MASTER DRAINAGE
and
FLOODPLAIN MANAGEMENT PLAN
for
CITY OF CHARLESTON, SOUTH CAROLINA

JOSEPH P. RILEY, JR., MAYOR

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DAVIS & FLOYD, INC.
CONSULTING ENGINEERS

MAY 1984

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SECTION I

PURPOSE AND SCOPE

Stormwater drainage is a major problem in the City of Charleston. The existing facilities for the removal of stormwater runoff at an acceptable level are inadequate in a large portion of the City, as is evidenced by the numerous and recurrent incidents of surface flooding during periods of moderate to heavy rainfall.

The severity of flooding varies from area to area and with the intensity and duration of the rain. Flooding can result in hardships to the City residents in the form of disruption of vital services and the loss of mobility and income. In some instances, the flooding has also resulted in property loss or damage, and most importantly, has posed a potential hazard to the health and safety of the population. With the continued growth, and the resulting land development, the frequency of flooding and its impact can only be expected to increase due to the increased quantities and concentration of stormwater runoff.

In recognition of the problem and the need for remedial action, the City of Charleston engaged Davis & Floyd, Inc. to provide the engineering services necessary to analyze and recommend corrective measures for the existing stormwater facilities in the City of Charleston. The study area comprises all of the area within the Charleston City boundaries as delineated on Figure No. 1 - Location Map.

The agreement between the City and the Engineers is the first of four phases required to reduce the City's existing drainage problems. The phases are as follows:

1. First Phase - study and report on the condition and capabilities of the existing stormwater drainage facilities and make recommendations as to improvements required.

2. Second Phase - secure funds for the construction of recommended improvements.

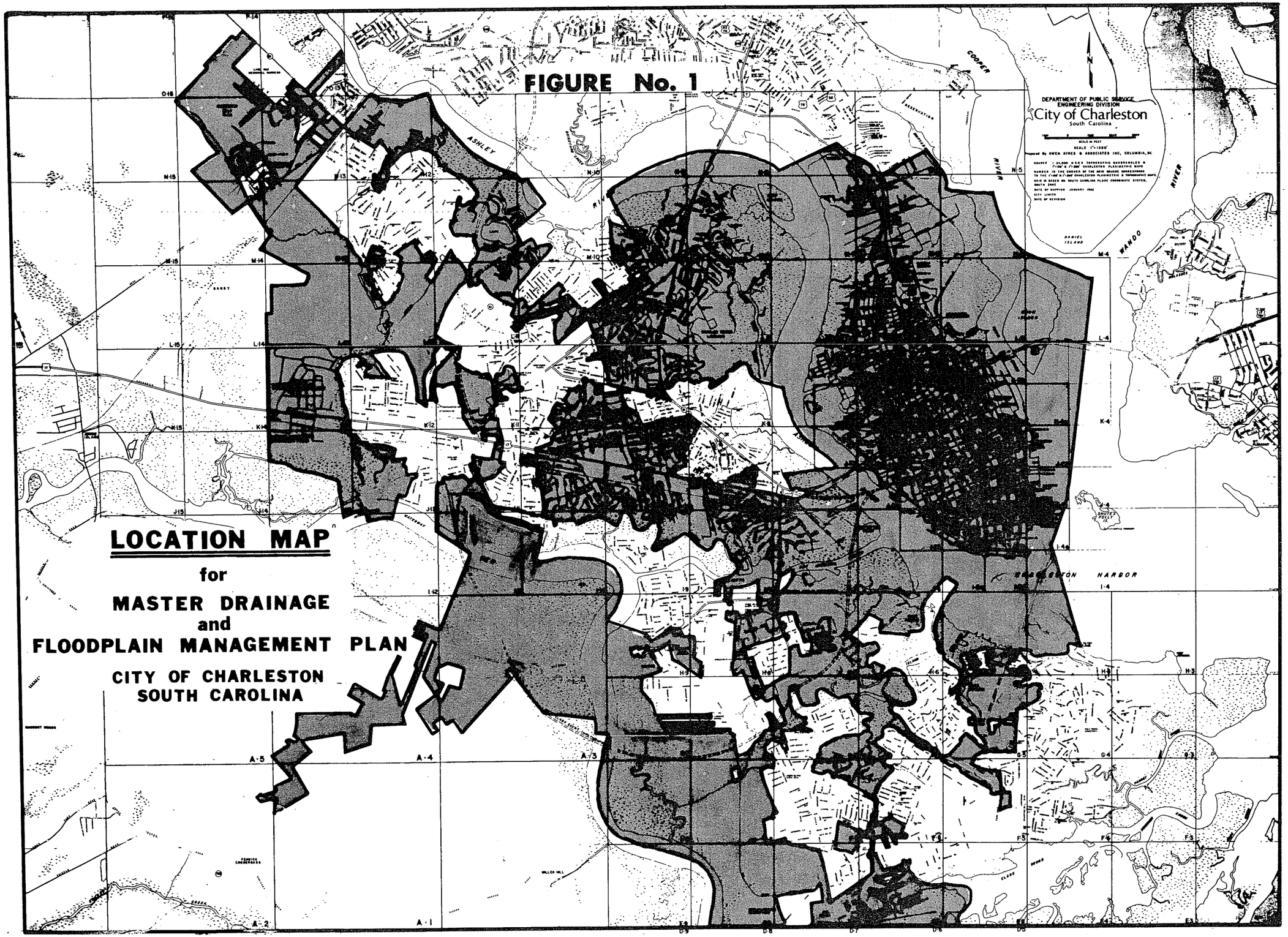
3. Third Phase - preparation of plans and specifications for recommended improvements.

4. Fourth Phase - construction of recommended improvements.

This report is submitted in compliance with the agreement between the City and the Engineers and constitutes completion of the First Phase of identifying the existing drainage problems and recommending improvements.

The flooding which is frequently experienced in the City of Charleston can be attributed to a number of causes, specifically: flat terrain which reduces runoff capacity; improper sizing and spacing of stormwater inlets; clogged inlets, pipes, culverts, and ditches; high ground water table; undersized pipes, culverts, and ditches; and tidal influence. While all of these causes will be addressed to some

FIGURE No. 1


DEPARTMENT OF PUBLIC SERVICE
ENGINEERING DIVISION
City of Charleston
South Carolina
SCALE 1"=1320'
Prepared by OWEN AYRES & ASSOCIATES INC, COLUMBIA, SC
DATE OF MAPPING JANUARY 1982
CITY LIMITS
DATE OF REVISION
ASHLEY
COOPER
RIVER
WANDO
DANIEL ISLAND
CHARLESTON HARBOR
SHUTES FOLLY IS.
SANDY
MILLER HILL
CLARK
HUGER
LOCATION MAP
for
MASTER DRAINAGE
and
FLOODPLAIN MANAGEMENT PLAN
CITY OF CHARLESTON
SOUTH CAROLINA

extent in the subsequent sections, the primary focus of this study pertains to the analysis of major (24 inch diameter or larger) stormwater conveyance facilities with the detailed improvements addressed as the major drainage improvements are implemented.

This report presents the results of a field survey of the major existing drainage facilities, the methodology developed for use in evaluating the existing facilities, specific recommendations as to improvements needed to provide an adequate and coordinated stormwater drainage system for the City of Charleston, a floodplain management program recommendation, the estimated construction and total project costs for the proposed improvements, and a schedule for their construction on a priority basis. Subsequent sections of the report contain discussions of the following:

The Study Area. This section includes a description of the boundaries, topography, land use and other characteristics of the area which are pertinent to the design and configuration of stormwater drainage facilities.

Design Criteria. This section evaluates rainfall and tidal data, discusses the degree of protection desired or economically feasible, and develops a specific design criteria for use in the evaluation of the existing system and the design of proposed improvements.

Evaluation of Existing Stormwater Drainage Facilities and Recommended Improvements. Included in this section are detailed descriptions and evaluations of the existing drainage system components as to type, condition and capacity, and the designation of those which are deficient and require replacement, enlargement or relief. Preliminary designs have been prepared and total project cost estimates for the recommended facilities are presented.

Construction Program. Components of the overall recommended facilities are rated on the basis of capacity deficiency, greatest benefit to the most people at least cost, most urgent need, and health and safety of the public. A priority construction program based upon the above has been developed for recommended drainage improvements within the City.

Floodplain Management Program. This section presents a recommended program that the City should consider implementing to assure that future development in the City will be compatible with an orderly drainage plan so that new developments will not have an adverse impact upon the drainage of areas either upstream or downstream of the proposed development site.

SECTION II

THE STUDY AREA

The Study Area is the area inside the corporate limits of the City of Charleston as of May 1984, as illustrated on Figure No. 1. The area is bounded on the north by the Ashley River and the City of Charleston/City of North Charleston city limits, on the east by the Cooper River, on the south by the Stono River and the City of Charleston/Charleston County line on James Island, and on the west by the City of Charleston/Charleston County line in the West Ashley area and on Johns Island.

Although the detailed investigations and recommendations developed in this Study have been limited to the area described, the impact of stormwater runoff entering the areas from outside the corporate boundaries has been considered in the evaluations and recommendations. In addition, the stormwater runoff generated from several of the areas must pass through areas outside the City boundaries prior to discharge into one of the several receiving tributaries. The characteristics and capacities of these tributaries have also been analyzed.

To perform the investigations for the study, the areas were divided into individual drainage basins. A drainage basin is an area from which the runoff generated is discharged via one outfall system.

The physical characteristics of each drainage basin within the Study Area influences the quantity of stormwater runoff from the area, and therefore influences the stormwater drainage facilities used to transport that runoff. Physical characteristics include topography, land use, type and extent of development, soil and surface cover, and environmental features. Each of these characteristics and the effect of their influence is described in the following paragraphs.

Topography

Surface elevations within the Study Area range from mean sea level (MSL) to a maximum of 25 feet above mean sea level in the West Ashley area and can be characterized as low-lying, slightly undulating and gently sloping. Surface slopes are generally 1 percent or less, and slope to one of the several rivers or tributaries which surround the area, i.e., Cooper River, Ashley River, Stono River, etc.

Drainage systems have been installed throughout the Study Area and the drainage patterns established by the existing systems have been adhered to in the study. The configurations and limits of the areas drained by each of the existing systems have been determined by field surveys and observations.

The field surveys have resulted in the delineation of 182 separate drainage basins. Each of the basins has one separate outlet to either the Cooper River, Ashley River, Stono River, or James Island Creek, and each has been evaluated independently of adjacent areas. A discussion of each of the drainage basins is presented in Section IV, "Evaluation of Existing Stormwater Drainage Facilities." Section IV contains a detailed description of the limits, characteristics, and existing

drainage facilities, as well as recommended improvements for each of the drainage basins.

The influence of the topography of the Charleston area may be either beneficial or detrimental insofar as stormwater runoff protection is concerned. The flat slopes tend to result in storage of a portion of the rainfall in numerous shallow depressions and also to increase the quantities of rainfall which percolates into the ground. Overland flow velocities are also lower which increases the time for runoff to concentrate at specific points in the collection system. The low ground elevations and the very flat slopes result in areas for which protection is very difficult, especially during storms which occur at or just before high tide. Much of the development within the Peninsular City area is in fact impractical to protect without the use of stormwater pumping stations. The areas which can be protected by gravity flow require much larger diameter conduits than would be required for more steeply sloping areas.

Land Use and Development

The City has been divided into four separate and distinct study areas; (a) Peninsula, (b) West Ashley, (c) James Island, and (d) Johns Island. At present less than 65 percent of the land within the Study Area has been developed. Of those areas which have been developed, approximately 65 percent is designated for residential use, of which about two-thirds is single family dwellings. Single family type dwellings predominate the James Island and West of the Ashley areas, whereas the number of residential and multi-family dwellings is about equal in the Peninsular City area. General business, commercial, and institutional areas constitute approximately 25 percent of the area. These areas are located on the major traffic arteries in the James Island and West Ashley areas. In the Peninsular City area this type of development is diversely located, especially in the area south of the Crosstown Expressway. Industrial development comprises the remaining 10 percent of the area and is concentrated mainly in the northern section of the Peninsular City area above Mt. Pleasant Street.

The area which lies west of Ashley River Road and north of Highway 17 will undergo the greatest amount of transformation in the future. This area is an old phosphate strip mine area and presently is mostly undeveloped. The present runoff collects in the strip mined ridge and valley network and drains slowly to either Church Creek or Long Branch Creek. Development of the area will fill in the valleys and channelize the runoff to one of the receiving tributaries, resulting in increased peak and total flows if floodplain management is not utilized. Hydraulic analysis of Long Branch Creek was performed assuming full development of the drainage area with no floodplain management. The hydraulic analysis of the Church Creek drainage basin was performed assuming present development of the basin with floodplain management requiring future peak discharge equal to present peak discharge. The results of the comparative analysis of these drainage basins are included in Section IV.

Those areas which are presently not developed to potential in the James Island and Johns Island area will require careful planning to assure proper drainage. The majority of the areas will discharge directly to the Stono River or James Island Creek and their development should have a minimal effect on the drainage of the area if adequate facilities are planned for upstream runoff prior to development.

Soils

The soils throughout the Study Area are of marine or fluvial origin and consist of sediments ranging in particle size from clay to fine sand. The Soil Conservation Service and Forest Service of the U.S. Department of Agriculture have conducted extensive studies of the soils within the Study Area. The results of the studies have been presented in reports entitled "Feasibility Study of Requirements for Main Drainage Canals" dated 1963; and "Soil Survey, Charleston County, South Carolina", dated 1971. The locations, descriptions and characteristics of soils within the Study Area have been excerpted from these reports.

During the above referenced studies, soils with distinct characteristics and profiles were identified and classified in accordance with uniform national procedures. They were then placed in associations in which two or more soil types occur in a distinctive proportional pattern. The name of each association consists of the names of its principal soil components arranged in order of most prevalent to least prevalent.

The approximate boundaries of the soil associations which have been identified within the Study Area are shown in Appendix C, along with a detailed description of each. Those soil associations discussed include Chipley-Lakeland, Wando-Seabrook, Kiawah-Seabrook-Dawhoo-Yonges-Hockley-Edisto, Tidal Marsh, Mine Pits-Dumps-and-Made Land.

Several general conclusions can be drawn from the types of soils found in the Study Area:

1. Velocity of runoff from most of the unpaved areas will be slow.

2. A large percentage of the rainfall will percolate into the ground or be absorbed by vegetation.

3. Bottom and side slopes of drainage ditches will be subject to erosion unless protected or unless the velocity of flow is restricted to 2 to 3 feet per second or less.

Environmental Features

The Study Area has numerous environmental features which are of importance to the conduct of the study, and will have significant impact upon future construction. The most important of these are the tidal wetlands and archaeological and historic sites.

Tidal wetlands will probably have the most impact upon the future construction of stormwater drainage facilities. They are important to the environment in that they provide a nursery and source of food for various forms of aquatic life; fish, shrimp, oysters, etc. Wetlands are located along the Cooper River, Ashley River, Stono River and James Island Creek, and are controlled by federal and state law. A project which may disrupt or change the character of these areas must be reviewed and permitted by the U.S. Corps of Engineers and the South Carolina Coastal Council. Not only must a permit be obtained for new construction, but also for any maintenance of existing drainage facilities which will require excavation in these wetland.

Numerous historic and archaeological sites are located within the Study Area. Drainage projects which may in any way affect these areas must be carefully planned to assure their protection. A complete list of historical and archaeological sites may be obtained from the South Carolina Department of Archives and History.

The construction of proposed stormwater drainage projects will also adversely influence air quality and noise levels to some extent. However, the influences will be felt only during construction and will be localized and temporary in nature.

SECTION III

DESIGN CRITERIA

The design of stormwater drainage facilities for the study area and the degree of protection provided by those facilities is directly related to the intensity and duration of rainfall and the percentage of impervious land surface which influences the quantity of stormwater runoff. The capacity of the existing stormwater drainage facilities is also influenced by the tidal elevations of the receiving waters. Values selected for these factors, and the design methodology adopted for use in sizing drainage systems are discussed in the following paragraphs. The design data will be used for both evaluation of the existing stormwater drainage facilities and the development of proposed remedial stormwater drainage works in Section IV.

Rainfall Frequency - Duration - Intensity Relationships

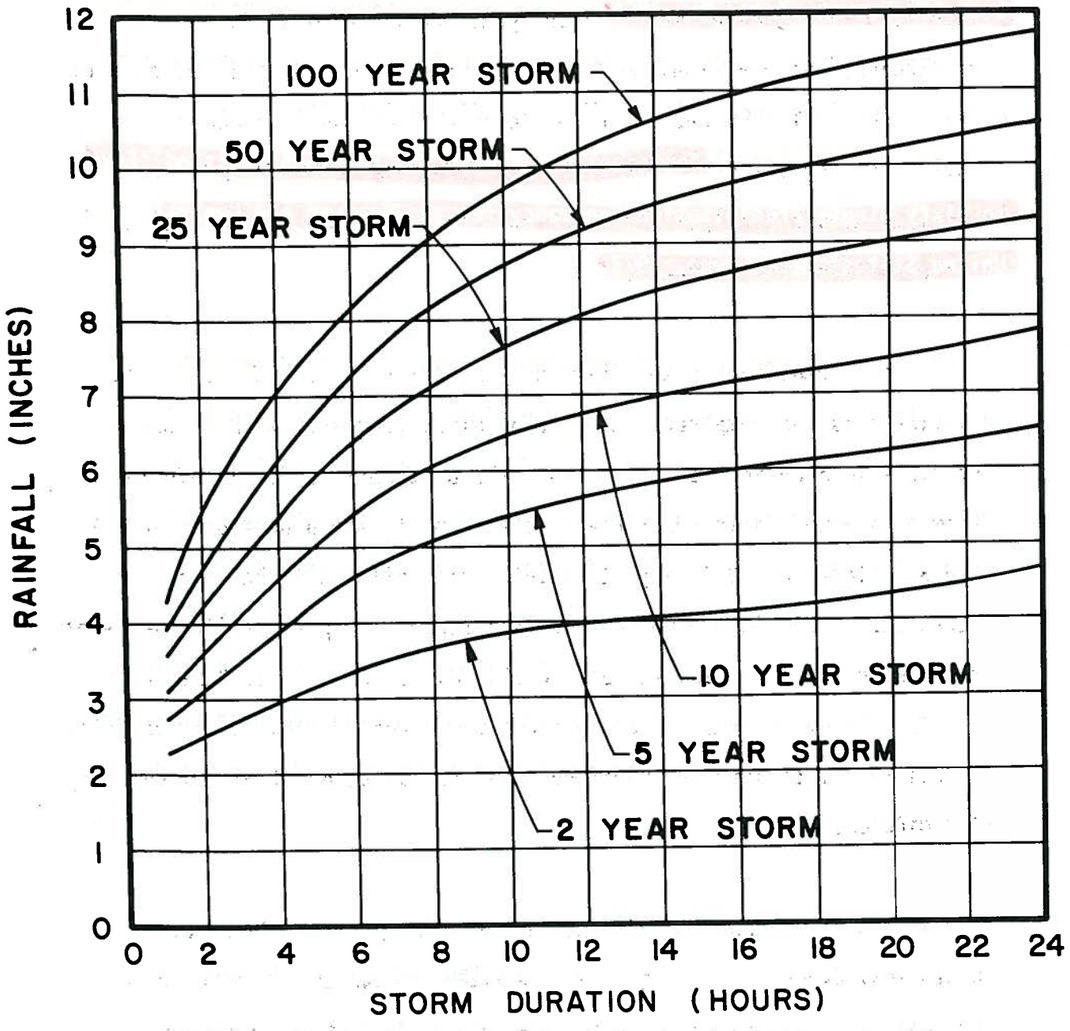
The U.S. Weather Bureau has maintained rainfall monitoring stations at two locations in the study area for many years. One station is at the U.S. Customs house located on East Bay Street and has been in operation since 1897. Another station is at the Charleston International Airport and has been in operation since 1931.

The U.S. Weather Bureau has compiled and analyzed the rainfall records from these stations, as well as other stations throughout the United States, and developed statistical relationships between rainfalls of various duration and magnitude and their frequency of occurrence. The results of the analyses are reported in several publications, two of which have been adopted for use in this study. The first of these is Technical Paper No. 40 entitled "Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years", dated May 1961 and prepared by David M. Hershfield for the Engineering Division, Soil Conservation Service, U.S. Department of Agriculture. The second is the National Oceanic and Atmospheric Administration's (NOAA) Technical Memorandum NWS HYDRO-35 entitled "Five to Sixty Minute Precipitation Frequency for the Eastern and Central United States" dated June, 1977.

Data pertaining to the Charleston Area was extracted from these publications and compared with data obtained from the two monitoring stations located in the study area. The pertinent rainfall information from these publications has been plotted and is shown on Figure Nos. 2 and 3. Figure No. 2 is a plot of total rainfall, in inches, for durations of 30 minutes to 24 hours and for return periods (frequency of occurrence) of 2, 5, 10, 25, 50 and 100 years. Figure No. 3 has been developed from the same data base; but total rainfall has been converted to rainfall intensity in inches per hour for durations from 5 minutes to 120 minutes.

