of fossil beds in the Perry County, Pennsylvania area. It was there also that Bill first visited and surveyed many caves.

The early convergence of Bill's interest in engineering and in geology led him naturally to the Massachusetts Institute of Technology, which he entered in 1935. Sharpening his skills in mathematics and in physics, he graduated in 1939 with a major in geology and a minor in geophysics. He then accepted a graduate assistantship in the geology department at Michigan State College. In addition to his departmental responsibilities, he was a summer field assistant with the Pennsylvania Geological Survey conducting geologic mapping in the south-central part of Pennsylvania. The geology department secretary at Michigan State College was a keen judge of character and introduced Bill to Geraldine Hall. After Bill received his M.S. in June 1941, the two were married in November 1941. Gerry became his lifelong partner, frequently accompanying him into the field and at his numerous international meetings. She appreciated his interest and his dedication, and she contributed substantively to his work.

Bill entered the U.S. Army in July 1941 as a second lieutenant with the Corps of Engineers and was stationed at the Engineer Reproduction Plant at Fort McNair and later at the Army Map Service, both in the Washington, D.C. area. At the map Research Department, he started with one assistant, and by August 1944, he was Captain Davies, Chief of the Map Research Department, with a staff of 70. They produced thousands of maps for strategic planning of ground and air operations, as well as handkerchief maps for pilots bailing out and for inclusion in loaves of bread for prisoners of war. Bill recalled delivering to the White House classified maps destined for Winston Churchill. When the war ended, Bill was a Major and later retired from the Army Reserves in 1963 as a Lieutenant Colonel. After leaving military service in 1946, Bill remained at the Army Map Service as a civilian in charge of gathering map intelligence data.

In May 1948, Bill left the Army Map Service and joined the West Virginia Geological Survey for an investigation of the caves and karst of West Virginia. The work was initiated

primarily because of the interest at that time in the use of caves as defense shelters. Thomas W. Richards, then a student at Dickinson College, was Bill's field assistant during the summer of 1948, and related the following recollections of their work together.

Working from 7 ½ minute quadrangles on which Bill had plotted all the limestone outcrops and known caves, they visited every outcrop they could, and queried farmers about the presence of any caves, sinkholes or pits.

Richards quickly learned that Bill favored large breakfasts and dinners, but skipped lunch. For daytime survival, Richards carried a loaf of bread and jars of peanut butter and jam in his pack. Bill accepted a sandwich only once, on a day in which they had breakfasted lightly. By summer's end, Bill had added approximately 150 new caves to the then-known inventory. They worked on the future publication *Caverns of West Virginia* during the week and moonlighted in Maryland on Saturdays and Sundays doing fieldwork for the subsequent book, *Caves of Maryland. Caverns of West Virginia,* describing the caves of the state, their origin, and the features of the karst related to the caves, was published by the West Virginia Geological Survey in 1949. It became a bestseller that has gone through three editions. *Caves of Maryland* was published in 1950.

Bill's long and productive career with the U.S. Geological Survey started in August 1949 when he was asked to join the Military Geology Branch by its perceptive chief, Frank Whitmore. The Corps of Engineers largely funded that branch, and Bill's expertise and familiarity with the engineering geology needs of the military were extremely valuable professional assets. In one of his early assignments, Bill was chosen as the site selector for the first underground installation in the United States, at Raven Rock (Camp Ritchie), Maryland. In June 1953, I accompanied Bill to Thule Air Force Base (Greenland), which at that time was being enlarged. Bill seized upon the availability of helicopters as a rare opportunity to extend the range of our work and to map an extensive region including offshore islands that previously had received only reconnaissance coverage. By-products of that work included a detailed report on the geology of this area published in Denmark in 1963 by the Meddeleser OM Gronland.

On March 19, 1954, Bill joined Justice William O. Douglas and eight other naturalists, conservationists, and newspaper editors for that memorable hike from Cumberland, Maryland, to Washington, D.C., along the 184.5 miles of the Chesapeake and Ohio Canal. In a misguided campaign to make the scenery along the Potomac River more accessible to the public, the *Washington Post* had suggested that a parkway be constructed over much of the canal. Justice Douglas, in an eloquent plea, challenged the editors to get acquainted with the canal by hiking its length with him. The editors of the *Washington Post* accepted the challenge, and after the hike, they dropped their support of a parkway. It was the start of Bill's love affair with the canal and of his close relationship with Justice Douglas. Almost all of the engineering geology concerning the canal's construction and its subsequent designation as a national park was mapped or assembled by Bill for the use of Justice Douglas in preparing the requisite legislation.