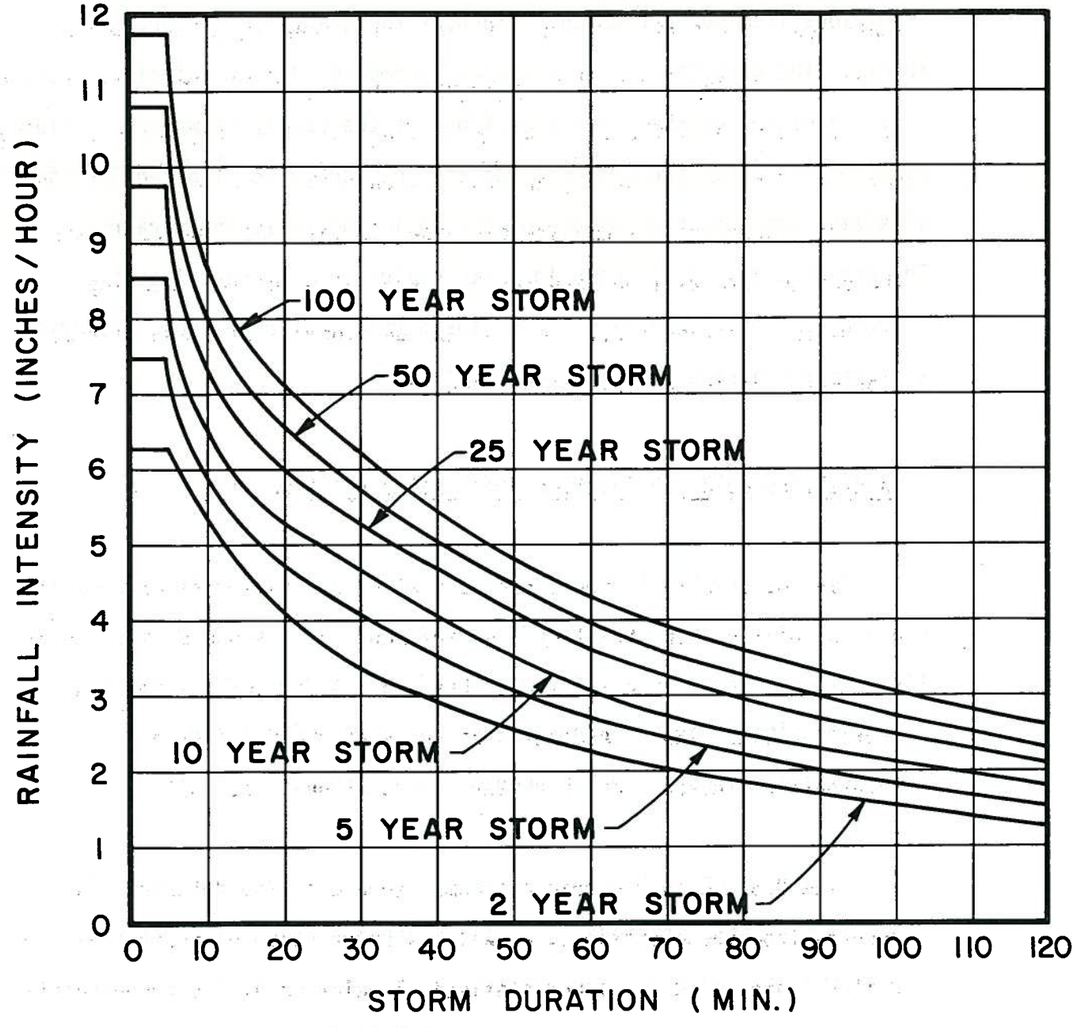
It must be acknowledged that the data, as plotted, is based on historical events. It is generally accepted, however, that the data presented, particularly for rainfalls of 25 year return frequency or less, are applicable to the future. The data has accordingly been adopted for use in the study.

FIGURE No. 2



CITY OF CHARLESTON
RAINFALL CURVE

FIGURE No. 3



CITY OF CHARLESTON
RAINFALL CURVE

Design Storm

The first step in the plan for the analysis of stormwater drainage facilities is the selection of a design storm, or the level of protection desired. A design storm is a statistical relationship between the amount of rainfall in the specific time period (intensity), and the amount of time between rainfalls of similar intensity. The storm frequencies selected are statistically average frequencies of occurrence based on long periods of historical data. It should be emphasized that storms of such magnitude are historical and may occur more or less frequently over short durations.

Drainage facilities may be designed to handle the runoff from a wide range of rainfall intensities depending upon the degree of protection required or desired. In theory, the selection of the design storm should be selected on a compromise or cost-benefit basis, which strikes a balance between the costs of installing drainage facilities and the potential costs related to flooding and resulting in possible property damage, injury or loss of life, loss of income or business and general inconvenience. While reasonable estimates of property damage costs may be made, it is very difficult, if not impossible, to place a dollar value on the potential for injury or loss of life and the other enumerated detrimental effects of flooding. Such detail, furthermore, is seldom warranted. For this reason, it is usual practice to adopt design rainfall intensities and frequencies on the basis of knowledge of the area, experience and judgement. This latter approach is considered adequate for the land uses and intensity of development which exist in the Study Area and has been adopted for purposes of the study.

Local governmental agencies have established stormwater design criteria. Current County of Charleston design standards require protection from an average 5 year frequency storm for local street, parking and yard areas and an average 100 year frequency for interior flooding of residential, commercial and industrial structures. The South Carolina Department of Highways and Public Transportation has adopted the following design standards:

1. Pipes across Secondary Roads - average 25 year frequency.

2. Pipes across Primary Roads and Interstates - average 50 year frequency.

3. Storm Sewers draining up to 40 acres - average 10 year frequency.

4. Storm Sewers draining over 40 acres - average 25 year frequency.

The above design frequencies are based on free flow in piping systems without a build up of headwater at pipe entrances. In addition to this design storm the Highway Department also checks the design of all new construction on Primary Roads and Interstates to insure that the pavement will not be overtopped by an average 100 year frequency storm.

This is based partially on the need for mobility of emergency vehicles during major storm events.

The current City of Charleston Design Standards specify that drainage facilities must have free flow during a 5 year frequency storm for all new drainage construction. For purposes of evaluation of existing systems and remedial improvements a 5 year frequency storm has been adopted for the study area, with the exception of the Peninsular City extending from the Battery to the Crosstown Expressway, for which a 10 year frequency storm has been adopted. The 10 year frequency storm was adopted for the Peninsular City because it is the center for medical facilities and commerce for the Study Area. Flooding which results in this area creates a threat to the health of the Study Area's residents due to the inaccessibility to the medical facilities, and may result in significant economic loss for the entire area. This design basis will provide, however, for a degree of protection greater than 5 or 10 years for road and structure flooding since ponding at pipe entrances and increased water elevations during less frequent storm events will increase the capacity of the system. During actual design, it is recommended that the effect of an average 100 year frequency event be checked to insure that primary roads and structures remain above flood elevation.

In summary, it is recommended that the following storm event frequencies be utilized for new stormwater facility design.

1. Channels and piping systems without headwater surcharge:

   a. Peninsular City (Battery to Crosstown Expressway) - 10 year frequency.

   b. Remainder of Study Area - 5 year frequency.

Protection from storms of greater intensity should be provided in those instances in which the incremental cost for providing such additional protection is nominal or believed to be justified to maintain vital services and to protect life or specified properties. Drainage systems may also be designed for storms of lesser intensity in an effort to reduce the cost of improvements; however, the savings in project cost will reduce the level of protection received. The design storm chosen for this study is the minimum recommended to obtain maximum utilization of funds.

Stormwater Runoff

The amount of runoff from any rainfall is equal to the quantity of rainfall minus losses due to infiltration, depression storage, interception by vegetation, and evaporation. The quantities of rainfall which are lost due to infiltration (percolation into the ground) and depression storage is substantial in the majority of the study area, particularly in the western section of which only a small percentage is presently developed. Small quantities are lost to evaporation and transpiration from vegetation.

Over the years, coefficients of runoff have been developed empirically to express the relationship between rainfall and runoff. These take the above listed losses into consideration and provide for adjustments to reflect differences in area characteristics. They have been and are widely used. More recently a number of investigations have been conducted in other parts of the country in attempts to establish more precise relationships between rainfall and runoff for specific drainage areas. These studies have involved detailed analysis of the drainage areas and extensive flow gauging. The analysis has been further complicated by the fact that the relationship is not constant but varies with the conditions prevailing prior to the rainfall and with the rainfall pattern itself. Considering the many variables involved and the time and effort required, the conduct of a similar study for the Charleston area is not believed to be warranted. It is questionable, furthermore, that the investigation would result in runoff coefficients sufficiently different to significantly affect the study results. For these reasons, established empirical coefficients have been adopted for use in the study. The coefficients vary to some extent depending upon the method selected for computing runoff.

Two technical sources for runoff computation have been adopted for use in the study, the Rational Method and Technical Release No. 55, by the Soil Conservation Service. These studies and the coefficients of runoff adopted for each are described below.

Rational Method

The Rational Method is the most widely used and simplest method for computing runoff from urban areas and is expressed by the formula Q = CIA where:

Q = rate of runoff in cubic feet per second.

A = area to be drained in acres.

C = Coefficient of runoff based on the percentage of impervious area.

I = rainfall intensity in inches per hour at the time at which flows from all parts of the drainage area are concentrating at the point in the system under investigation.

The method assumes that rainfall is uniform over the entire drainage area and that rainfall intensity is also uniform throughout the time of concentration. These assumptions are valid for small drainage areas up to 200 acres. The Rational Method has been adopted for the analyses of all small drainage areas tributary to the main streams of the Study Area. Runoff quantities computed for evaluation and design purposes have been based upon the rainfall intensities from Figure 3 and the coefficients of runoff listed in Table 1.

TABLE 1

RUNOFF COEFFICIENTS
CITY OF CHARLESTON
MASTER DRAINAGE AND FLOODPLAIN MANAGEMENT PLAN
(ASCE MANUAL NO. 37)

DESCRIPTION OF AREA	RUNOFF COEFFICIENTS
Business, downtown	0.90
Business Neighborhood	0.70
Residential, Single Family	
Lot size:	
1/2 acre or greater	0.35
Less than 1/2 acre	0.45
Apartments	0.60
Industrial, Light	0.70
Industrial, Heavy	0.80
Parks, Cemetaries	0.25
Playgrounds	0.25
Unimproved	0.15

TABLE 2

RUNOFF CURVE NUMBERS
CITY OF CHARLESTON
MASTER DRAINAGE AND FLOODPLAIN MANAGEMENT PLAN
(TR-55 Method)

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP*			
	A	B	C	D
Business, Downtown (85% Impervious)	89	92	94	95
Business, Neighborhood (65% Impervious)	83	88	92	94
Residential:				
Single Family (30% Impervious)	57	72	81	86
Multi-Family (65% Impervious)	77	85	90	92
Industrial, Light (72% Impervious)	81	88	91	93
Industrial, Heavy (85% Impervious)	89	92	94	95
Parks, Cemetaries	39	61	74	80
Playgrounds	49	69	79	84
Unimproved:				
Wood or Forest Land:				
Thin Stand, Poor Cover	45	66	71	83
Good Cover	25	55	70	77
Meadow: Good Condition	30	58	71	78

* Soil Groups: See Appendix C for description of soil groups.

Technical Release No. 55

For drainage systems over 200 acres or those influenced by tidal fluctuation where storage or retention is available, the Rational Method is not very accurate. For these systems the procedures and criteria set forth in the Soil Conservation Service (SCS) Technical Release No. 55, dated January 1975, have been utilized. This method is essentially an adaptation of the widely used and accepted hydrological analysis of rural watersheds to urban conditions. As in the Rational Method, runoff computed by this method is a function of area, rainfall, surface cover and soil characteristics and time of runoff travel. It is based upon a storm duration of 24 hours and uses an empirical relationship of these factors to produce a stream hydrograph. The hydrographs developed for study purposes have been based on the total 24 hour rainfall from Figure 2 and the coefficients of runoff listed in Table 2 for various soil types and surface conditions. Appendix C contains a discussion of the soil classifications in the City. Each soil association has been subdivided into specific hydrological soil groups as discussed in Technical Release No. 55.

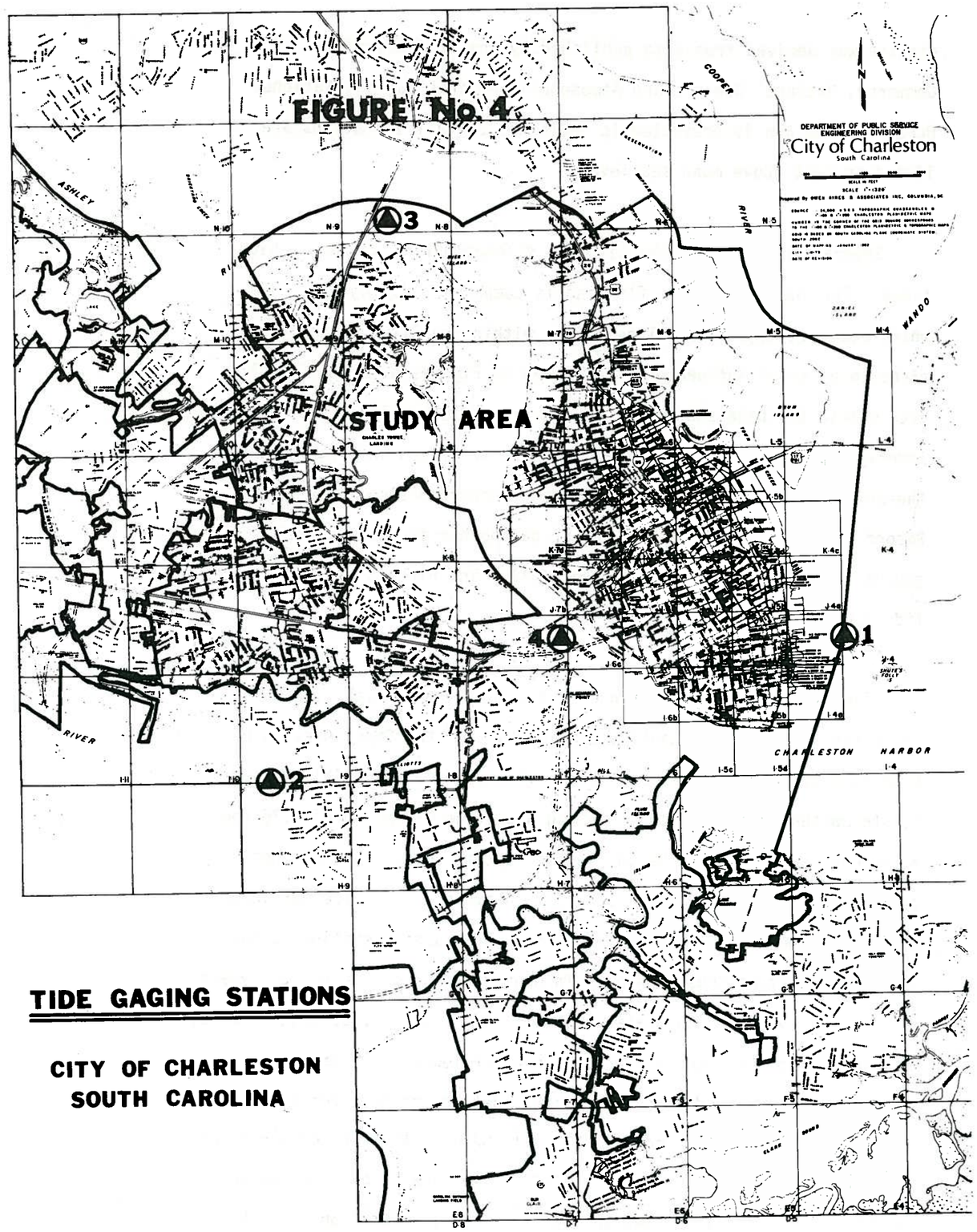
In both of the above methods it has been assumed that the characteristics of present developed areas will not change appreciably in the future. For undeveloped areas, assumptions based on their future developed condition have been used rather than their present or natural state.

Tidal Influence

All surface water runoff from the Study Area discharges to tidal estuaries. The tide level in these estuaries during periods of rainfall influences the capacity of the drainage systems in that the tide level establishes the elevation of the downstream hydraulic gradient for each of the systems. The magnitude of the impact depends, to a large extent, upon the amount of storage available in the downstream areas to retain surface water until the tide recedes. The impact from tides is greatest for the Peninsular City area because past development filled the marsh lands which surrounded and traversed the Peninsular City resulting in the loss of available storage areas. The potential for property damage is also greatest in this area since the majority of the area lies either in flood zone A or B as established by the Federal Insurance Administration. Flood Zone A and B are defined as follows:

ZONE	EXPLANATION
A	"Areas of 100-year flood; based flood elevations and flood hazard factors not determined."
B	"Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood."

Tide stations are maintained on the Cooper, Ashley and Stono Rivers by the National Oceanic and Atmospheric Administration. The location of four of these stations pertinent to the Study Area is shown on Figure 4. The normal mean high tide and estimated highest water level for each



station was derived from data published by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service and is presented in Table No. 3. All elevations are listed as feet above mean sea level.

Several areas within the City are flooded during extremely high tides. For these areas the flooding is compounded during rainfalls which occur at high tide. Those areas within the City which are affected by tidal influence are depicted on Figures 5, 6 and 7. The area within the blue shading represents areas below elevation 4.36 MSL (average spring tide), and the area within the green shading represents the area below elevation 8.9 MSL (highest recorded tide elevation). Record high tide levels usually occur during hurricanes and are generally accompanied by intense rainfall. The highest recorded storm tide levels are listed in Table No. 4.

The differences in the range of the normal mean high tide elevations for the four gauging stations within the Study Area is not significant. For this reason, and in view of many intangibles inherent to stormwater system design, a spring high tide elevation of 4.36 feet above mean sea level at the Charleston Customs House has been adopted as the design for the study. Spring high tides occur twice per lunar month at or near both full and new moon. The gauging station at the Charleston Customs House has been in operation for sixty-one (61) years, and its fairly consistent data is considered reasonably accurate. Also, maximum rainfall may occur at either high or low tide or at any intermediate level and since no reliable data as to the probable frequency of concurrent maximum rainfall and high tide are available at this time, the drainage facilities recommended are sized to accommodate design storm rainfalls at the spring-tide elevation of 4.36 feet MSL.

TABLE 3

TIDE GAGING STATIONS

STATION NO.	LOCATION	MEAN HIGH WATER (M.S.L.)	ESTIMATED HIGHEST WATER LEVEL (M.S.L.)
1.	Charleston Customs House	3.03	8.08
2.	Welch's Wharf, Stono River	2.55	7.95
3.	Cosgrove Bridge, Ashley River	2.80	8.20
4.	South Ashley River Bridge	2.65	7.85

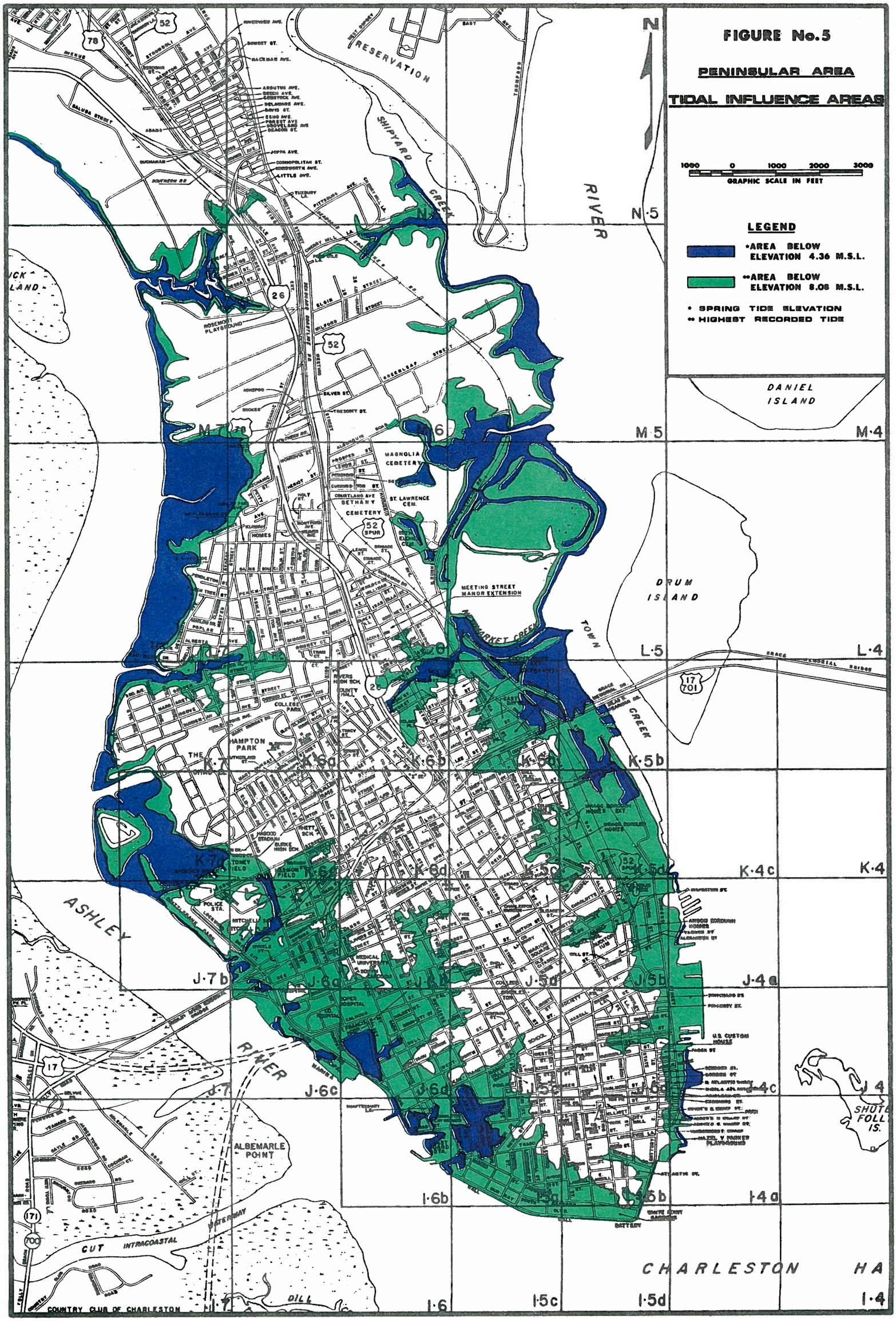
Source: U. S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Survey

TABLE 4

STORM TIDES IN CHARLESTON, S.C.

DATE	TIDE ABOVE MSL
August 28, 1893	8.9
August 11, 1940	8.0
August 27/28, 1911	7.9
September 27/28, 1894	7.0
September 29, 1959 (Gracie)	6.0
October 15, 1947	6.0
July 14, 1916	5.9
September 4, 1979 (David)	5.9
October 20, 1944	5.8
September 18, 1928	5.6
August 17, 1955 (Diane)	5.2
September 11, 1960 (Donna)	5.0
September 18/19, 1955 (Ione)	4.4
August 11, 1955 (Connie)	4.3
October 15, 1954 (Hazel)	4.2
August 29/30, 1954 (Carol)	4.2
August 30, 1952 (Able)	4.0
September 27, 1958 (Helene)	3.9

Source: Corps of Engineers (1966) Table 1.
National Geodetic Vertical Datum of 1929.
- used for all elevations ?


FIGURE No.5
PENINSULAR AREA
TIDAL INFLUENCE AREAS
1000 0 1000 2000 3000
GRAPHIC SCALE IN FEET
LEGEND
*AREA BELOW ELEVATION 4.36 M.S.L.
**AREA BELOW ELEVATION 8.06 M.S.L.
* SPRING TIDE ELEVATION
** HIGHEST RECORDED TIDE
N
RESERVATION
SHIPYARD
GREEN
RIVER
DANIEL ISLAND
DRUM ISLAND
MEETING STREET MANOR EXTENSION
MARKET CREEK
TOWN
GREEN
ASHLEY
RIVER
ALBEMARLE POINT
INTRACOASTAL WATERWAY
CUT
CHARLESTON HA
SHUTE FOLL IS.
MAGNOLIA CEMETERY
ST. LAWRENCE CEM.
COMSTOCK AVE BETHANY CEMETERY
HAMPTON PARK
COLLEGE PARK
ROSEMONT PLAYGROUND
COUNTRY CLUB OF CHARLESTON
N·5
M·5
M·4
L·5
L·4
K·5b
K·4c
K·4
J·7b
J·6a
J·5d
J·5b
J·4a
J·6c
J·6d
J·5c
J·4c
I·6b
I·6a
I·5b
I·4a
I·6
I·5c
I·5d
I·4

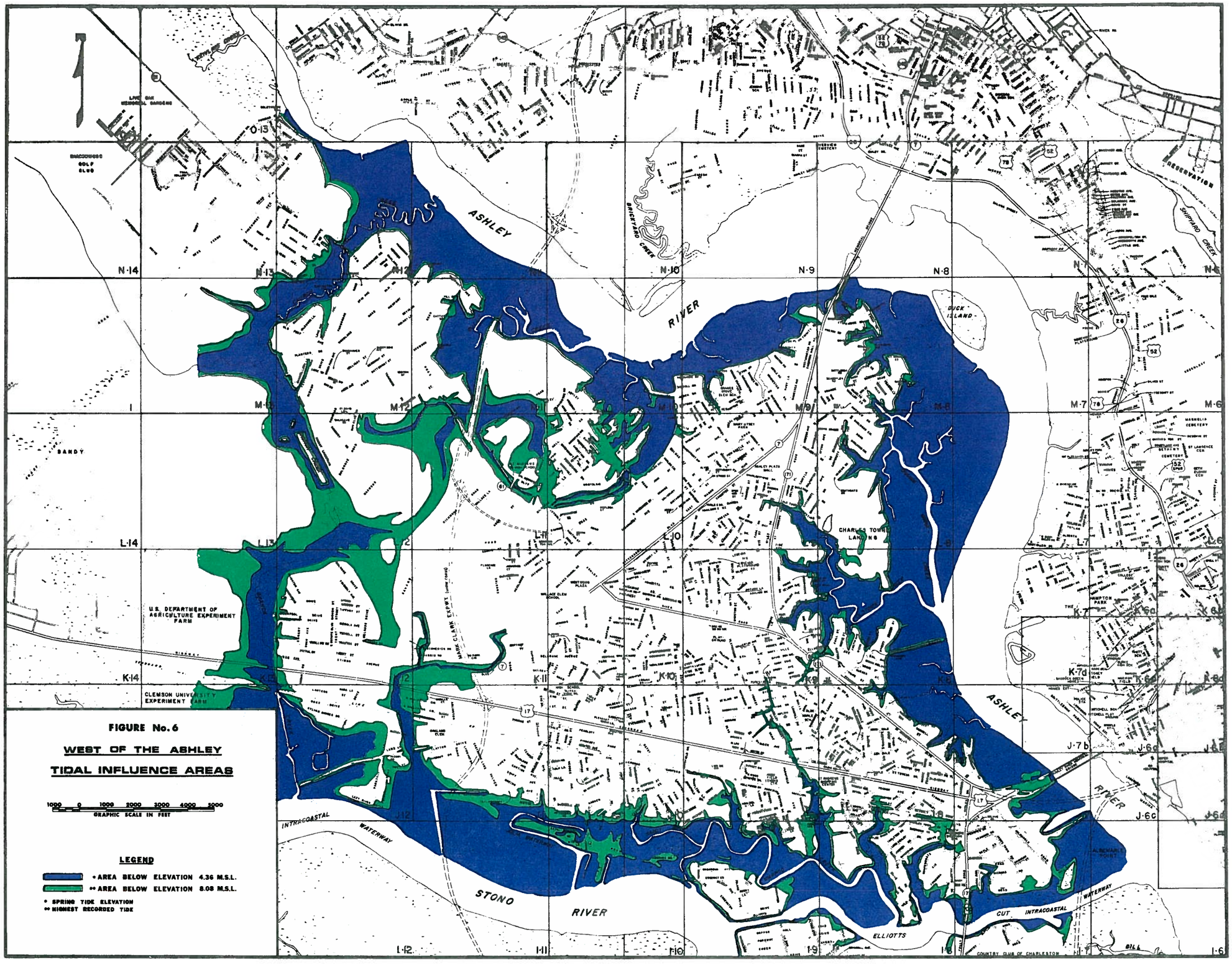

ASHLEY
RIVER
BRICKYARD CREEK
SHIPYARD CREEK
DUCK ISLAND
SANDY
U.S. DEPARTMENT OF AGRICULTURE EXPERIMENT FARM
CLEMSON UNIVERSITY EXPERIMENT FARM
INTRACOASTAL WATERWAY
STONO RIVER
CUT INTRACOASTAL WATERWAY
ELLIOTTS
CHARLES TOWNE LANDING
HAMPTON PARK
MAGNOLIA CEMETERY
COUNTRY CLUB OF CHARLESTON
FIGURE No. 6
WEST OF THE ASHLEY
TIDAL INFLUENCE AREAS
1000 0 1000 2000 3000 4000 5000
GRAPHIC SCALE IN FEET
LEGEND
* AREA BELOW ELEVATION 4.36 M.S.L.
** AREA BELOW ELEVATION 8.08 M.S.L.
* SPRING TIDE ELEVATION
** HIGHEST RECORDED TIDE

FIGURE No. 7

JAMES ISLAND

TIDAL INFLUENCE AREAS

1000 0 1000 2000 3000 4000 5000

GRAPHIC SCALE IN FEET

LEGEND

- * AREA BELOW ELEVATION 4.36 M.S.L.
- ** AREA BELOW ELEVATION 8.08 M.S.L.

* SPRING TIDE ELEVATION
** HIGHEST RECORDED TIDE

Pipe and Open Channels

The existing and proposed drainage systems for the Study Area consist of open channels, culverts under driveways, roads, railroads, etc., and buried pipe conduits. The Manning formula, in addition to accounting for pipe entrance and exit losses, has been used herein for both the evaluation and design of all drainage systems.

The formula is expressed: $Q = \frac{1.486}{N} A R^{2/3} S^{1/2}$ where:

Q = flow rate in cubic feet per second.

A = cross-section area of flow in square feet.

R = hydraulic radius; area of flow divided by wetted perimeter in feet.

S = slope of hydraulic grade line (feet per foot).

N = Manning's coefficient of roughness.

Pipe conduits have been sized for full flow at maximum flow rate. The pipe slope (hydraulic grade line) for the existing systems was computed by using the spring tide elevation (4.36 MSL) at the outlet, and allowing either one foot of head or one foot freeboard below the existing ground elevation at the point along the pipe system of lowest ground elevation. For proposed systems the pipe slope is assumed to be equal to the hydraulic grade line. The pipe slope has been selected to provide a minimum velocity of 2.5 feet per second to prevent, or minimize, silt from accumulating in the pipe. Manning formula "N" values of 0.015 and 0.023 have been selected for concrete pipe and corrugated metal pipe respectively.

The evaluation of existing culverts and the design of proposed culverts were based on criteria set forth in the National Corrugated Steel Pipe Association Technical Manual and the American Concrete Pipe Association Design Manual, and the Manual of Instructions for Drainage published by the Commonwealth of Virginia as applicable. Culvert entrance losses have been computed using a coefficient "Ke" of 0.2 for bell pipe end inlets, 0.5 for inlets with a square edge entrance and no culvert projection beyond the headwall face and 0.9 for culverts with sharp edge projecting inlets. For purposes of evaluation of existing culverts and selecting proposed systems, a water level to the crown of the culvert has been allowed for culverts operating under inlet control, and a head of 0.5 feet was used for culverts operating under outlet control.

All drainage channels have been evaluated using a trapezoidal cross section. The steepest side slope, consistent with bank stability, has been adopted as 2:1 (2.0 horizontal to 1.0 vertical) for channels less than 4.0 feet deep. These flattened slopes are necessary to allow maintenance of the side slope vegetation by the adjacent property owner without the need of special equipment. Channel shapes have been selected to limit channel velocities at maximum flow to 3.0 feet per second or less wherever possible. For those instances in which greater velocities are required, bottom and side slope protection is provided. Such protection is also provided at bends and junctions where turbulence

may result in scouring. All channels have been designed with a one foot freeboard at maximum flow and using a Manning "N" value of 0.03.

Channel bottom and side slope protection includes concrete paving of the channel invert, paving the channel up to the elevation of storm flow and the use of stone rip-rap to line the channel. The channel invert should be paved in areas where channel velocity is greater than 3.0 feet per second (FPS). The paving would cover the channel floor and extend one foot up side slopes. This affords protection from mildly erosive velocities by preventing erosion of the channel area that is most susceptible to scour due to the difficulty of establishing a vegetation cover. When channel velocity in the grassed condition exceeded 5.0 FPS the improvement schedule recommends full paving to the depth of storm flow. Depth of flow with paving was determined using a Manning friction factor of 0.015. Rip-rap was used in place of concrete primarily for marsh areas where a flexible channel cover is needed.

The above protective measures are only recommended for new construction in areas where the existing channel is undersized, thereby requiring improvement. Existing channels of adequate capacity, but high velocity, have been noted in Section IV as areas of potential erosion; however, in most cases the erosion has been reduced due to the establishment of vegetation adjacent to the channel.

Detention Basins

Detention basins have two applications in low lying coastal areas. The first application involves the construction of a basin in the upstream portion of a drainage area to intercept and retain a portion of the runoff from a rainfall, thereby moderating or reducing the peak rates of runoff to be handled by downstream drainage conduits. The second application involves the construction of a basin in the downstream portion of the drainage area to retain runoff during high tide periods or when discharge to the receiving waters is otherwise restricted. The applications are useful either to minimize corrective action for an existing stormwater conveyance system or to minimize conduit sizes for a new system.

In theory, the detention basin capacity is established by means of an economic analysis which strikes a balance between basin cost and related downstream conduit cost. In practice, however, the basin size is very often determined by the land available for its installation. Land available for detention basins is very limited in the Peninsular City and other highly developed portions of the Study Area, although, there are instances in which their use will be economically advisable.

The new South Carolina Coastal Council regulations require that new development peak discharge be equal to predevelopment peak discharge for a ten (10) year frequency storm. As a result of these regulations, many new developments will require detention basins.

The design of detention (or retention) basins and their consequent reduction in downstream peak flows has been based upon procedures outlined in the U.S. Soil Conservation Service publication entitled "Ponds" and by the previously mentioned stream hydrograph method. In computing available storage, one foot of freeboard between maximum water level and the top of the containment dike has been adopted. Special features of the basins, such as bottom or side slope treatment, outlet structures, the use of tide gates, etc. will be determined on a case by case basis during the design phase.

The foregoing discussion pertains to basins specifically constructed for detention purposes. The design procedures are equally applicable to areas providing natural storage such as the Church Creek Basin.

Pump Stations

Stormwater pump stations collect stormwater and lift and move the resulting runoff through pressure ("force") mains to selected outlets. Functional locations were selected where tidal influences forced impractical sizes of natural gravity drainage pipes and culverts.

Tidal influences affect gravity drainage facilities where ground elevations or long runs of pipe force drainage conduits to elevations that are inundated by tide waters. The higher the tide water is in the facilities the more the stormwater will be retarded because the hydraulic gradeline or effective slope is reduced. The effective slope directly affects the quantity of stormwater that will be carried through the pipe or conversely larger pipe is required to transport the same quantity of water as the effective slope is reduced.

Stormwater pump stations are sized so that two pumps will remove the stormwater from the respective areas. Each pump station has a recommended additional standby pump to assist if required by storm intensity or if required because one of the two duty pumps is inoperable. The volume of stormwater to be removed is computed from Soil Conservation Service hydrographs which portray storm events from no flow at the beginning of the rainfall event to a maximum water flow at peak (the time at which all waters within the respective drainage areas have concentrated at the pump station site). Following the peak event, water runoff recedes to no flow in a time span equal to one and two-thirds (1-2/3) times the time initially required to arrive at the maximum runoff event.

The stormwater runoff volumes determined above establish the required sizes and numbers of pumps and the sizes of the storage chambers (wet wells) required at each site. These, in turn, establish the sizes of conduits (force mains) needed to transport the stormwater to the estuaries.

In all proposed locations for stormwater pump stations a major concern was aesthetics. Fortunately, the wetwell of each pump station is subterranean or hidden from public view. The structure will be designed to go underneath streets at locations where it is advantageous

for present or future drainage facilities. For the most part underground utility lines that are located in the streets need not be relocated, but rather can continue service through the upper portion of each wet well. Water storage volumetric needs will be met at elevations below such utility conduits wherever possible. To further conceal stormwater pumping appurtenances, the pumps can also be subterranean with the prime movers for the pumps installed in remote locations if the pumps are hydraulically powered. Hydraulic lines to and from each pump allow locations as far as three hundred feet from the wet well with hidden pumping units to motor houses.

Under ordinary circumstances electric motors will power the hydraulic pumps which in turn power the stormwater pumps. In cases of power failure, a standby diesel powered engine provides power via immediate acting switching gear. Pump motors for the pump stations can be concealed within existing buildings, or within lattice-work or artistic fencing so that the area will not be degraded. Figure 8 illustrates a typical layout of the proposed pump stations for the Peninsular City.

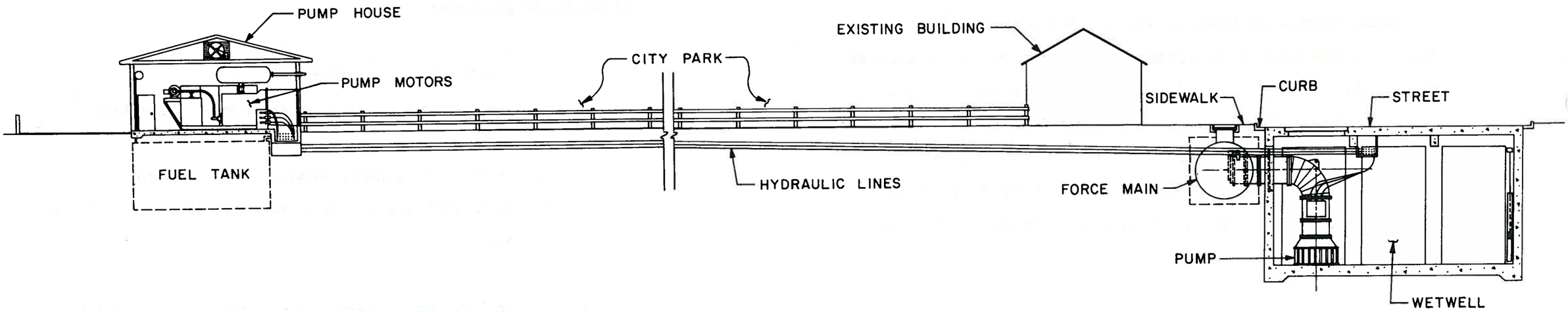
Construction Materials

Manufactured construction materials proposed for use on projects recommended in this Study consist almost exclusively of piping for underground systems and for culverts under driveways, roads and railroads. An investigation of the types of pipe and piping materials suitable for use in the Charleston area was conducted as a part of this study. A full report of the findings is included in Appendix B. The report substantially recommends that, except on an experimental basis, the installation of storm drainage systems be limited to the use of the following pipe materials:

1. Reinforced concrete pipe.
2. Asbestos bonded corrugated steel pipe with asphalt coating.
3. Corrugated aluminum pipe with asphalt coating.
4. Corrugated steel pipe with full asphalt coating and paved invert.

The use of all the above alternative pipe materials is subject to certain hydraulic, structural and coating requirements as set forth in the report. On the basis of these requirements the alternative types of pipe are expected to be closely competitive in cost. For this reason, and for the purposes of preparing cost estimates for the proposed drainage works, the use of reinforced concrete pipe has been assumed for all systems. During the preparation of detailed plans and specifications for specific projects, provisions will be made as applicable for bidding alternative types of pipe.

FIGURE No. 8



TYPICAL STORMWATER PUMP STATION
UNDERSTREET INSTALLATION

SECTION IV

EVALUATION OF EXISTING STORMWATER DRAINAGE FACILITIES

The characteristics of the existing stormwater drainage facilities found within the Study Area are discussed in the following paragraphs. For clarity, Section IV has been broken into four divisions, (a) Peninsular City Area, (b) West Ashley Area, (c) James Island Area, (d) Johns Island Area. The discussion includes descriptive data for the major components of each existing system together with evaluations in regard to their adequacy and/or deficiencies. For those systems which were found to be deficient improvements have been proposed and their estimated construction costs have been developed. Both the evaluation of existing systems and the development of proposed improvements have been conducted using the design basis and criteria set forth in the preceding section.

Existing System - Description

Information for existing drainage facilities on record were furnished by the Public Services Department of the City. To verify this information and to expand it into the other portions of the study area where no records exist, it was necessary to conduct field surveys on all major components of the systems. During the survey all pipe conduit and culverts 24 inches in diameter and larger, including equivalent channels and ditches, were field located and examined in detail. Data obtained consisted of location, routes, sizes, pipe material, invert elevations, and extent of siltation. Additional, but less detailed, observations of the smaller components of the system were also made, as necessary, to establish drainage area limits. The work resulted in the delineation of 182 distinct drainage areas for evaluation.

Information obtained from the field surveys and drainage area boundaries have been placed on copies of orthophoto contour maps of the study area which were supplied to Davis & Floyd, Inc. by the City of Charleston. For reference purposes, each of the drainage areas have been designated thereon with a name derived from a major street, a neighborhood designation or other prominent feature within the area. Reduced copies of the maps at a scale of 1" = 250' for a portion of the Peninsular City area, 1" = 500' for the remainder of the Peninsular City area, West Ashley area, and James Island area, and 1" = 1000' for the Johns Island area are bound herein as Appendix A.