During the period of 1954-1955, Bill sailed to Antarctica aboard the icebreaker U.S.S. *Atka* for the purpose of selecting sites suitable for U.S. research stations during the International Geophysical Year. His choices were based on his keen assessment of each site's purpose, its supply needs, and its proximity to its study subjects, whether they were penguins or large ice masses. The Davies Escarpment in Antarctica was named in honor of his work there.

Bill was appointed assistant chief of the Military Geology Branch in January 1955. In February 1956, Bill became chief of the Alaska Terrain and Permafrost Section of the Military Geology Branch. That group consisted of glacial geologists, geomorphologists, and botanists, several of whom had been students of Kirk Bryan at Harvard and who had conducted pioneering studies on the surficial and geomorphologic implications of permafrost. Bill's stewardship provided guidance in utilization of the results of these research studies toward their application to engineering geologic problems. In addition to his administrative duties, Bill resumed his field studies in the ice-free land of northern Greenland. This work was done in cooperation with the

U.S. Air Force for the purpose of establishing austere airfields with little or no construction effort. It was a unique opportunity to do detailed ground investigations of otherwise inaccessible regions and to combine engineering geology with observations of the glacial geology and geomorphology of areas that had been seen only from aerial photos.

In early June 1960, Bill crossed the Greenland Icecap by helicopter and joined a group that had established a base camp at Centrum Lake, northeast Greenland. Using two H-34 helicopters, the group conducted fieldwork from the Centrum Lake base camp from June 14 to July 1, 1960. It was during this period that Bill discovered and explored the farthest north caves in Greenland, at 81 degrees N. These caves, comparable in size to caves in the temperate zones, contained 12 levels in a vertical range of 1000 feet and are valuable indicators of glacial limits in northern Greenland. On July 2, 1960, with two helicopters and a party of ten, Bill led an epic journey across northeast Greenland to Cape Morris Jesup, the northern tip of Greenland. On July 4, 1960, the party was the first to set foot on Coffee Club Island, an offshore moraine and the northernmost land on Earth. Bedrock and unconsolidated materials were mapped, raised marine beaches were measured, and samples were collected, including shells for radiocarbon dating. Several published reports resulting from these investigations established, among other things, that Wisconsin glaciation covered all of northeastern Greenland with a continental ice sheet centered in central Greenland; withdrawal of the ice sheet resulted in marine submergence to a depth of 225 ft (68 m) about 5400 years ago.

In mid-July 1960, Bill and I did detailed fieldwork at a potential unprepared landing site at Bronlund Fjord, Peary Land, Greenland. Our equipment included a then revolutionary, newly designed tent of internal aluminum frame construction. The first order of business was to put up the tent for safety, if not survival. By the time we had assembled the world's largest kite, the Greenland wind obliged us with a trial flight! It was all we could do to hold on to the tent while we searched for rocks big enough to hold down the tent flaps. Of course, we had intentionally chosen a site with few large rocks. After what seemed like hours, we had anchored the tent and crawled in to lie down on our sleeping bags. We were exhausted but triumphant. Bill said, "Can you imagine what that might have looked like if some Eskimos had happened by? We would have become part of their legends in our time!" Our fatigue quickly turned to laughter.

Bill was the ideal field companion: considerate, generous, never complaining, and remarkably calm in emergencies. He was a bear for work, and his interest and curiosity always lured him to just one more outcrop.

The summer of 1960 was a vintage time for fieldwork. After the challenges of Greenland, Bill flew to Alaska in late July to examine potential landing sites in the Aleutians and at Anaktuvuk Pass in the Brooks Range. In August 1960, he traveled to Finnmark, northern Norway, where he mapped the engineering geology of several austere landing sites for NATO. It was a far cry from uninhabited northern Greenland. The Lapps, colorfully clothed, were frequent visitors with their herds of reindeer. Bill, always a part of any community, was invited to the social event of that season at Kautokeino, a sellout filming of "Gone With The Wind." The movie dubbed in Swedish was shown to an all Lapp-speaking audience!