As shown on the maps, the overall drainage systems are composed of both buried pipe conduits and open channels with culverts installed at roadway and driveway crossings. The open channel type installation is the least expensive in original capital cost and has been used in the past wherever feasible. It is the most prevalent type of drainage system in the low density residential and commercial areas in which the restriction to property access and property utilization can be tolerated. In high density areas the use of open channels is prohibited due to high land cost, and public safety.

The majority of the channels within the study area are constructed with nearly vertical sides; and, almost all have developed a protective vegetation cover. Roadway culverts are constructed of both corrugated

metal pipe and reinforced concrete pipe. The smaller size culverts are almost exclusively reinforced concrete pipe. Except for the larger size culverts installed under major highways and railroads, culverts have been installed without inlet and outlet headwalls.

For major thoroughfares provided with curbs and gutters, pipes have been installed either under the street or under or immediately adjacent to both curb lines. Inlets are of the side inlet curb type or cast iron grate type set flush with the gutter. For pipe installed in drainage easements, inlets consist about equally of cast iron field grate type installed flush with the ground surface and the raised box type with side inlet openings.

Sediment deposition exists in the bottoms of practically all components of the system, most notably the drainage facilities located within the Peninsular City area. The depth of deposition ranges from about 10 percent of the pipe diameter in most instances to 80 percent in extreme cases. Some improvement in system performance can accordingly be accomplished by cleaning the existing systems.

Existing System - Evaluation

All of the existing systems which were inventoried have been evaluated to determine their capacity for the design frequency storm. In order to account for the cost associated with improvements to the upstream drainage systems, the total cost for improvements to the entire watershed has been increased by 20 percent. In many cases, the deficiencies which may be present in these areas are localized and minor in nature and can be improved by cleaning the existing system and making improvements to the stormwater inlets using annual operation and maintenance funds.

In evaluating the existing drainage system, the present available capacity of each major component has been computed and compared with the corresponding estimated runoff from a storm of design intensity. The capacity of the existing system components for circular and arched pipe conduits was computed based on the assumption that the pipes are clean and provide a fully effective cross sectional area except for the brick arch conduits which exist in the Peninsular City area. The brick arch conduits cross sectional area was taken from the top of the brick arch to the existing sand elevation and the capacity for these systems was computed based on this cross sectional area because it is considered impractical to remove this sand built-up. Both the existing available capacities and the required capacities have been listed for each system and presented in Table Nos. 10 through 84.

Under design rainfall and tidal conditions, the downstream portions of many systems will be submerged and their capacities thereby reduced either directly by the tidal elevations selected for design or indirectly by storm flow backwater levels caused by such tides.

Proposed Improvements

As revealed in the referenced tables, and as expected, a large number of the existing system components are of inadequate capacity under the conditions adopted for design. For each of those facilities found to be inadequate, alternative methods for correcting the deficiency have been investigated and specific improvements recommended. Table Nos. 10 through 84 have been expanded to incorporate descriptions of the proposed improvements and estimates of their construction costs. Pertinent comments as to specific conditions and considerations involved in the evaluation and recommendation for each facility have been presented adjacent to the Tables. Aerial maps showing the proposed improvements are included as Map Sector Nos. A-1 through M-15. The location of proposed facilities is schematic in nature, and the exact location will be determined during final design. Several general comments as to procedures, objectives and factors considered in the development of the proposed improvements are presented below.

In developing the recommendations, the present configurations of the individual drainage areas are retained insofar as possible. No attempt has been made to identify existing drainage easements. The investment in the existing drainage facilities is fully recognized and these systems have been incorporated into the improved overall system wherever cost effective. Furthermore, the present characteristics of the system with respect to the use of closed pipe conduit and open channel and culvert types of construction are retained.

For channel and culvert type installations, the recommended improvements consist of increasing the cross sectional areas of the channels and culverts in their present locations and routes. For pipe conduit type installations, which cannot so readily be increased in capacity, a number of alternative solutions were considered on a case by case basis. Among these were the installation of a relief sewer either adjacent to and following the same route as the existing sewer or along an alternate route. In many cases, the recommended improvements call for a multiple pipe conduit system based upon the ground elevations and features from the aerial photo maps. During final design the installation of only one larger diameter pipe conduit system may be possible with the opposite being true for those recommended improvements which call for only one pipe conduit. Where gravity systems became impractically large for some locations in the Peninsular City area, stormwater pump stations were evaluated as alternatives. The removal and replacement of an existing conduit with one of larger capacity has been recommended only when other alternatives would result in higher costs or were impracticable for other reasons.

All of the recommended improvements outlet into one of several receiving streams, and most will require excavation within the South Carolina Coastal Council Critical Zone, for both installation and to provide a free outlet. Steps must be taken to obtain a permit to excavate within this area. Without channel excavations in the marsh the proposed systems will not function properly.

The costs shown in the tables were based on the unit costs listed in Table 5. They include allowances for land acquisition costs, as applicable, and for administrative expenses, engineering and contingencies.

TABLE 5

MASTER PLAN UNIT COSTS

ITEM	UNITS	UNIT COSTS (1984 Dollars)		
		Residential Area in Easement -	in Pavement	High Traffic and Business Areas
1. Pipe - Open Cut				
18" Diameter	Lin.Ft.	41	48	73
24" Diameter	Lin.Ft.	50	58	84
30" Diameter	Lin.Ft.	64	71	97
36" Diameter	Lin.Ft.	91	99	141
42" Diameter	Lin.Ft.	109	116	160
48" Diameter	Lin.Ft.	125	132	176
54" Diameter	Lin.Ft.	168	175	221
60" Diameter	Lin.Ft.	191	198	246
72" Diameter	Lin.Ft.	239	247	296
2. Box Culverts - Open Cut				
6' x 4'	Lin.Ft.	220	240	300
6' x 6'	Lin.Ft.	240	260	320
8' x 4'	Lin.Ft.	275	295	355
8' x 6'	Lin.Ft.	295	325	375
8' x 8'	Lin.Ft.	320	340	400
10' x 6'	Lin.Ft.	395	420	480
10' x 8'	Lin.Ft.	430	450	500
10' x 10'	Lin.Ft.	460	480	530
3. Force Main - Open Cut				
54" Diameter	Lin.Ft.	305		
60" Diameter	Lin.Ft.	350		
66" Diameter	Lin.Ft.	405		
72" Diameter	Lin.Ft.	460		
84" Diameter	Lin.Ft.	575		
96" Diameter	Lin.Ft.	705		

TABLE 5

MASTER PLAN UNIT COSTS

ITEM	UNITS	UNIT COSTS (1984 Dollars)
4. Pipe - Bore and Jack		
18" Diameter	Lin.Ft.	350
24" Diameter	Lin.Ft.	400
30" Diameter	Lin.Ft.	450
36" Diameter	Lin.Ft.	500
5. Pipe - Tunnel		
42" Diameter	Lin.Ft.	800
48" Diameter	Lin.Ft.	900
54" Diameter	Lin.Ft.	1000
60" Diameter	Lin.Ft.	1100
72" Diameter	Lin.Ft.	1200
84" Diameter	Lin.Ft.	1350
96" Diameter	Lin.Ft.	1600
6. Headwalls		
18"-30" Diameter Pipe	Each	2000
36"-48" Diameter Pipe	Each	3000
54"-72" Diameter Pipe	Each	4000
7. Manholes, Catch Basins Drop Inlets		
18"-30" Diameter Pipe	Each	1500
36"-48" Diameter Pipe	Each	2500
54"-72" Diameter Pipe	Each	2800
8. Channels		
Excavation	Cu. Yd.	6.00
Concrete Paving	Sq. Ft.	4.00
Rip-Rap	Sq. Ft.	3.50
Sodding	Sq. Ft.	0.40
9. Easements		
1 Acre or less	Lot	6000
over 1 Acre	Lot	12000

Major Drainage Basis

In addition to the 182 individual drainage basins, there are four major drainage basins which lie within the City of Charleston boundaries and which have been analyzed separately. These major drainage basins drain over 300 acres each and are as follows: (1) Newmarket Creek, (2) Long Branch Creek, (3) Citadel Mall Channel, and (4) Church Creek.

1. Newmarket Creek: Newmarket Creek drains a total of 304.4 acres of the Peninsular City area between I-26 on the west and the Cooper River on the east. The existing system consist of a drainage channel which commences at I-26 and runs eastward to the Cooper River, with roadway culverts at Meeting Street and Morrison Drive (see Figure 9). As is the case with all of the major drainage channels within the study area, tide elevations have a major influence upon the capacity of the existing drainage system.

Newmarket Creek serves as the outfall for three smaller drainage basins discussed in Division A of Section IV; Meeting Street North, Huger, and Runey. The present system is inadequate and replacing the existing brick arch at Meeting Street with dual 4'x6' box culverts is recommended. In addition, widening the existing channel between Meeting Street and the Seaboard Systems Railroad east of Morrison Drive to a 45' flat bottom width, and the placement of a 60" RCP parallel to the existing dual 6'x10' box culverts under Morrison Drive are required. Table 6 list a breakdown of recommended improvements and their associated cost for Newmarket Creek. The recommended improvements will require excavation within the South Carolina Coastal Council Critical Zone and will require a permit prior to construction.

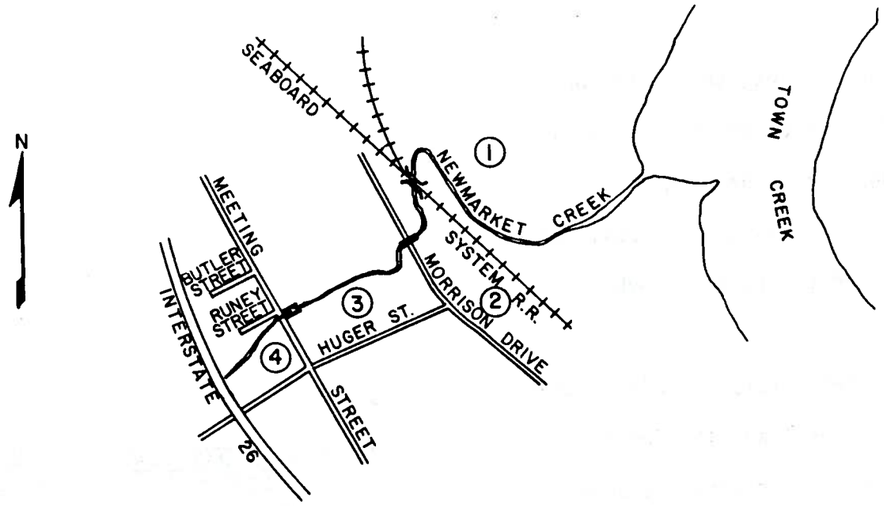
TABLE 6

HYDRAULIC ANALYSIS OF NEWMARKET CREEK

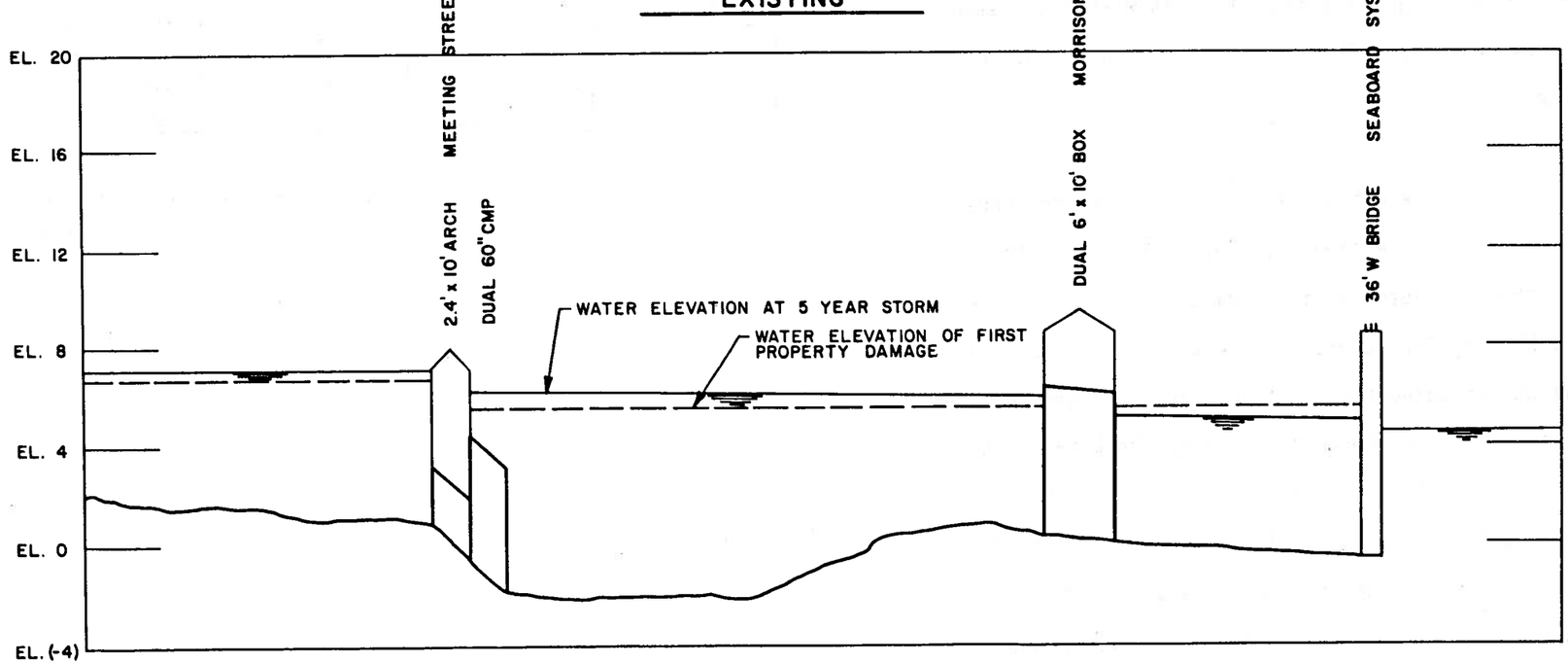
REACH NO.	DRAINAGE AREA SUBTOTAL	DRAINAGE AREA TOTAL	DISCHARGE (CFS)	EXISTING SYSTEM CONDUIT	EXISTING SYSTEM CAPACITY	RECOMMENDED IMPROVEMENTS CONDUIT	RECOMMENDED IMPROVEMENTS COST	COMMENTS
4	101.5	101.5	239	9' F.B. Channel	133	9' F.B. Channel	$ 9,000	
4-3			239	2.4'x10' Brick Arch	32	Dual 4'x6' Box Culvert	$ 55,000	Replace existing brick arch
3	194.3	295.8	680	10.5' F.B. Channel	256	45' F.B. Channel	$ 56,000	
3-2			680	Dual 6'x10' Box Culverts	690	140' - 60" RCP	$ 44,450	Parallel system
2	8.6	304.4	686	14' F.B. Channel	359	45' F.B. Channel	$ 21,600	
2-1			686	36' Wide Bridge	847		Adequate	