From 1961 through 1966, Bill's summer fieldwork was conducted in the Yukon-Tanana Upland of central Alaska. Using helicopters, Bill mapped the surficial and bedrock geology with engineering interpretation for construction and military operations. During the summer of 1967, he conducted engineering geology studies for the U.S. and Australian governments in the central deserts of Australia. After completion of that work, he transferred to the Engineering Geology Branch of the U.S. Geological Survey.

Bill's work then was primarily in the Appalachians, a region that had first elicited his interest in geology and that would continue to stimulate and challenge him. In late 1967, he made a study of the stability of coal refuse banks and tailings dams in cooperation with the U.S. Bureau of Mines. This was followed by two-year effort to locate suitable sites for missile silos in bedrock east of the Mississippi River. In 1972, Bill was the engineering geologist assigned to

investigate the Buffalo Creek, West Virginia, disaster that involved the failure of a tailings dam made of coal waste. The failure resulted in a 20-30 foot-high wave of highly turbid water that rushed through a narrow valley, inundating 16 small communities with approximately 130 million gallons of water and coalmine debris and killing 120 people. Bill was appointed by the Governor of West Virginia to a commission to investigate the disaster. The investigation, completed in1973, resulted in the enactment of legislation to require regulations for critical elements of contemporary coal-mining procedures, especially the construction of coal-waste impoundments. Bill's 1967 studies had identified many coal-waste dumps, including the tailings dam at Buffalo Creek, that were vulnerable to failure. His report generally had been ignored. After the 1972 disaster, Bill was sought for advice by several governmental agencies.

In 1975, he was asked by the Appropriations Committee of the House of Representatives to determine the cause of cost overruns and to evaluate the safety of Gathright Dam in Virginia. It was designed as a hydro-facility, and had been sited on karst. He was asked by the U.S. Department of Justice in 1977 to determine the safety and the practicality of the tailings dams proposed by the Reserve Mining Company, to prevent discharges into Lake Superior. That same year, he investigated for the Corps of Engineers the failure of the Kelly Barnes Dam at Toccoa, Georgia.

Bill's work on the slope stability of the Appalachians was greatly aided by one of his many dedicated and devoted assistants, Greg Ohlmacher, who worked with Bill from 1975 to 1983. Greg reported that Bill, instead of stopping at the boundaries defined by the Appalachian Regional Commission, decided to extend the mapping in order to complete all of the pertinent 2-degree sheets. That part of the project was completed as a series of 7 ½ minute U.S. Geological Survey open-file maps. Bill was a major contributor to the *Landslide Overview Map of the Conterminous United States,* scale 1:7,5000,000 that was published in 1983. In all, he completed an amazing 1539 maps showing landslides and landslide susceptibility in Pennsylvania, Ohio, and West Virginia. He involved many college undergraduates as interns in drafting and compiling the final landslide maps, and he also took many of these students on short field trips in order that they would understand and appreciate what was involved in the work. In 1980, Bill was assigned to the Geological Survey of Indonesia, through the Agency for International Development, to train engineering geologists and to participate in landslide studies in Java and Sumatra.

Bill read and collected books voraciously. His library was one of the best private collections in Washington, D.C. One day in Vancouver, British Columbia, on his way to Alaska, Bill had to visit just one more bookstore with a fine Arctic collection. As he was negotiating a purchase, Police raided the place. Ye Little Olde Book Shop, unbeknownst to Bill, had a backroom with an extensive porno collection!

His bibliography contains more than 200 titles that embrace most aspects of geology, especially engineering geology, geomorphology, glacial geology, and speleology and attest to the breadth and scope of his accomplishments. In addition to these, there are also 50 military geology publications that have security classification and are not listed. He delivered hundreds of lectures in his well-organized and dynamic style, and guided numerous field trips for aspiring geologists.

Bill received the Antarctic Medal for his outstanding work in that continent in 1954-1955. He was a Fellow of the Geological Society of America, the Arctic Institute of North America, and the Explorers Club, and the American Association for the Advancement of Science. He was a member of the Geological Society of Washington, the Association of Engineering Geologists, and the Virginia Academy of Sciences, and he was president of the National Speleological Society (1954-1956).