Subtotal	$186,050
Administrative, Engineering, Contingency	37,200
Total	$223,250

FIGURE No. 9

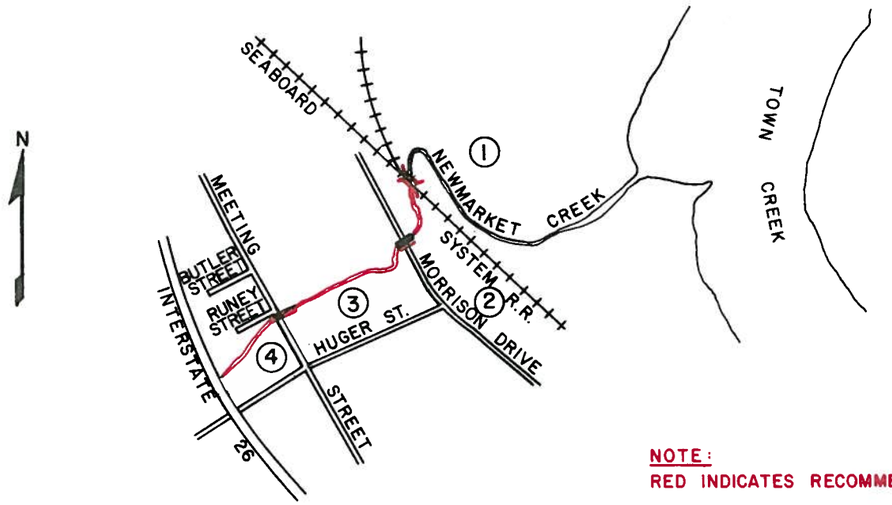


PLAN VIEW
NEWMARKET CREEK
EXISTING



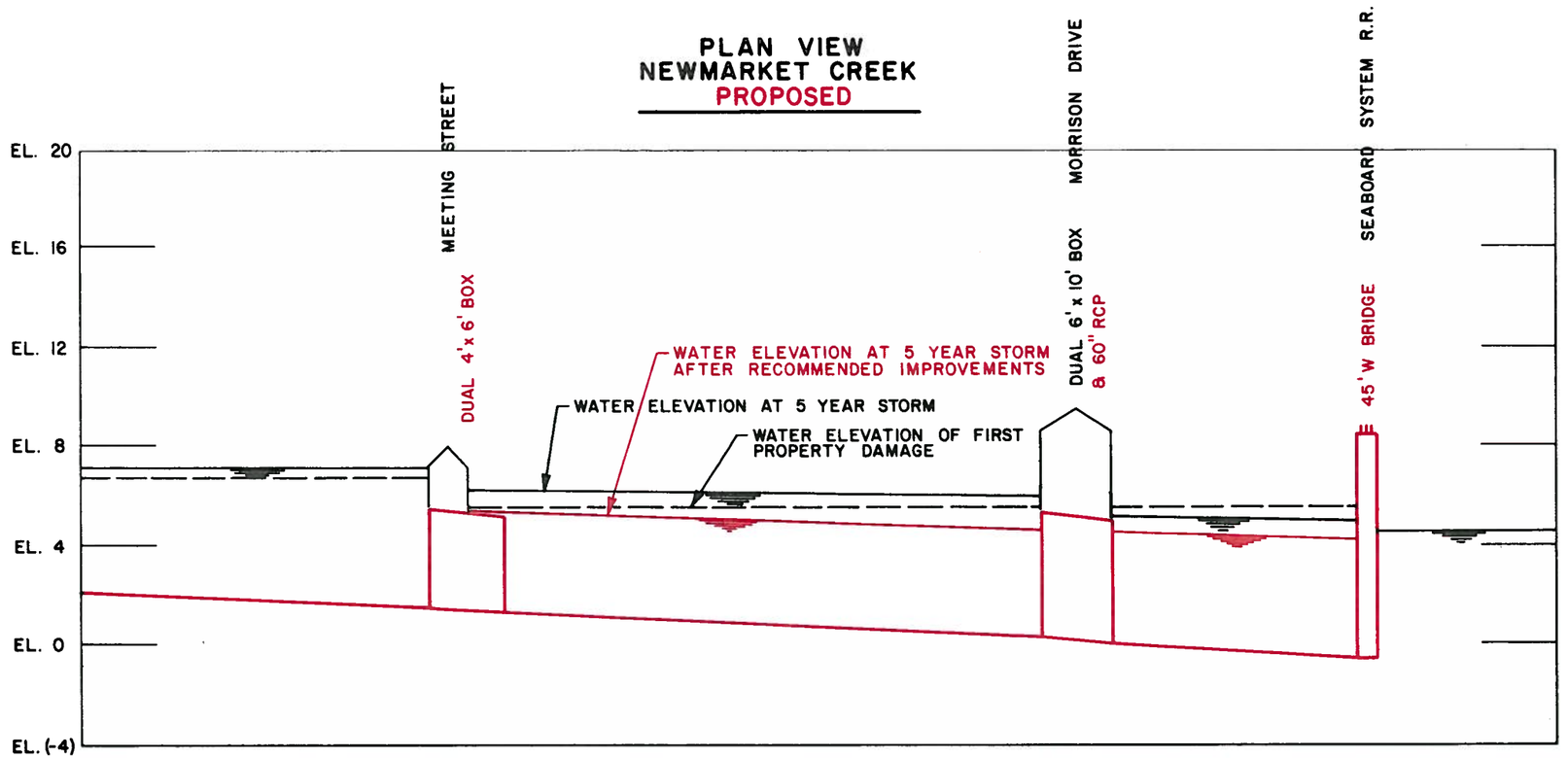
PROFILE
NEWMARKET CREEK
EXISTING

FIGURE No. 10



NOTE:
RED INDICATES RECOMMENDED IMPROVEMENTS

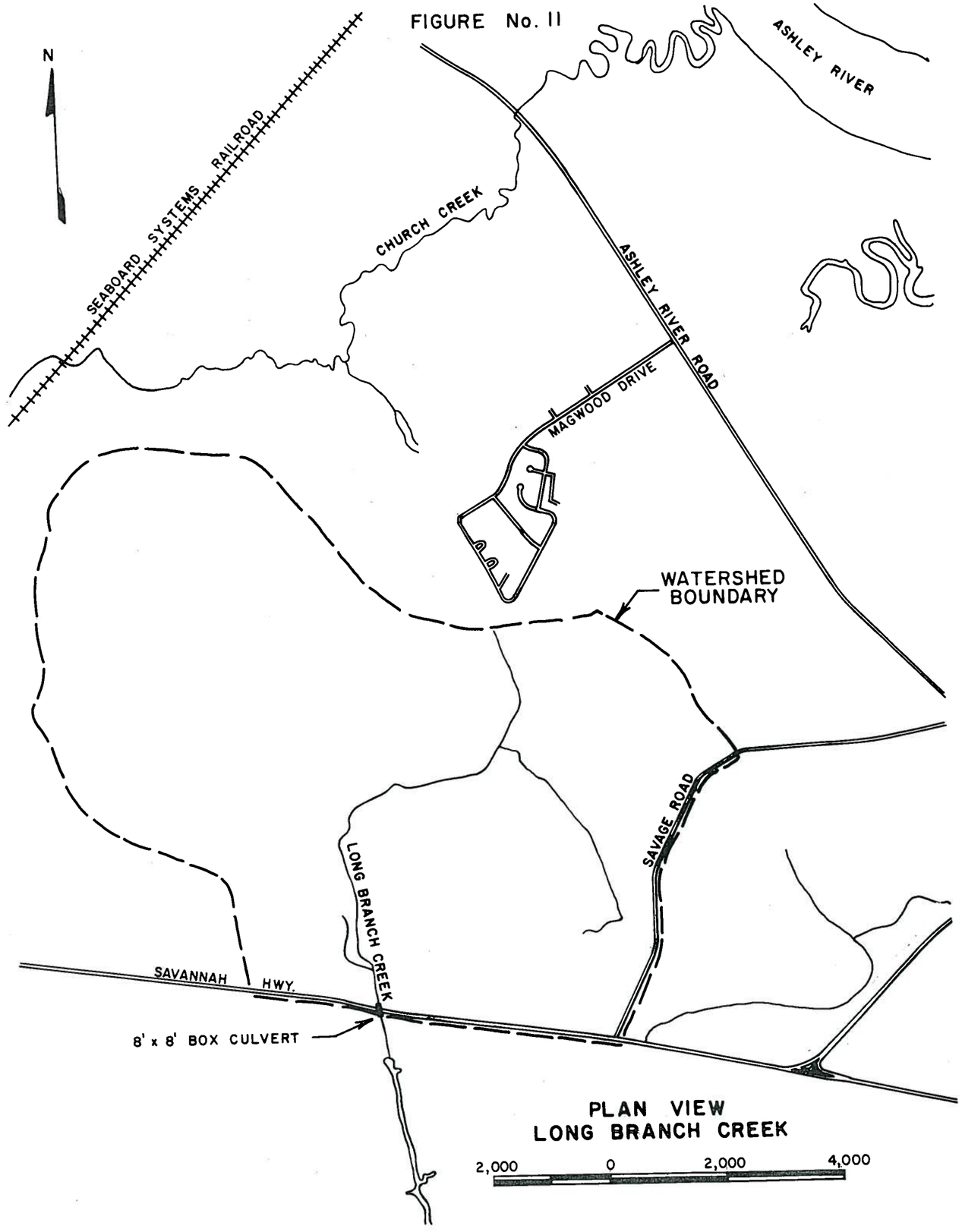
PLAN VIEW
NEWMARKET CREEK
PROPOSED



PROFILE
NEWMARKET CREEK
PROPOSED

2. Long Branch Creek: The Long Branch Creek drainage basin drains a total of 1852 acres of mostly undeveloped land lying north of U.S. Highway 17 via an 8'x8' box culvert under U.S. Highway 17. For analysis of this drainage basin, it was assumed based on the City of Charleston Land Use Plan that 70 percent of the area will be developed for either residential or apartment complex use. Based upon this assumption, the system was analyzed for the effects of a 5 year storm, and is adequate for this frequency storm provided that a total of 355 acre-feet of storage area is provided. This amount of storage area is available as presently developed, however, steps should be taken to assure that this amount of storage is provided upon completion of future development.

FIGURE No. II



3. Citadel Mall Channel: The Citadel Mall Channel drains a total of 1281 acres, with approximately 65 percent lying outside the City of Charleston boundaries. The drainage area consists of residential development in the upper reaches above U.S. Highway 7, large commercial developments in the middle reaches between Highway 7 and the Mark Clark Expressway, and mostly undeveloped land below the Mark Clark Expressway. In the past several years, there has been a rapid development of commercial areas in the middle reaches of the drainage basin, including the development of the Citadel Mall complex. The majority of these developments consist of large areas of pavement and buildings which results in increased runoff and thereby increases the probability of flooding in this area. Very few improvements have been made to the existing drainage system, with the exception of a detention basin which was built to serve the rear portion of the Citadel Mall complex.

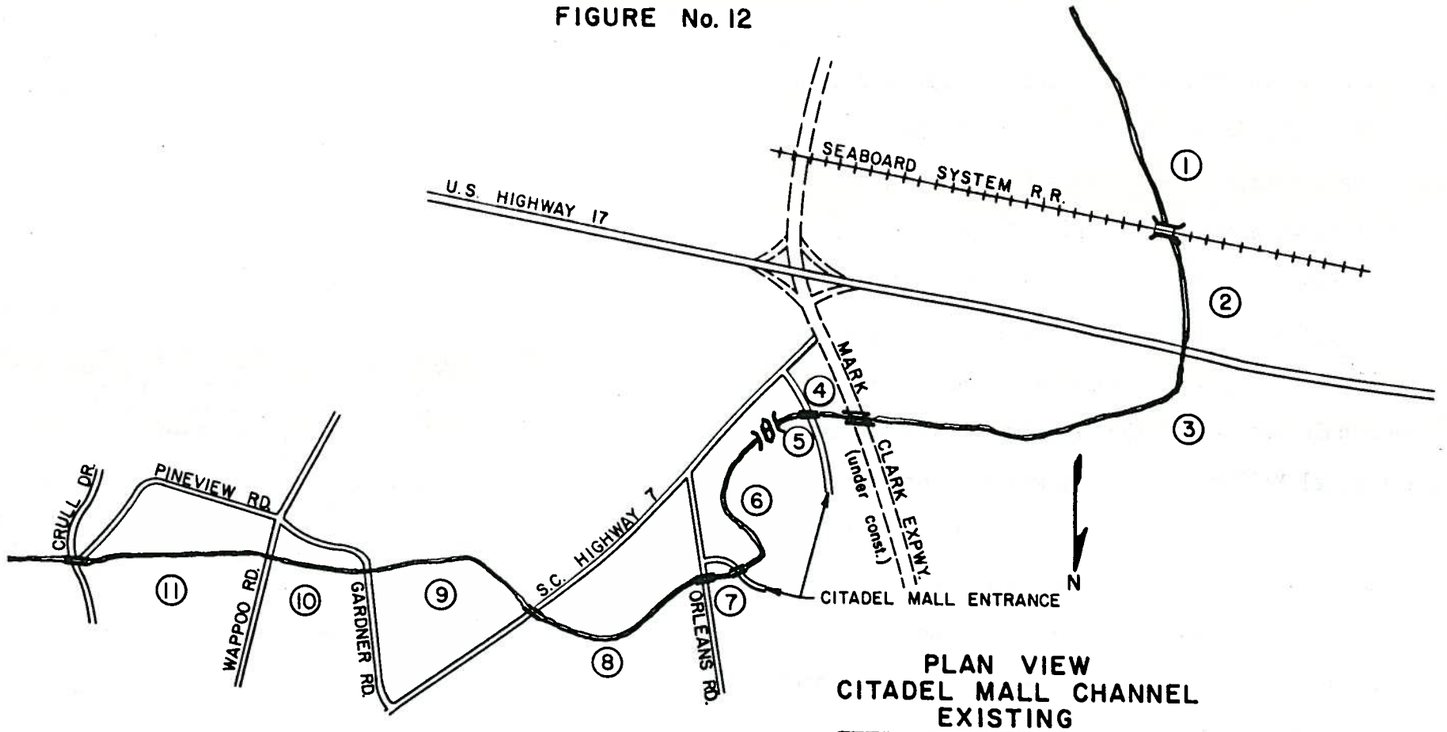
The existing drainage system is composed of a flat bottom channel with culverts at roadway crossings, (see Figure 12). The downstream portion of the channel is influenced by the effects of tide which results in decreased capacity for the system. At present, the existing drainage system is inadequate and must be improved from the Mark Clark Expressway to the upstream portion of the drainage basin. No improvements are required to either the Highway 17 or Seaboard Systems Railroad crossings, provided a total of 215 acre-feet of retention is maintained between the Mark Clark Expressway and U.S. Highway 17. As presently developed, there is adequate storage in this area, however, the City should implement steps to assure that the amount of retention area required is provided upon completion of development in the area. The recommended improvements and their associated construction cost are listed in Table 7.

TABLE 7

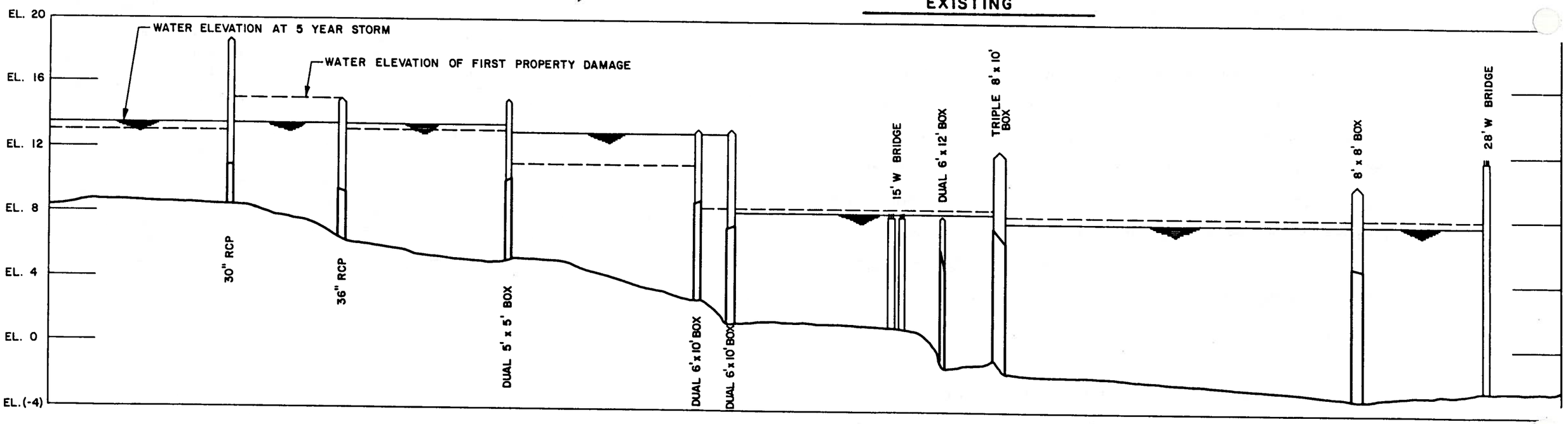
HYDRAULIC ANALYSIS OF CITADEL MALL CHANNEL

REACH NUMBER	DRAINAGE AREA (Ac.) SUBTOTAL	DRAINAGE AREA (Ac.) TOTAL	PEAK RUNOFF (cfs)	EXISTING SYSTEM STORMWATER CONDUIT	EXISTING SYSTEM DISCHARGE CAPACITY (cfs)	RECOMMENDED IMPROVEMENTS STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS COST (DOLLARS)	COMMENTS
11	113	113	367	4' F.B. Channel	20	14' F.B. Concrete Lined Channel	524,200	Possible relocation of four residences; 1/3 outside City boundary
11-10				30" RCP	24	Dual 4'x10' Box	88,000	Outside City boundary
10	47	160	465	4' F.B. Channel	62	16' F.B. Concrete Lined Channel	333,800	Possible relocation of two residences
10-9				36" RCP	37	Dual 5'x9' Box	65,400	Parallel system
9	183	343	801	6' F.B. Channel	115	28' F.B. Concrete Lined Channel	666,800	Possible relocation of four residences
9 - 8				Dual 5'x5' Box	280	Dual 5'x9½' Box	192,000	Parallel system
8	210	553	1205	8' F.B. Channel	238	47' F.B. Concrete Lined Channel	816,400	Possible relocation of two residences; 1/2 outside City boundary
8 - 7				Dual 6'x10' Box	740	Dual 6'x6½' Box	81,200	Parallel system
7	34	587	1312	20' F.B. Channel	1061	Dual 6'x6½' Box & Dual 6'x10' Box	274,000	Fill in channel & extend box culverts
7 - 6				Dual 6'x10' Box	740	Dual 6'x6½' Box	54,000	Parallel system
6	41	628	1376	15' F.B. Channel	139	54' F.B. Concrete Lined Channel	624,800	
6 - 5				15' wide bridge	805	72' Bridge	504,000	Replace existing bridge
5	140	768	1832	15' F.B. Channel	550	72' F.B. Concrete Lined Channel	144,200	
5 - 4				Dual 6'x12' Box	888	3 - 6'x8½' Box	118,000	Parallel system
4	110	878	1954	15' F.B. Channel	550	72' F.B. Concrete Lined Channel	186,400	
4 - 3				3 - 8'x10' Box	1740	72" RCP	35,200	Parallel system
3	287	1165	2053	Floodplain		215 Ac. - Ft. of of detention	Private	Detention to be provided during future development. Adequate with detention; Outside City boundaries
3 - 2				8'x8' Box	310			
2	116	1281	2203	Marsh				Adequate
2 - 1				28' Wide Bridge				Adequate with detention
						Subtotal	$4,708,400	
						Administration, Engineering, Contingency	941,700	
						Total	$5,650,100	

FIGURE No. 12

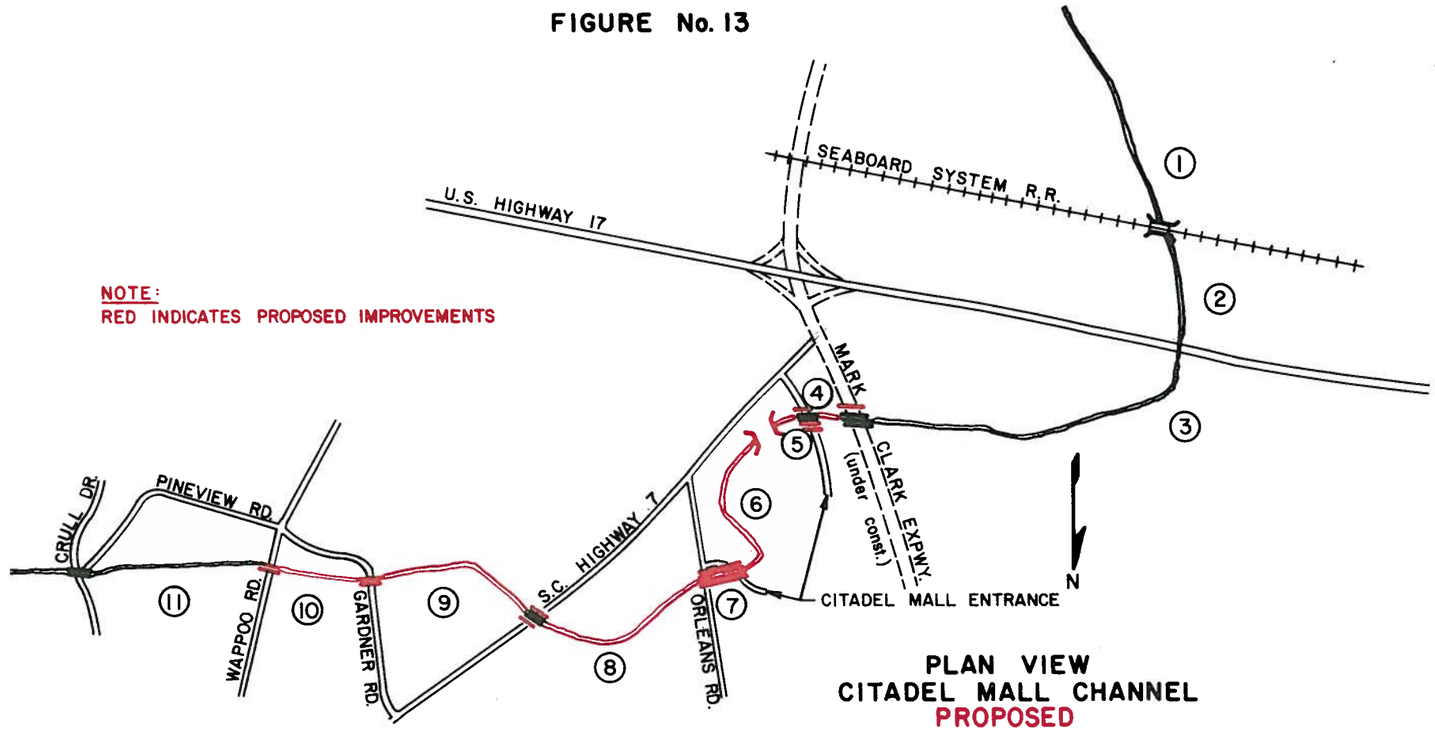


PLAN VIEW
CITADEL MALL CHANNEL
EXISTING

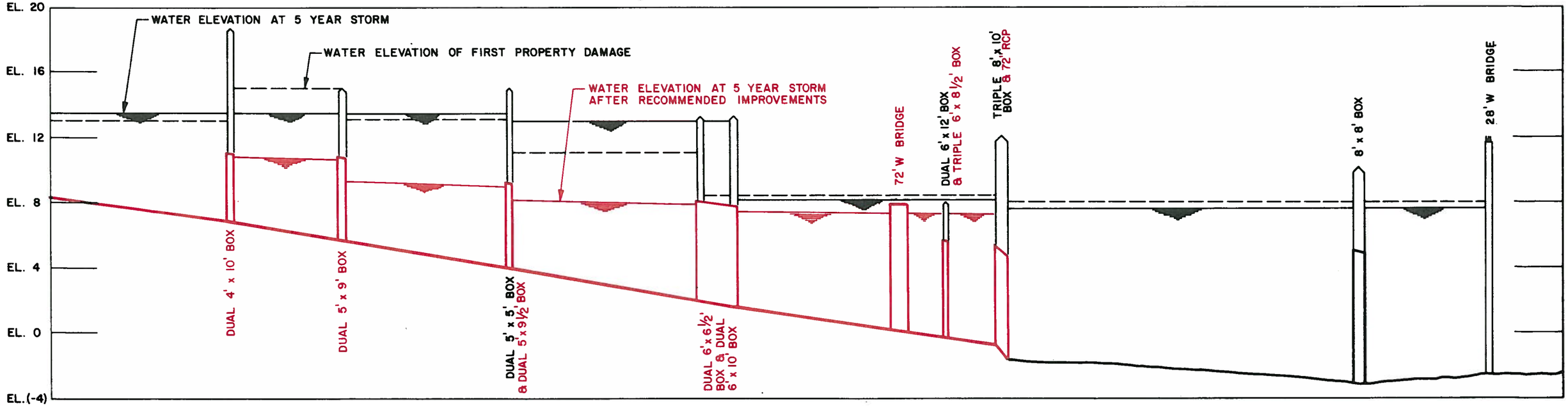


PROFILE
CITADEL MALL CHANNEL
EXISTING

FIGURE No. 13



PLAN VIEW
CITADEL MALL CHANNEL
PROPOSED



PROFILE
CITADEL MALL CHANNEL
PROPOSED

4. Church Creek: The Church Creek drainage basin drains a total of 4879 acres located along the western side of the Ashley River, and is composed mainly of old phosphate mines and marsh areas. At present about thirty percent of the total area has been developed. Development in the present city limits consist of the residential neighborhoods of Shadowmoss, Hickory Hill and Forest Lakes.

The Church Creek drainage facilities consist of a natural drainage channel and marsh area located between the outlet under U.S. Highway 61 and the Seaboard Systems Railroad. Upstream of the Seaboard Systems Railroad portions of the existing channel have been improved between Bees Ferry Road and the railroad. No improvements have been made to the existing channel upstream of the Bees Ferry crossing, with the exception of the section adjacent to the Hickory Hill Subdivision, due to the lack of development in this area. However, with development of the area, improvements to the existing channel will be required.

The peak discharge and recommended improvements for the Church Creek drainage basin are listed in Table 8. Peak discharges were computed based upon present development conditions, and the assumption that the peak discharge from future developments may not exceed the pre-development peak discharge, based upon the recommended floodplain management plan. However, it should be noted that if the recommended floodplain management plan is not implemented, the peak discharge will be increased, and as a result the existing downstream drainage facilities would then have to be enlarged.

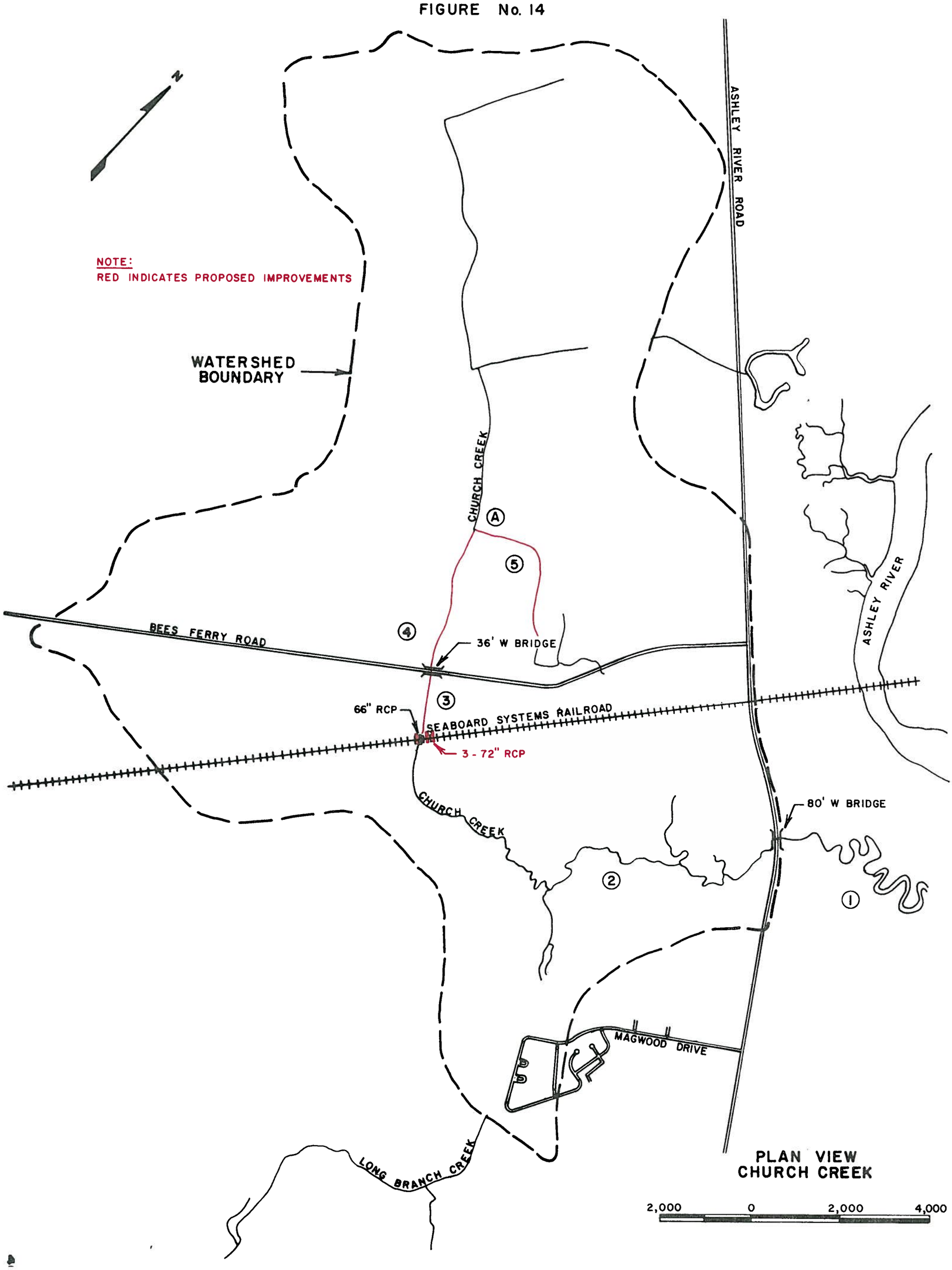
TABLE 8

HYDRAULIC ANALYSIS OF CHURCH CREEK

REACH NUMBER	DRAINAGE AREA (Ac.) SUBTOTAL	DRAINAGE AREA (Ac.) TOTAL	*PEAK RUNOFF (cfs)	EXISTING SYSTEM STORMWATER CONDUIT	EXISTING SYSTEM DISCHARGE CAPACITY (cfs)	RECOMMENDED IMPROVEMENTS STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS COST (DOLLARS)	COMMENTS
5-A	478	478	340	15' F.B. Channel	232	24' F.B. Channel	38,900	
A-4	2284	2762	621	15' F.B. Channel	232	31' F.B. Channel	162,000	
4-3				36' Wide Bridge	1688		Adequate	
3	761	3523	691	24' F.B. Channel	359	35' F.B. Channel 70' - Triple	46,800	
3-2				66" RCP	155	72" RCP	302,400	Parallel System
2	1356	4879	933	Marsh	-		Adequate	
2-1				80' Wide Bridge	3584		Adequate	
						Subtotal	$550,100	
						Administration, Engineering, Contingency	110,050	
						Total	$660,150	

*Peak discharge based on present development

FIGURE No. 14


N
NOTE:
RED INDICATES PROPOSED IMPROVEMENTS
WATERSHED BOUNDARY
ASHLEY RIVER ROAD
CHURCH CREEK
A
5
4
BEES FERRY ROAD
36' W BRIDGE
ASHLEY RIVER
3
66" RCP
SEABOARD SYSTEMS RAILROAD
3 - 72" RCP
CHURCH CREEK
80' W BRIDGE
2
1
MAGWOOD DRIVE
LONG BRANCH CREEK
PLAN VIEW
CHURCH CREEK
2,000
0
2,000
4,000

SECTION A

PENINSULAR CITY AREA

INDEX

PENINSULAR AREA WATERSHEDS

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PENINSULAR AREA WATERSHEDS (CONTINUED)

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EXPLANATION OF HYDRAULIC DATA TABLES

The Hydraulic Data Tables contain information, by watershed areas, for each of the drainage facilities within the respective area. The data listed in each column is as follows:

Column 1: Location of the system to be analyzed, listing upstream manhole number and downstream manhole number.

Column 2: Drainage Area to system to be analyzed in acres.

Column 3: Runoff coefficient for the area listed in Column 2. (See Table 1)

Column 4: Total CA is the sum of Column 2 times Column 3 plus CA for areas upstream of the point of analysis.

Column 5: Travel time is the time required for runoff to reach the point of analysis from the most remote point within in the watershed.

Column 6: Discharge (Q) equals CIA where CA is the total found in Column 4 times the rainfall intensity (I) in inches per hour from Figure No. 3 using the travel time in Column 5.

Column 7: Existing system description.

Column 8: Length of existing system.

Column 9: Slope of existing system. Both the physical slope (actual slope of system) and the hydraulic slope (water surface profile) are listed for each system. The hydraulic slope is placed in parenthesis and is used to compute the capacity of the existing system.

Column 10: Capacity of existing system in cubic feet per second computed from Manning's equation.

Column 11: Velocity of existing system in feet per second. Discharge divided by flow area.

Column 12 & 13: Recommended Improvements. List improvements required (Column 12) and associated cost (Column 13).

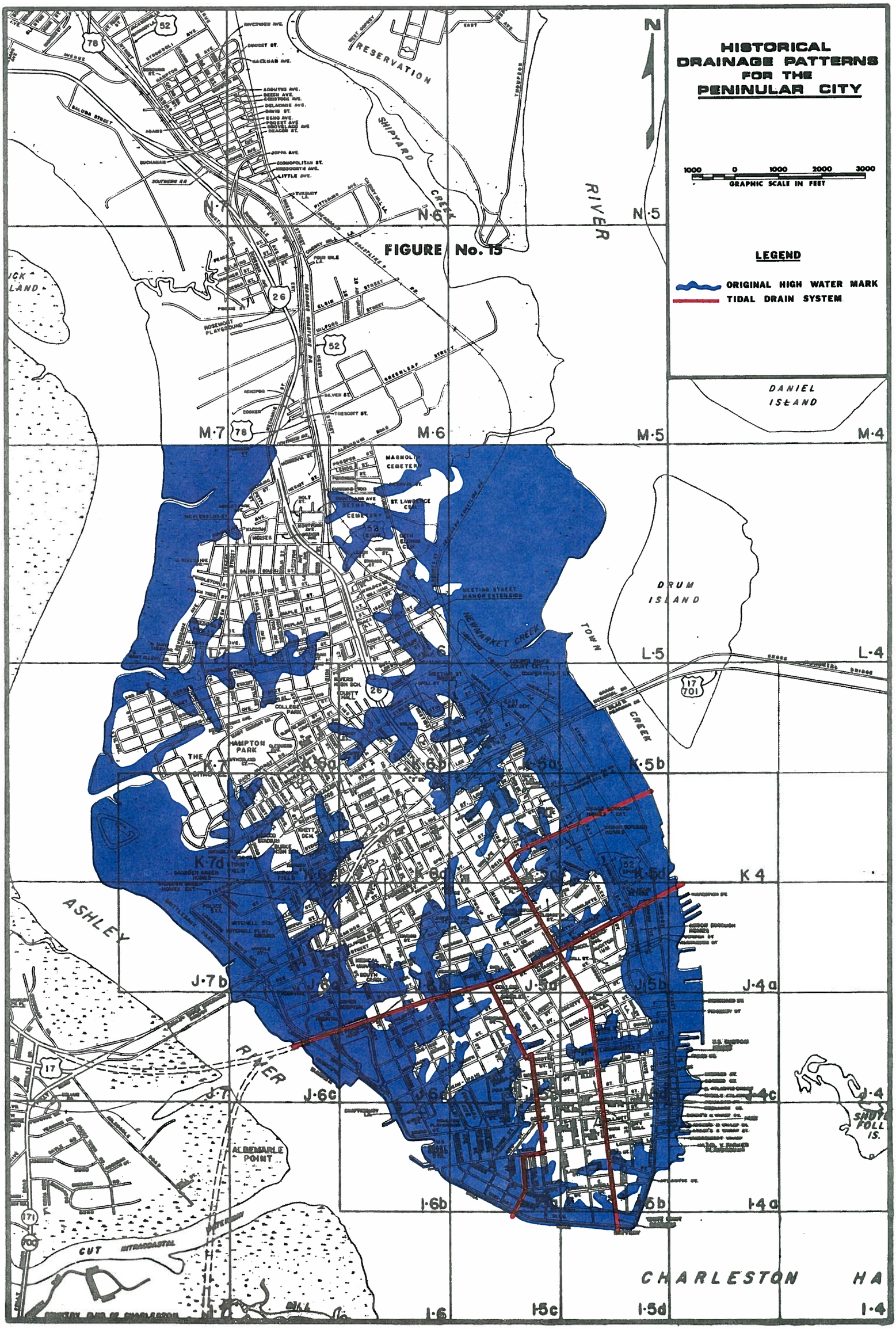
Column 14: Comments

The Peninsular City Area is the most heavily developed portion of the study area with approximately 80 to 90 percent of the land area presently developed. The area is comprised of three distinct areas of development; (a) commercial and residential development south of the Crosstown Expressway, (b) residential development between the Crosstown Expressway and Mount Pleasant Street, and (c) industrial development north of Mount Pleasant Street. This high density development and the lack of adequate drainage facilities results in numerous flooding problems throughout the Peninsular City area.

The existing stormwater drainage facilities within this area consist mainly of vitrified clay pipe or brick arches, some of which date back to the 1850's, and the majority of which are inadequate for design limits. Of the existing stormwater drainage facilities, the most notable is an existing tidal drain system which was built in the 1850's as a combined sanitary and storm sewer. The system is constructed as a brick arch culvert (3' to 4' wide and approximately 7' high) which is interconnected with outlets to either the Ashley or Cooper Rivers. A brick arch along Meeting Street from Reid Street to the Battery and one along Calhoun Street from the Ashley River to the Cooper River comprise the main components of the system. When originally placed into service the system was controlled by a tide gate at each discharge point. Each day at low tide one gate was opened which allowed the system to remain flushed, and free of siltation. Over the years the tide gate system was abandoned which resulted in the siltation of the tidal drain system as it is presently in use. The existing tidal drain system and the original shoreline are depicted in Figure No. 15.

The existing tidal drain system comprises the backbone for the drainage system in the Peninsular City area south of the Crosstown Expressway. The recommended plan will utilize this existing system along with a network of new stormwater pumping stations. The plan is based on making certain improvements to the existing tidal drain system. By utilizing this old system complemented with the construction of the new pumping stations, the cost of the recommended improved system will be significantly less than constructing a complete new system.

In addition to the system of new recommended stormwater pumping stations, the major portion of the existing systems in the city either require replacement or parallel systems. Table Nos. 10 thru 35 list the existing stormwater drainage facilities along with recommended improvements and associated construction cost. The total construction cost for each watershed is listed at the end of each table and includes 20 percent of the total construction cost for improvement to upstream areas. The cost for stormwater pumping stations is not included.


HISTORICAL
DRAINAGE PATTERNS
FOR THE
PENINULAR CITY
1000 0 1000 2000 3000
GRAPHIC SCALE IN FEET
LEGEND
ORIGINAL HIGH WATER MARK
TIDAL DRAIN SYSTEM
FIGURE No. 15
N
RESERVATION
SHIPYARD CREEK
RIVER
DANIEL ISLAND
DRUM ISLAND
NEWMARKET CREEK
TOWN CREEK
ASHLEY RIVER
ALBEMARLE POINT
CUT
INTRACOASTAL WATERWAY
CHARLESTON HA
SHUTE FOLL IS.
HAMPTON PARK
ROSENDALE PLAYGROUND
MAGNOLIA CEMETERY
ST. LAWRENCE CEM.
COLLEGE PARK
MEETING STREET MANOR EXTENSION
N·7
N·6
N·5
M·7
M·6
M·5
M·4
L·5
L·4
K·7
K·6b
K·5a
K·5b
K·7d
K·6d
K·5d
K 4
J·7b
J·6
J·5d
J·5b
J·4a
J·6c
J·6d
J·5c
J·4c
J·4
I·6b
I·5b
I·4a
I·6
I·5c
I·5d
I·4

Stormwater Pumping Stations

For a number of locations in the Lower Peninsular City, the low area profiles and tide elevations at the design limits selected proved to require gravity systems that were so large as to be impractical to construct and unreasonable to fund. Alternative methods of providing acceptable stormwater protection dictated that the most feasible solution would be to mechanically pump the stormwater during periods of high tide. By providing pumping stations on the lower ends of the drainage basins, the tidal effect on the drainage system for that drainage area is nullified and the upstream facilities can be designed at a practical, acceptable size and configuration. It is recognized that the initial cost of pumping stations is high for the area served initially, but for overall protection on a "most cost effective" and practical basis, the pumping stations proved to be a more acceptable solution for certain areas.

A total of nine stormwater pumping stations are recommended for the Peninsular City area, and will serve a total of 1514 acres upon installation. The locations of the pump stations along with their approximate service areas are shown on Figure No. 16. The pump stations as envisioned will use hydraulically driven propeller pumps which allow for the location of the pump motor up to 300 feet away from the wet well and pump. On the initial priority schedule, no line work upstream of the stations is proposed due to the construction cost for the pump station. Only that amount of line work required to connect to the existing tidal drain system is recommended. However, as additional projects are funded and line improvements implemented, the effectiveness of the pump stations will increase.

Because of the high initial cost of the pump stations, the construction of the stations is separated into three phases (See Table No. 9 for pump station size and associated cost). First phase construction will consist of placing the wet well, pump house, one pump and one force main in service. Due to the limited capacity of the existing drainage facilities, one pump will provide adequate capacity to drain water from the existing drainage systems until the upstream drainage facilities are improved. At such time as the upstream improvements are constructed, the installation of one or two additional pumps and force mains will be required.

TABLE 9

STORMWATER PUMP STATIONS

NO. LOCATION	FLOW (cfs)	PUMP SIZE	FORCE MAIN SIZE & LENGTH	DRAINAGE AREA (ACRES)	WATERSHEDS SERVED	CONSTRUCTION COST PHASE I	PHASE II	PHASE III	TOTAL
1. Colonial Lake	728	3 - 120,000 GPM	850 L.F. of Triple 84"	215	Beaufain, Colonial Lake, Limehouse, Meeting, Rutledge	$ 3,096,250	$ 799,450	$ 799,450	$ 4,695,150
2. Cooper @ Jackson	424	3 - 70,000 GPM	200 L.F. of Triple 66"	175	Cooper Street and Jackson Streets	$ 1,787,400	$ 223,200	$ 223,200	$ 2,233,800
3. Reid @ East Bay	315	3 - 50,000 GPM	1700 L.F. of Triple 60"	100	Calhoun Street East and Society Street	$ 2,074,800	$ 804,000	$ 804,000	$ 3,682,800
4. Calhoun @ East Bay	621	3 - 100,000 GPM	1290 L.F. of Triple 84"	210	Calhoun Street West and Society Street	$ 3,068,900	$1,065,500	$1,065,500	$ 5,199,900
5. Calhoun Street West	765	3 - 120,000 GPM	1350 L.F. of Triple 84"	200	Calhoun Street West	$ 3,439,450	$1,142,650	$1,142,650	$ 5,724,750
6. Market @ Concord	345	3 - 60,000 GPM	150 L.F. of Triple 66"	74	Hasell Street, Market Street, and Pinckney Street	$ 1,599,300	$ 180,900	$ 180,900	$ 1,961,100
7. Fishburne Street	683	[illegible]	300 L.F. of [illegible] 84"	250	Fishburne Avenue and Spring Street	$ 2,553,150	$ 403,950	$ 403,950	$ 3,361,050
8. V.A. Hospital	[illegible]	[illegible]	[illegible]	45	V.A. Hospital	$ 1,087,600	$ 162,400	$ -	$ 1,250,000
9. Cannon @ President	617	3 - 100,000 GPM	2000 L.F. of Triple 84"	245	Spring Street	$ 3,556,200	$1,552,800	$1,552,800	$ 6,661,800
10. Forest Acres	300	3 - 50,000 GPM	2300 L.F. of Dual 66"	170	Forest Acres	$ 2,065,500	$1,081,500	$ -	$ 3,147,000
					TOTAL	$24,328,550	$7,416,350	$6,172,450	
								GRAND TOTAL	$37,917,350

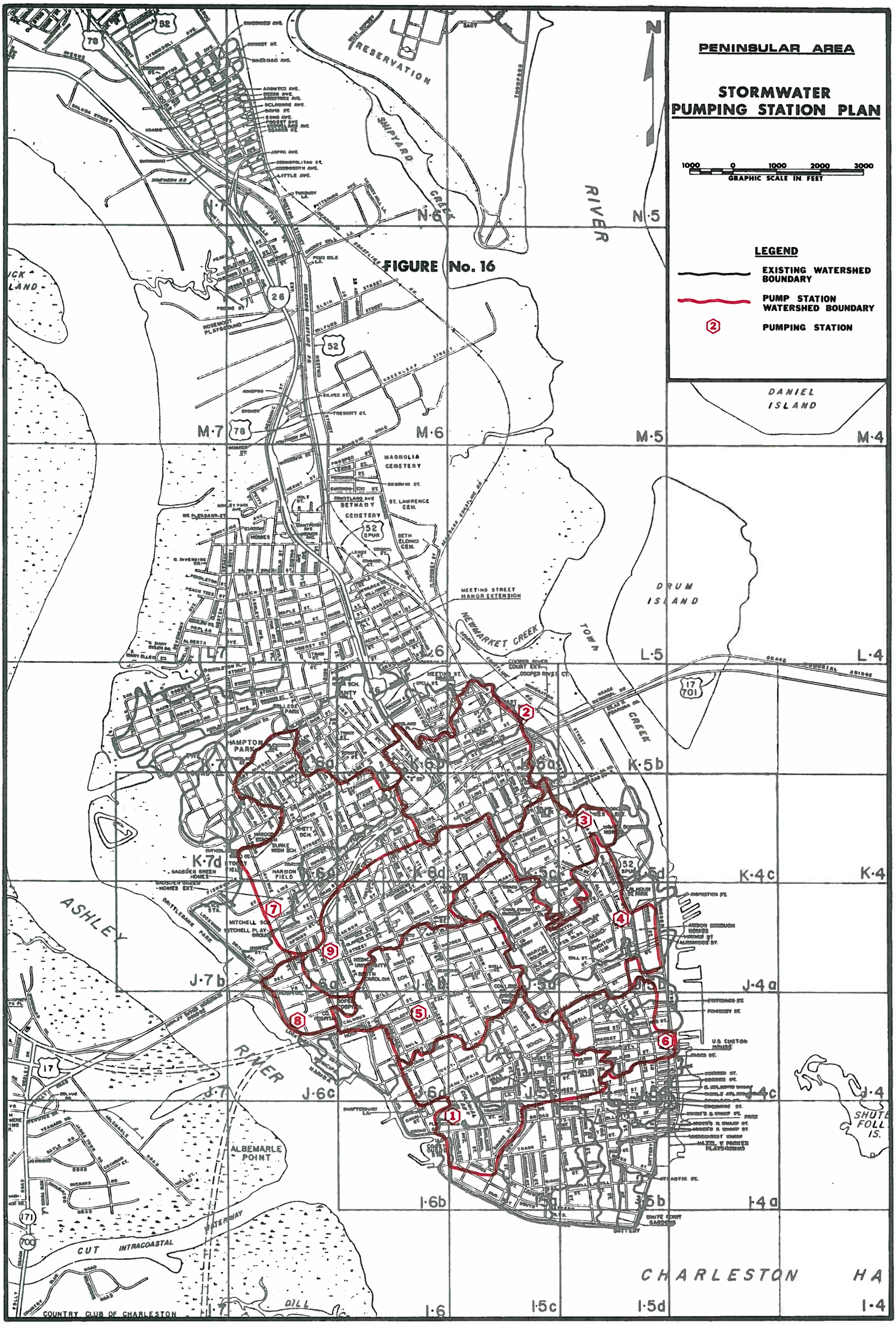

PENINSULAR AREA
STORMWATER
PUMPING STATION PLAN
1000 0 1000 2000 3000
GRAPHIC SCALE IN FEET
LEGEND
EXISTING WATERSHED BOUNDARY
PUMP STATION WATERSHED BOUNDARY
PUMPING STATION
FIGURE No. 16
N
RESERVATION
SHIPYARD CREEK
RIVER
DANIEL ISLAND
MAGNOLIA CEMETERY
BETHANY CEMETERY
ST. LAWRENCE CEM.
BETH ELOHIM CEM.
MEETING STREET MANOR EXTENSION
NEWMARKET CREEK
TOWN
DRUM ISLAND
GRACE
COOPER RIVER
HAMPTON PARK
ASHLEY
RIVER
ALBEMARLE POINT
CUT
INTRACOASTAL
WATERWAY
COUNTRY CLUB OF CHARLESTON
CHARLESTON
SHUTE FOLL IS.
1
2
3
4
5
6
7
8
9