No less astonishing than the multiplicity of his professional work efforts and the published results of a prolific scientist was Bill's unsparing dedication to a host of civic causes that required his expertise and that he embraced with vigor, leadership, and inspiration. Bill

represented Falls Church on the Northern Virginia Regional Park Authority for 30 years. Governors Robb and Wilder appointed him to the Cave Board of Virginia and with regard to the C and O Canal, he was the *ex officio* chief engineer for the National Park Service, and a charter member of the C and O Canal Association, of which he had been an officer or on the Board of directors from 1955 until his death.

Whether it was Thule, Copenhagen, or Djakarta, Bill's warmth and personality elicited instant admiration. He had an extensive circle of friends who looked forward to hosting him and Gerry on their numerous travels to international meetings or on exotic field trips. He was generous of his time and efforts with friends and organizations, and whatever he did, he did well.

When Bill retired from the U.S. Geological Survey in July 1983, his career reflected merely a change in direction and emphasis. He continued to work on completing many of his geologic maps and reports, but used more time for his other pursuits. Chief among these was his intense interest in the C and O Canal, particularly the geology displayed along the canal and the engineering features on and adjacent to it. Not content with having mapped every one of its 184.5 miles on foot, frequently accompanied by Gerry, Bill reviewed all of the archival and library material concerning the canal. Mrs. Patricia Eames of the Office of Public Programs, National Archives, admiringly observed Bill's "impressive skills in organizing and preserving the records of the C and O Canal - - for four years he came in twice a week, working from 8:00a.m. to 5:00p.m. each day."

At the time of his death, Bill was preparing a guide to the engineering and geology of the C and O Canal, including a detailed history of the canal with emphasis on the engineering aspects and an annotated bibliography of more than 1000 publications pertaining to the canal. On Saturday, June 23, 1990, Bill led a Smithsonian tour of his beloved canal. Three days later, quite unexpectedly, he departed on his last great journey.

Those of us who were fortunate to have shared his tent, his office, or his council will cherish those memories. Aspiring engineering geologists can marvel and read from his impressive bibliography that attests to the scope of Bill's contributions to his profession.

His loving family includes his wife, Geraldine H. Davies; a daughter, Pamela G. Davies; his son, William H. Davies; a brother, John A. Davies; and a new grandson, Drew William Davies.

Daniel B. Krinsley
Washington, D.C.
13 March 1993

Appendix B

An Event in the Legal History of the Chesapeake and Ohio Canal Company

William E. Davies

The Chesapeake and Ohio Canal was born in legal controversy and throughout its corporate existence it lived under the constant threat of dismemberment by legal processes. It finally collapsed into bankruptcy and trusteeship in its 64th year. Nearly 100 major legal cases involving the Canal Company provide information on little known but fascinating aspects of the canal's history. The case described below was the first one for the company and still remains one of Maryland's greatest legal battles.

Collision at Point of Rocks: The Chesapeake and Ohio Canal v The Baltimore and Ohio Rail Road

As crowds gathered in Baltimore and in Georgetown on July 4, 1828 to participate in the start of construction for both the canal and the railroad, legal action was well underway that could lead to the quick death of either or both companies. The only practical route to the west for both companies was along the Potomac River and for much of the way the topography provided space for only a single right of way. Surveys for the canal showed that a route along the Maryland side of the river was the only possible one for its use. The railroad, in contrast, had surveyed two routes, one along the Maryland side of the river and another farther north. Since 1827 the Rail Road Company had been obtaining quietly a right of way on the Maryland side of the river by purchase or easement and within a year had control of most of the critical sections between Point of Rocks and Cumberland. During the same period the Canal Company was struggling to organize and did little to obtain a right of way above Point of Rocks.

Early in 1828 the Canal Company realized that the Rail Road Company's control of the right of way on the Maryland side of the river threatened to block its construction above Point of Rocks. On the 10th of June 1828 the Canal Company in conjunction with the Potomac Company obtained an injunction in the County Court of Washington County, Maryland: to restrain the B & O from obtaining additional land; to force the railroad to reveal the extent of right of way it controlled; to set aside all conveyance of land obtained by the railroad; and to prohibit county sheriffs from executing warrants for condemnation of land for right of ways.