TABLE 10

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
CHURCH STREET (I-5b,I-5d)													
I5.47 to I5.46	0.66	0.7	0.46	3	4	2.5'x3.5' B.A.	320'	(0.0011)	16	2.2	370' - 30" RCP	46,700	Relief system I5.47 to I5.47A. Ties to Water St. system.
I5.46 to I5.45	3.02	0.7	2.57	6	20	2.5'x3' B.A.	650'	(0.0011)	14	2.1		Adequate	Peak discharge reduced by relief system
I5.45 to I5.42A	6.37	0.7	7.03	10	46	2.5'x3' B.A.	320'	(0.0011)	14	2.1		Adequate	Peak discharge reduced by relief system
I5.42A to I5.42	3.02	0.45	8.39	12	51	2.5'x3' B.A.	50'	(0.0011)	14	2.1	50' - 24" RCP	9,250	Parallel system.
												55,950	SUBTOTAL
												11,200	UPSTREAM IMPROVEMENTS
												67,150	TOTAL
WATER STREET (I-5b)													
I5.36 to I5.35	1.00	0.7	0.7	4	6	0.7'x2' B.A.	240'	(0.0075)	3	2.5	240' - 18" RCP	22,950	Replace existing B.A.
I5.35 to I5.34	1.90	0.7	2.03	6	16	0.7'x2' B.A.	290'	(0.0173)	4	3.9	290' - 24" RCP	31,100	Replace existing B.A.
I5.38 to I5.34	2.1	0.7	1.47	4	12	3.5'x2.2' B.A.	310'	(0.0002)	7	0.9		Adequate	Available head
I5.34 to I5.33	3.86	0.7	6.20	8	43	3.5'x2.2' B.A.	320'	(0.0002)	7	0.9	450' - 42" RCP	92,400	Parallel system
I5.33 to I5.30	5.9	0.7	10.33	10	68	3.5'x3' B.A.	200'	(0.0002)	10	1.0	70' - Dual 48" RCP	40,400	Remove existing pipe
												186,850	SUBTOTAL
												37,400	UPSTREAM IMPROVEMENTS
												224,250	TOTAL
TRADD STREET (I-4a,I-5b)													
I5.18 to I5.15	1.10	0.9	0.99	4	8	0.7'x2' B.A.	400'	(0.0056)	2	2.2		Adequate	This system is adeuate; however requires cleaning
I5.15 to I5.13	2.61	0.9	3.34	7	23	36" RCP	270'	(0.0056)	43	6.1			
I5.13 to I5.12	1.72	0.9	4.89	9	33	36" RCP	315'	(0.0056)	43	6.1			
I5.12 to I4.11	1.45	0.9	6.20	11	40	36" RCP	455'	(0.0056)	43	6.1			
EXCHANGE STREET (I-4a,I-5b,J-4c,J-5d)													
I5.4 to I5.3	6.01	0.9	5.41	9.0	37	2'x4' Brick Arch	95'	(0.0121) 0.0139	41	6.5		Adequate	
I5.3 to I4.2	2.32	0.9	7.50	10	49	36" RCP	380'	(0.0121) 0.0035	63	9.0		Adequate	
I4.2 to I4.1	2.48	0.9	9.73	13	58	36" RCP	150'	(0.0121) 0.0073	63	9.0		Adequate	

Church Street

The Church Street watershed drains a total of 13 acres of residential and business development located in the southeastern corner of the Peninsular City. The watershed is bounded on the north by Tradd Street, on the west by Meeting Street and on the east and south by the Charleston Harbor. An existing brick arch conveys the runoff from the area to the Charleston Harbor. Installation of a 30" RCP relief system along Atlantic Street is recommended to reduce the amount of flow which the existing brick arch must handle. Upon completion of the relief system, a 24" RCP parallel to the existing brick arch is required across Murray Boulevard.

Water Street

The Water Street watershed is located east of Meeting Street and is bounded on the north by Tradd Street and on the south by Atlantic Street. The 14.8 acre basin is drained by a 3 foot wide brick arch that runs east on Water Street to the Harbor. A 42" RCP parallel to the brick arch along Water Street from Church Street to East Bay Street and a dual 48" RCP to the outfall are recommended. This system will also serve the northern portion of the Church Street watershed which is to be diverted down Atlantic Street to East Bay Street.

Tradd Street

The Tradd Street watershed is located east of Meeting Street and immediately south of Broad Street and drains a total of 6.9 acres of residential development. Existing drainage facilities consist of a 4'x2.5' brick arch along Tradd Street which connects into a 36" RCP prior to discharge in the Cooper River. The system is adequate, however, the pipes need to be cleaned to improve their hydraulic capacity.

Exchange Street

The Exchange Street watershed drains 10.8 acres around the intersection of Broad Street and East Bay Street. The existing 36" RCP system is adequate to handle the estimated runoff, however, it should be cleaned to improve the hydraulic capacity of the system.

TABLE 11

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
MEETING STREET (I-5a,I-5b,I-5d,J-5c,J-5d)													
J5.79 to J5.49	0.88	0.9	0.79	2.0	7	2.1'x2.2' Brick Arch	250'	(0.0002) -0.003	3	0.8	250' - 24" RCP	27,000	Replace existing system
J5.49 to J5.42	1.11	0.9	1.79	4.0	15	3.2'x2.5' Brick Arch	230'	(0.0002) -0.0066	7	0.9	230' - 30" RCP	28,650	Replace existing system
J5.42 to J5.44	4.27	0.9	5.63	7.0	41	2.5'x2.5' Brick Arch	315'	(0.0002) 0.0033	5	0.9	315' - 42" RCP	63,500	Parallel system
J5.44 to J5.46	2.3	0.9	7.70	9.0	52	2.5'x2.5' Brick Arch	180'	(0.0002) 0.0033	5	0.9	180' - 48" RCP	41,050	Parallel system
J5.46 to J5.39	3.34	0.9	10.71	10.0	70	24" RCP	525'	(0.0002) 0.006	3	0.9	545' - Dual 42" RCP	227,300	Relief system J5.46 to J5.11. Replace existing system
J5.39 to J5.8	6.97	0.9	16.98	14.0	98	2.5'x3.0' Brick Arch	495'	(0.0028) -0.0021	26	4.0	495' - 30" RCP	61,300	Replace existing system
J5.72 to J5.16	8.17 0.76	0.7 0.25	5.90	9.0	40	24" RCP	235'	(0.0036) 0.0011	12	3.7	1030' - Dual 54" RCP	578,550	Relief system to pump station #1. J5.8 to J5.70
J5.16 to J5.11	2.46	0.9	8.12	11.0	52	24" RCP	285'	(0.0036) 0.001	12	3.7			
J5.11 to J5.10	1.76	0.9	9.70	13.0	58	24" RCP	190'	(0.0036) 0.0015	12	3.7	515' - Dual 42" RCP	209,800	
J5.10 to J5.8	2.39	0.9	11.85	14.0	69	24" RCP	325'	(0.0036) 0.0031	12	3.7			
J5.8 to I5.6	3.50	0.9	31.98	17.0	176	3'x8' Brick Arch	570'	(0.0028) 0.001	29	3.6		Adequate	Relief by pump station #1
I5.7 to I5.6	1.78	0.9	1.6	4.0	14	2.5'x3.0' Brick Arch	220'	(0.0236)	64	9.7		Adequate	
I5.6 to I5.52	5.72 2.50	0.9 0.45	39.85	21.0	207	3.5'x3' Brick Arch	1700'	(0.0023) 0.001	33	3.5	1700' - 36" RCP	305,650	Parallel system
I5.52 to I5.51	18.02 1.88	0.7 0.45	52.46	32.0	244	5'x3' Brick Arch	550'	(0.0023) 0.001	54	3.8	950' - 54" RCP	270,200	Parallel system
I5.51 to I5.48	3.61 5.05	0.25 0.7	57.75	36.0	254	5'x3' Brick Arch	400'	(0.0026) -0.0026	56	4.1			Parallel system
												1,813,000	SUBTOTAL
												362,600	UPSTREAM IMPROVEMENTS
												2,175,600	TOTAL
KING STREET (I-5a,I-5b,I-5c,I-5d)													
I5.41 to I5.64	4.66	0.7	3.26	8	23	3.5'x2.5' B.A.	200'	(0.0039) 0.0023	34	4.2		Adequate	
I5.65 to I5.64	0.74	0.45	0.33	4	3	1.5'x2' B.A.	185'	(0.0014) 0.0154	4	1.7		Adequate	
I5.64 to I5.63	1.29	0.45	4.17	9	28	3.6'x2.5' B.A.	130'	(0.0014)	21	2.5	440' - 24" RCP	49,800	Parallel system
I5.63 to I5.60	1.84	0.45	5.00	10	33	3.6'x2.5' B.A.	310'	(0.0014) 0.0028	21	2.5			Parallel system
I5.60 to I5.58	4.22	0.45	6.90	12	42	2.9' x 2.5' B.A.	380'	(0.0029) 0.0028	22	3.4	380' - 30" RCP	48,000	Parallel system
I5.58 to I5.56	11.09	0.45	11.89	15	68	3.0'x2.5' B.A.	380'	(0.0006)	11	1.6	430' - Dual 36" RCP	168,400	Replace existing arch
I5.56 to I5.55	7.67	0.45	15.34	18	83	2.3'x4' B.A.	50'	(0.0006)	12	1.6			
												266,200	SUBTOTAL
												53,250	UPSTREAM IMPROVEMENTS
												319,450	TOTAL

Meeting Street

The Meeting Street watershed drains the immediate area around Meeting Street from Market Street to Murray Boulevard. The 76.5 acre basin is drained by a brick arch tidal drain that runs the length of Meeting Street and outfalls into the harbor, and provides less than 10 percent of required capacity.

It is recommended that the flow be divered from north of Queen Street to the proposed Colonial Lake pump station. This will reduce the flow that must be handled by the existing drainage system on Meeting Street. The relief system consist of dual 42" RCP's and 54" RCP's along Queen Street from Meeting Street to Lenwood Street. At Lenwood Street the system will connect to the proposed 6'x8' box which conveys runoff from the Limehouse watershed to the Colonial Lake pump station. Various line improvements are recommended to convey runoff to the proposed relief system.

In addition to the relief system, the existing system south of Broad Street should also be improved. The recommendation is made to install a parallel system of 36" RCP's and 54" RCP's next to the existing brick arch.

King Street

The King Street watershed drains a total of 31.5 acres, and is located south of Broad Street between Meeting Street on the east and Legare Street on the west. The watershed is drained by an existing brick arch that runs southward along King Street to the harbor. A parallel system of 24" RCP and 30" RCP is recommended to provide necessary capacity from Weims Court to South Battery. From this point to the harbor, replacing the existing brick arch system with dual 36" RCP is recommended.

TABLE 12

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
LIMEHOUSE STREET (I-5a,I-5b,I-5c,J-5a,J-5c)													
J5.113 to J5.114	0.90 0.94	0.9 0.25	1.05	4	9	2'x2.5' B.A.	370'	(0.0005) -0.0008	5	1.2			Clean existing arch
J5.114 to J5.115	1.58	0.9	2.47	7	18	2.9'x2.5' B.A.	150'	(0.0027) 0.0011	22	3.3		Adequate	
J5.115 to J5.92	0.64	0.9	3.05	8	21	2.3'x2.5' B.A.	170'	(0.0018) 0.0094	13	2.5	170' - 24" RCP	19,000	Parallel system
J5.92 to J5.91	0.41 6.38	0.25 0.9	8.89	9	60	24" VCP	290'	(0.0045)	13	4.2	685' - 42" RCP	137,550	Parallel system
J5.91 to J5.89	4.94	0.9	13.34	11	85	24" VCP	395'	(0.0066)	16	5.1			
J5.89 to J5.80	5.58 9.99	0.9 0.45	22.86	14	133	3'x3' B.A.	410'	(0.0003) -0.0028	10	1.2	410' - Dual 4'x6' Box	308,650	Replace existing B.A. flow to pump station #1
J5.77 to J5.80	3.60	0.9	3.24	6	25	24" VCP	135'	(0.0178) 0.0063	26	8.3		Adequate	Flow to pump station #1
J5.80 to J5.80A	2.18	0.9	28.06	17	154	3'x3' B.A.	170'	(0.0003)	10	1.2	1055' - Dual 4'x6' Box	786,500	Replace arch
J5.80A to J5.74	1.12 0.67	0.9 0.6	29.47	18	159	1.8'x3' B.A.	410'	(0.0003)	4	0.9			Replace arch flow to pump station #1
J5.74 to J5.70	0.84 0.76 1.38	0.6 0.9 0.45	31.27	21	163	4.2'x3' B.A.	475'	(0.0003) -0.0023	15	1.3	1850' - 6'x8' Box	852,700	Relief system J5.70 to pump station #1
J5.70 to I5.76	12.30 5.35	0.45 0.9	41.63	24	184	4'x4' B.A.	535'	(0.0003) -0.0002	20	1.4		Adequate	Peak discharge reduced by pump station #1
I5.77 to I5.76	7.53	0.45	3.39	6	26	24" VCP	175'	(0.004)	12	3.9	175' - 30" RCP	24,000	Parallel system
I5.76 to I5.74	1.31 2.80	0.6 0.45	47.06	28	231	3'x5' B.A.	55'	(0.0022)	37	3.0		Adequate	Due to relief system
I5.74 to I5.73	2.25	0.45	48.08	29	231	4.1'x3' B.A.	600'	(0.0022)	40	3.5		Adequate	Available head
I5.23 to I5.27	6.11	0.45	2.75	8	19	2.5'x3' B.A.	225'	(0.0043) 0.0034	27	4.1		Adequate	
I5.27 to I5.73	3.51	0.45	4.33	9	29	2.5'x3' B.A.	735'	(0.005) 0.0039	29	4.5		Adequate	
I5.73 to I5.72	13.38	0.45	58.43	33	269	3.5'x3' B.A.	495'	(0.0022) 0.0037	32	3.4	1645' - 4'x6' Box; 200' - 30" RCP & 850' - 24" RCP	734,650	Relief system I5.73A to I5.73B
I5.72 to I5.71	9.85	0.45	62.86	36	277	4'x4' B.A.	800'	(0.0007) -0.0002	31	2.2		Adequate	Due to relief system
I5.71 to I5.70	27.16	0.45	75.08	41	308	4'x4' B.A.	265'	(0.0007) 0.001	31	2.2	265' - 24" RCP	28,600	Parallel system
I5.70 to I5.69	4.38	0.45	77.05	43	308	4'x4' B.A.	310'	(0.0007) 0.0002	31	2.2	310' - 30" RCP	37,950	Parallel system
I5.69 to I5.68	6.86	0.45	80.14	45	313	36" CMP	50'	(0.0007) -0.0036	10	1.4	50' - Dual 36" RCP	27,750	Parallel system
												2,957,350	SUBTOTAL
												591,500	UPSTREAM IMPROVEMENTS
												3,548,850	TOTAL

Limehouse Street

The Limehouse Street watershed drains 144.7 acres of the Peninsular City area and is bounded on the east by the Meeting Street and King Street watersheds, on the west by the Rutledge Avenue watershed, and extends from George Street on the north to Murray Boulevard on the south.

Existing drainage facilities consist of a brick arch tidal drain that runs northward from Murray Boulevard to Calhoun Street. The existing tidal drain system is inadequate, providing less than 20 percent of the required capacity at high tide.

The recommendation is made to redirect a portion of the runoff to the proposed Colonial Lake pump station via a 6'x8' box section to be constructed along Queen Street from Lenwood Boulevard to the Colonial Lake pump station. This rediversion will reduce the discharge which must be handled by the system south of Broad Street. However, the existing system is inadequate for this reduced flow rate. A relief system to be constructed along Lenwood Boulevard from Tradd Street to Murray Boulevard is also recommended to divert a portion of the runoff from the existing tidal drain on Limehouse Street. The system will consist of a 4'x6' box section which will convey the runoff from the area to the Charleston Harbor. In addition, a parallel 30" RCP along Limehouse Street from Lowndes Street to the harbor is required.

TABLE 13

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
WEST BATTERY (I-5a,I-6b)													
Catch Basin to 16.1	2.04 1.70	0.9 0.45	2.61	9	18	10" CIP	35'	(0.0114)	2	3.7	35' - 24" RCP	5,400	Replace 10" CIP
												5,400	SUBTOTAL
												1,100	UPSTREAM IMPROVEMENTS
												6,500	TOTAL
RUTLEDGE AVENUE (I-5a , I-6b , J-5c)													
I5.91 to I5.89	7.38	0.45	3.32	7	24	24" RCP	380'	(0.0008) 0.0023	5.5	1.8	980' - 54" RCP	276,750	To Relief system pump station #1
I5.89 to I5.88	12.14 2.64 2.46	0.45 0.90 0.25	11.78	10	78	24" RCP	35'	(0.0114) -0.0203	21	6.7	410' - 48" RCP & 310' - 42" RCP	152,200	Redirect flow to pump station #1
I5.88 to I5.86			11.78	11	78	24" VCP	685'	(0.0006) -0.0005	5	1.5			
I5.86 to I5.85	2.09 15.24	0.25 0.45	19.16	16	107	24" VCP	340'	(0.0006) 0.004	5	1.5			
I5.85 to I5.83	6.89	0.45	22.26	18	120	30" VCP	575'	(0.0006)	8	1.7	575' - 36" RCP	116,900	To harbor, begin improvements @ I5.84
I5.83 to I5.82	16.64	0.45	29.75	22	155	30" VCP	45'	(0.0006)	8	1.7	45' - 42" RCP	14,550	To harbor, begin improvements @ I5.84
												560,400	SUBTOTAL
												112,100	UPSTREAM IMPROVEMENTS
												672,500	TOTAL
COLONIAL LAKE (I-5a,I-6b, J-5c, J-6d)													
I5.95 to I6.5	9.7 2.62	0.9 0.9	8.73	10	57	42" RCP	770'	(0.0015) 0.0018	34	3.5		Adequate	Flow to pump station #1
I6.5 to I6.4	2.64 2.90	0.45 0.25	13.01	15	74	42" RCP	50'	(0.0015) -0.0286	34	3.5		Adequate	Flow to the Ashley River
I6.4 to I6.3	2.81 3.11	0.9 0.45	16.94	19	95	3' F.B. Channel	390'	(0.0015) 0.0047	45	2.8	4' F.B. Channel	3,250	
I6.3 to I6.2			16.94	19	95	36" Alum.	105'	(0.0015) -0.0125	15	2.1	105' - Dual 36" RCP	36,850	Parallel system.
												40,100	SUBTOTAL
												8,050	UPSTREAM IMPROVEMENTS
												48,150	TOTAL

West Battery

The West Battery watershed drains 3.7 acres around the intersection of Murray Boulevard and Tradd Street. The majority of the area lies below elevation 5 mean sea level, which results in the area being inundated during very high tides. Replacement of the existing 10" CIP with a 24" RCP is recommended. This improvement will not prevent inundation by extremely high tides, but will drain once the tide receeds.

Rutledge Avenue

The Rutledge Avenue watershed drains the southwest corner of the Peninsular City between Broad Street and Murray Boulevard. The 65.6 acre basin is drained by a 24" VCP which extends southward along Rutledge Avenue from Broad Street to the discharge into the Charleston Harbor.

Recommended improvements include the construction of a system of 42" RCP, 48" RCP, and 54" RCP which will convey the majority of the runoff from the area to the proposed Colonial Lake pump station. This system will redirect the runoff from the area north of Tradd Street to the proposed pump station.