The B & O reacted quickly on the 23rd of June by filing a bill of complaint in the Chancery Court of Maryland in Annapolis. The bill cited 21 points for overturning the injunction and asked that the Canal Company be restrained from obtaining a right of way at points of conflict above Point of Rocks. On the 24th and 25th of June the railroad filed two additional bills of complaint justifying its actions and asking further restraint of the Canal Company.

The Canal Company answered the bills of complaint citing numerous acts of the Legislature of Maryland to counter the railroad's claims, especially those claims that alleged the Canal Company had lost its rights because it lagged behind the railroad in completing its organization. The Canal Company also charged the railroad was involved in a conflict of interest because it had used U.S. Army topographical engineers to obtain land parcels for the right of way, although the engineers had been assigned only for the purpose of establishing the route of the railroad.

After receiving the evidence, Chancellor Theodorick Bland on July 21, 1829 ordered the three bills of complaint filed by the railroad be consolidated into one. He also ordered an injunction against the Canal Company as requested by the railroad. In the summer and fall of 1829 the Canal Company presented arguments to dissolve the injunction. Chancellor Bland,

however, countered with an order to establish a commission to make surveys and estimates of cost for consolidated construction of the canal and railroad between Point of Rocks and Harpers Ferry and at other points to Cumberland. Jonathan Knight, Chief Engineer of the B & O and Nathan L. Roberts of the C & O worked through the spring of 1830 on the surveys and submitted a report on July 12, 1830.

Based on the surveys the engineers offered a plan of "conjoint" construction that contemplated simultaneous construction of the canal and railroad. The plan provided for the location of the two lines at the "collision" points such that the railroad was on the inland side of the canal. The soil from the cuts would be greatly in excess of the embankment needs of the railroad and would be used to alleviate the deficiency of material for canal embankments. The plan of construction was applicable to five collision points downstream from Harpers Ferry and to 45 miles containing numerous tight places scattered between Harpers Ferry and Cumberland.

Testimony from both sides continued through 1830 and on November 7, 1831 Chancellor Bland issued a decree nullifying the injunction issued by the Washington County Court and making permanent the B & O injunction against the Canal Company. He also ordered the Canal Company to pay all court and survey costs. The Canal Company appealed immediately and the case moved to the Maryland Court of Appeals.

The Canal Company solicited an early decision from the Court of Appeals and the case was argued from December 26, 1831 to January 2, 1832. Walter Jones and A.C. Magruder represented the Canal Company. The attorneys for the Rail Road Company were Daniel Webster and Riverdy Johnson. The arguments presented to the Chancellor were heard again. Three major points were reviewed: (1) When did the railroad and the canal companies obtain their rights? (2) What rights were granted in the Canal Company's charter? and (3) What rights did the Canal Company derive from the Potomac Company? On January 4, 1832 the Court of Appeals by a vote of 3 to 2 reversed the decree of Chancellor Bland and dissolved the injunction obtained by the Rail Road Company.

Although the Canal Company's position prevailed, it was the loser in the long run. The four years of delay in court proceedings brought it perilously close to the time limit as established by its charter for completion to Cumberland. Although the company had power to continue construction its funds were inadequate. Aggravating this was the great inflation in construction costs that had developed during the period of court action. The railroad had the funds but lacked the power to continue construction. During the time of the court proceedings: the railroad proved that it was a viable form of transportation; it successfully applied steam locomotives to haul trains; and it was forced to adopt a route west of Harpers Ferry on the south side of the river, which because of the topography, placed the roadbed above the level of most floods of the river.

After the Court of Appeals decision the two companies were faced with working out a compromise for construction between Point of Rocks and Harpers Ferry. The railroad put forth a plan for "conjoint" construction but was rebuffed by the Canal Company. Pressure from the Maryland Legislature finally produced an agreement that allowed the Canal Company to build both the railroad and the canal at the tight points at a cost not to exceed $100,000. The railroad agreed to subscribe to 2500 shares of stock ($250,000) of the Canal Company. However, the railroad settled with the Canal Company for $226,000 in lieu of the cost of construction and the stock subscription. The railroad also agreed not to use the Maryland side of the river for a right of way until the canal reached Cumberland or until 1840 if the canal was not completed.

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