Replacing the existing system from Gibbes Street to the harbor with a system composed of 36" RCP and 42" RCP is also required.

Colonial Lake

The Colonial Lake watershed consists of the area including and surrounding Colonial Lake. The 23.8 acre watershed is drained by a 42" RCP which discharges from Colonial Lake to the Ashley River.

Construction of a pump station which will convey the runoff from the area to the Ashley River is recommended. In addition to the Colonial Lake watershed, the pump station will also serve the Beaufain, Limehouse Street, Meeting Street, and Rutledge Avenue watersheds. Improvement of the existing 36" aluminum culvert crossing Halsey Boulevard by the addition of two 36" RCP culverts parallel to the existing culvert is recommended. Consideration should also be given to raising the existing road near the intersection of Halsey Boulevard and Broad Street to eliminate existing flooding which occurs at high tides.

TABLE 14

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
QUEEN STREET (I-5b, J-4c, J-5d)													
J5.5 to J5.3	9.81	0.9	8.83	7	64	4'x2.5' Brick Arch	405'	(0.0052) 0.0017	47	5.1	405' - 42" RCP	83,800	Parallel system
J5.3 to J5.2	3.62	0.7	11.36	10	74	4'x2.5' Brick Arch	325'	(0.0054) 0.0043	48	5.2	325' - 42" RCP	68,400	Parallel system
J5.2 to J4.2	7.14	0.9	17.79	12	109	4.5'x3.5' Brick Arch	460'	(0.0054) 0.0029	87	6.0	460' - 42" RCP	94,350	Parallel system
J4.2 to J4.1A	5.63	0.9	22.86	15	130	48" RCP	100'	(0.002) 0.001	56	4.4	100' - 54" RCP	33,250	Parallel system
J4.4 to J4.1A	2.65	0.9	2.39	4	20	18"x29" CMP	105'	(0.0019) 0.0001	6	1.8	105' - 30" RCP	14,050	Replace existing 18"x29" CMP
J4.1A to J4.1	1.07	0.9	26.21	16	147	48" CMP	150'	(0.0009) 0.0073	24	1.9	150' - 4'x6' box	62,200	Replace 48" CMP
												356,050	SUBTOTAL
												71,250	UPSTREAM IMPROVEMENTS
												427,300	TOTAL
PINCKNEY STREET (J-4c, J-5d)													
J4.11 to J4.9	12.4	0.8	9.90	14	57	18"x29" CMP	205'	(0.0028) -0.0059	7	2.2	410' - 36" RCP	91,050	Outlets to harbor
											460' - Dual 42" RCP	188,650	Relief system to pump station #6. J5.55A to J5.19
												279,700	SUBTOTAL
												55,950	UPSTREAM IMPROVEMENTS
												335,650	TOTAL

Queen Street

The Queen Street watershed is a 30 acre area located east of Meeting Street and immediately south of the Old Marketplace , and contains predominately small business type developments. Existing stormwater drainage facilities consist of a brick arch that runs eastward on Queen Street, tying into a 48" CMP at Concord Street prior to discharging into the Cooper River.

A system of 30" RCP through 48" RCP parallel to the existing brick arch, and a 4'x6' box section to replace the 48" CMP is recommended.

Pinckney Street

The Pinckney Street watershed drains 12.4 acres of industrial development and is bordered on the north by the Hasell Street watershed and on the south by the Market Street watershed. It is recommended that part of the stormwater runoff be handled by the 42" RCP relief system that is recommended to run from Hasell Street to the proposed Market Street pump station. Replacing the existing 18"x29" CMP outfall with a 36" RCP is recommended.

TABLE 15

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
MARKET STREET (J-4c, J-5b, J-5d)													
J5.136 to J5.133	0.37	0.9	0.33	2	3	2.5'x3.0' Brick Arch	215'	(0.0108) 0.0019	43	6.6		Adequate	
J5.132 to J5.133	0.80	0.9	0.72	2	6	24" RCP	565'	(0.0018) 0.0018	8	2.6		Adequate	
J5.133 to J5.61	5.94	0.9	6.40	3	54	2.5'x3.0' Brick Arch	315'	(0.0018) -0.0054	18	2.7	315' - 30" RCP	40,350	Parallel system
J5.60 to J5.61	0.13	0.9	0.12	2	1	2.6'x2.5' Brick Arch	340'	(0.0091) 0.0041	34	5.8		Adequate	
J5.66 to J5.61	3.7	0.9	3.33	2	28	2.8'x2.5' Brick Arch	470'	(0.0079) 0.0018	35	5.6		Adequate	
J5.61 to J5.62	0.41	0.9	10.22	5	87	2.5'x3.0' Brick Arch	165'	(0.0079) 0.0175	18	2.7	165' - 4'x5' Box	60,800	Replace 2.5'x3.0' brick arch
J5.62 to J5.64	4.85	0.9	14.59	6	112	2.5'x3.0' Brick Arch	185'	(0.0018) -0.0063	18	2.7	515' - 4'x6.5' Box	194,700	Replace existing 2.5'x3' brick arch
J5.64 to J5.36	2.67	0.9	16.99	7	124	2.5'x3.0' Brick Arch	295'	(0.0018) -0.0063	18	2.7	"	"	
J5.41 to J5.36	2.1	0.9	1.89	2	16	2.8'x2.5' Brick Arch	490'	(0.0071) (0.0012)	34	5.3		Adequate	
J5.36 to J5.35	2.67	0.9	21.28	9	145	2.8'x2.5' Brick Arch	610'	(0.0018) 0.0036	17	2.7	1325' - Dual 4'x5' box	949,100	Parallel system
J5.35 to J5.26	12.90 1.7	0.9 0.25	33.32	13	200	2.8'x2.5' Brick Arch	365'	(0.0002) 0.0050	6	1	"	"	
J5.26 to J5.19	4.24	0.9	37.14	15	212	3.0'x3.0' Brick Arch	350'	(0.0002) 0.0050	8	1	"	"	
J5.19 to J4.7	6.1	0.9	42.63	17	234	3.0'x3.0' Brick Arch	450'	(0.0002) 0.0032	8	1	385' - Dual 5'x6' box	293,200	Discharge to pump station #6
J4.7 to J4.6	6.9	0.9	48.84	20	259	6.6'x20.0' Brick Arch	75'	(0.0002) -0.0559	165	1.9	"	"	
												1,538,150	SUBTOTAL
												307,650	UPSTREAM IMPROVEMENTS
												1,845,800	TOTAL

Market Street

The Market Street watershed consists of the area including and surrounding the Old Market Place. The 55.5 acre basin is drained by a 4' wide brick arch that runs eastward on Market Street from Meeting Street to the Cooper River and by a 5' wide brick arch running along Meeting Street. The existing drainage facilities provide less than 20 percent of the required capacity.

Replacing the existing brick arch on Meeting Street with a 4'x5' box section and placing a dual 4'x5' box section along Market Street parallel to the existing brick arch is recommended. The box culverts will lead to a proposed pump station at the intersection of Concord Street and Market Street which will discharge into the Charleston Harbor. Runoff from the Hasell Street and Pinckney Street watersheds will also be removed by the proposed pump station.

TABLE 16

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
BEAUFAIN (I-6b, J-5c, J-6d)													
J5.86 to J5.85	11.0 6.2	0.6 0.45	9.39	9	64	30" VCP	255'	(0.0004) 0.0023	7	1.4	480' - 48" RCP	107,400	Replace 30" VCP
J5.85 to J5.84	1.8	0.45	10.20	11	65	30" VCP	225'	(0.0004) 0.0016	7	1.4	—	—	Replace 30" VCP
J5.84 to I6.13	4.5	0.45	12.23	13	73	30" VCP	950'	(0.0004)	7	1.4	475' - 54" RCP	129,400	Replace 30" VCP
J5.87 to J6.4	3.8 8.1	0.7 0.45	6.31	8	44	24" VCP	470'	(0.0036) 0.0013	10	3.1	410' - 36" RCP	72,450	Relief system J5.87 to J5.84
J6.4 to J6.3	8.2	0.45	10.0	11	64	2.1'x2' B.A.	480'	(0.0006) 0.006	5	1.3	410' - 30" RCP	49,600	Relief system J6.4 to J6.2
J6.3 to I6.13	14.7	0.45	16.62	14	96	30" VCP	405'	(0.0002)	5	1.0	405' - 42" RCP	80,800	Relief system to pump station #1, J6.3 to J6.2
I6.13 to I6.10	6.0	0.45	31.55	19	169	5'x5' Box	730'	(0.0004)	43	1.9	475' - 48" RCP 480' - Dual 54" RCP	374,400	To Colonial Lake pump station
I6.10 to I6.8	6.6	0.45	34.52	24	176	5'x5' Box	270'	(0.0004)	43	1.9		Adequate	Relief system to pump station
												814,050	SUBTOTAL
												162,850	UPSTREAM IMPROVEMENTS
												976,900	TOTAL
MARINA (J-6c, J-6d)													
J6.12 to J6.11	3.2	0.45	1.44	4	12	24" RCP	70'	(0.001) -0.0044	14	4.5		Adequate	
J6.11 to J6.10	2.0 7.7	0.25 0.45	5.41	5	46	2' F.B. Channel	380'	(0.001)	20	1.8	380' - 4' F.B. Channel	3,250	
U6.10 to J6.9				7	46	24" RCP	100'	(0.001) -0.0204	14	4.5	100' - Dual 36" RCP	34,950	Replace existing 24" RCP
J6.16 to J6.14	5.5	0.7	3.82	11	24	30" RCP	110'	(0.0027) 0.0153	18	3.8	190' - 36" RCP	41,200	Replace 30" RCP
J6.14 to J6.13	1.5	0.9	5.15	12	32	30" RCP	80'	(0.0027) -0.0144	18	3.8	—	—	Parallel system. Price includes
J6.7 to J6.6	20.0 3.80	0.9 0.45	30.24	19	164	42" RCP	100'	0.0228	54	5.6	100' - Dual 4'x8' Box	224,900	raising Lockwood Blvd. to elevation 6.0.
												304,300	SUBTOTAL
												60,900	UPSTREAM IMPROVEMENTS
												365,200	TOTAL

Beaufain

The Beaufain watershed drains the area bounded by Beaufain Street on the south, Pitt Street on the east, Montague Street on the north and Lockwood Drive on the west.

The existing drainage system is a 30" VCP along Beaufain Street which connects into a box section that crosses Lockwood Drive and outlets to the Ashley River. Due to the inadequacy of this system, it is recommended that the majority of the runoff be redirected to the proposed Colonial Lake pump station. Recommended system improvements include a system of dual 54" RCP's along Ashley Avenue from Beaufain Street to the Colonial Lake pump station, and a series of 54" RCP and 48" RCP along Beaufain Street. The downstream reaches of the Beaufain System west of Gadsden Street will be adequate upon completion of the system to divert runoff to the Colonial Lake pump station. The existing system requires cleaning and a new tide gate installed at the end of the existing box section.

Marina

The Marina watershed includes the area around the old City Marina and is bounded by Calhoun Street on the north, Barre Street on the east, Montague Avenue on the south, and Lockwood Drive on the west. The existing drainage facilities consist of a lake located east of Lockwood Drive, a pipe system into the lake from the present City Marina site west of Lockwood Drive, and a channel which drains the area east of Barre Street.

It is recommended that the existing channel which drains the area around Barre Street be cleaned and widened. Also, it is recommended that the existing 24" RCP culvert under Halsey Boulevard be replaced with dual 36" diameter culverts. In addition, placing dual 4'x8' box culverts parallel to the existing 42" RCP outfall under Lockwood Drive is required. It is also recommended that Lockwood Drive be raised to elevation 6.0 mean sea level which will reduce the frequency that Lockwood Drive is inundated by tide waters.

TABLE 17

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
HASELL STREET (J-4a, J-4c, J-5b, J-5d)													
J5.59 to J5.54	3.44	0.7	2.41	5.0	20	2.5'x2.5' Brick Arch	475'	(0.0012) 0.0077	12	2.1		Adequate	Requires cleaning
J5.54 to J5.50	5.36	0.7	6.16	8.0	43	24" RCP	450'	(0.0058) 0.0073	15	4.8	550' - Dual 36" RCP	193,900	Relief system to pump station #6
J5.50 to J5.12A	4.59	0.9	10.29	11.0	66	24" RCP	270'	(0.0015) -0.0079	8	2.4	450' - 36" RCP	85,150	Reverse flow to relief system @ J5.54
J4.12A to J4.10	4.24	0.7	13.26	13.0	80	24" RCP	470'	(0.0015) -0.0014	5	1.6		Adequate	Due to relief system
												279,050	SUBTOTAL
												55,850	UPSTREAM IMPROVEMENTS
												334,900	TOTAL
SOCIETY STREET (J-5a, J-5b, J-5c, J-5d)													
J5.143 to J5.142	0.61	0.7	0.43	5	4	2'x3' B.A.	190'	(0.0004) 0.0022	6	1.1		Adequate	
J5.142 to J5.140	1.11	0.7	1.21	6	9	1.9'x3' B.A.	310'	(0.0004) 0.0013	5	1.1		Adequate	With available head
J5.140 to J5.138	8.0	0.7	6.81	8	48	3.5'x3' B.A.	375'	(0.0018)	29	3.0	375' - 42" RCP	75,000	Replace existing arch
J5.138 to J5.137	5.1	0.7	10.38	11	66	3.5'x3' B.A.	110'	(0.0045)	55	5.1	110' - 24" RCP	12,900	Parallel system
J5.137 to J5.136	0.77	0.7	10.92	12	67	4.2'x3.5' B.A.	700'	(0.0021) 0.0051	49	3.7	700' - 30" RCP	85,100	Parallel system
J5.136 to J5.135	8.5	0.7	16.87	17	93	4.5'x3.5' B.A.	570'	(0.0023) -0.0001	57	3.9	570' - 36" RCP	102,500	Parallel system
J5.135 to J5.134	6.6	0.7	21.49	21	112	3.75'x3.5' B.A.	365'	(0.0022) 0.0032	43	3.6	365' - 48" RCP	83,100	Parallel system
J5.134 to J5.134A	2.87	0.7	23.50	23	120	3.8'x3.5' B.A.	220'	(0.0195)	130	10.9	220' - 48" RCP	55,500	Parallel system
J5.148 to J5.134A	5.2	0.9	4.68	5	40	2.5'x2.5' B.A.	340'	(0.0121)	37	6.6	1265' - 4'x6' Box	472,200	Relief system to pump station #4
J5.131 to J5.134A	2.89	0.9	2.60	5	22	3.2'x1.8' B.A.	280'	(0.0061)	24	4.5		Adequate	
J5.134A to J5.129	2.57	0.9	33.09	26	162	3.8'x3' B.A.	100'	(0.0061)	60	5.8		Adequate	With relief system to pump station
J5.129 to J5.128	1.41	0.9	34.36	27	168	3.8'x4' B.A.	315'	(0.0005) -0.0019	24	1.8		Adequate	
J5.128 to J4.13	4.61	0.9	38.51	28	187	3.4'x4' B.A.	860'	(0.0005) 0.0013	21	1.7		Adequate	60" CMP on end of brick arch
												886,300	SUBTOTAL
												177,300	UPSTREAM IMPROVEMENTS
												1,063,600	TOTAL

Hasell Street

The Hasell Street watershed drains 17.6 acres and is located east of Meeting Street and immediately north of the Old Market place. The existing drainage system consists of a brick arch that runs eastward along Hasell Street to East Bay Street. The brick arch ties into a 24" RCP at East Bay Street which discharges to the Cooper River. Replacing the brick arch with a 36" RCP is recommended. At East Bay Street, a relief system consisting of dual 36" RCP will take the majority of the Hasell Street runoff to the proposed Market Street pump station. The remainder of the Hasell Street system will be adequate upon completion of the relief system.

Society Street

The Society Street watershed drains 50 acres and is located south of Calhoun Street and north of Market Street on the east side of the Peninsular City. Existing drainage facilities consist of a 4 foot wide brick arch that runs eastward along Society Street and through the port area before outfalling into the Cooper River.

The recommended system improvements include replacing the arch on King Street that runs from George Street to Society Street with a 42" RCP. A system of various sized pipes parallel to the existing arch on Society Street is required. At the intersection of Society Street and East Bay Street, it is proposed to redirect the 4'x6' box to a pump station recommended for the Calhoun Street East watershed. With the relief provided by the pump station, the remainder of the Society Street system is adequate.

TABLE 18

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
CALHOUN STREET EAST (J-4a, J-5a, J-5b, K-5c, K-5d)													
J5.126 to J5.127	0.9	0.9	0.81	3	7	2'x4' Box	180'	(0.0003)	10	1.3			Runoff directed to Spring Street system
J5.127 to J5.45A	7.5	0.9	7.56	5	64	2'x4' Box	635'	(0.0003) -0.0011	10	1.3			
J5.45A to K5c.39	15.0	0.9	21.06	9	143	3'x3.5' Box	565'	(0.0003) 0.0016	16	1.5	565' - Dual 42" RCP	229,000	Replace existing box
K5.37 to K5c.39	2.5	0.9	2.25	5	19	3'x3' Box	465'	(0.01) 0.0014	74	8.2		Adequate	
K5c.39 to J5.40A	4.7	0.9	27.54	13	165	3'x3' Box	335'	(0.0003) 0.0016	13	1.4	335' - Dual 48" RCP	147,550	Replace existing box
J5.40A to J5.41A	6.1	0.9	33.03	15	188	3.5'x2.5' Box	110'	(0.0003) 0.0016	12	1.4	110' - Dual 4'x5' Box	90,000	Replace existing box
J5.41A to J5.185	2.6	0.9	35.37	16	198	3.5'x2.5' Box	540'	(0.0003) 0.0013	12	1.4	540' - Dual 4'x5' Box	396,000	Replace existing box
J5.185 to J5.184	7.9	0.9	42.48	20	225	3.75'x2.5' Box	195'	(0.0003) 0.0013	13	1.4	195' - Dual 4'x5' Box	149,200	Replace existing box
J5.184 to J5.180	3.3	0.9	45.45	21	236	4'x2.5' B.A.	425'	(0.0003) 0.0013	11	1.2	425' - Dual 4'x5' Box	302,550	Replace existing box
J5.180 to J5.179	0.5 3.8	0.25 0.9	49.00	24	250	4'x3' B.A.	325'	(0.0003) -0.0001	14	1.3	325' - Dual 4'x5' Box	239,650	Replace existing brick arch
J5.169 to J5.179	11.1	0.9	9.99	9	68	4'x3.5' B.A.	670'	(0.0087) 0.0028	94	7.4		Adequate	
J5.172 to J5.174	0.7	0.9	0.63	3	5	1'x2.5' B.A.	320'	(0.0034) 0.0071	4	2.2		Adequate	
J5.174 to J5.175	2.2	0.9	2.61	5	17	2'x2.5' B.A.	155'	(0.005) 0.0012	17	3.9		Adequate	
J5.175 to J5.179	4.3	0.9	6.48	6	30	3.25'x3.25' B.A.	260'	(0.021) 0.0313	98	10.4		Adequate	
J5.179 to J5.193	4.9 4.6	0.9 0.25	71.03	26	348	4.5'x3.5' B.A.	830'	(0.0003)	21	1.4	830' - Dual 5'x6' box	637,700	Replace existing arch
J5.192 to J5.191	7.2	0.7	5.04	8	35	24" RCP	160'	(0.0055) 0.0051	15	4.6	360' - 30" RCP	47,350	Parallel system
J5.191 to J5.193	0.7	0.7	5.53	9	38	24" RCP	200'	(0.0088)	18	5.9			
J5.193 to J5.194A	3.1 4.6	0.7 0.9	82.87	32	385	4.5'x3.5' B.A.	585'	(0.001)	38	2.6	585' - Dual 5'x6' Box	448,700	Replace existing arch

(CONTINUED)

TABLE 18

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
CALHOUN STREET EAST (CONTINUED)													
J5.200 to J5.197	1.7	0.9	1.53	3	13	24" RCP	390'	(0.009) 0.0113	19	5.9		Adequate	
J5.197 to J5.194A	2.8	0.9	4.05	6	31	24" RCP	280'	(0.003) 0.0049	11	3.4	280' - 30" RCP	34,450	Parallel system
J5.194A to J5.167	16.9 4.8	0.9	101.38	36	446	4'x3.5' B.A.	250'	(0.0021) 0.0049	46	3.6	310' - Dual 6'x6' Box	251,550	Replace existing system to pump station #4
J5.167 to J5.165	7.4	0.9	108.04	38	459	4.6'x3.5' B.A.	300'	(0.0008) 0.0024	35	2.3	295' - Dual 4'x5' Box	232,950	Replace existing system. Redirect water to pump station #4
J5.165 to J5.163	23.2	0.8	126.60	40	519	4.5'x3.5' B.A.	255'	(0.006)	92	6.4	255' - 4'x5' Box	95,200	
J5.150 to J5.151	3.4	0.8	2.72	4	23	1.2'x2' B.A.	255'	(0.0044) 0.0112	5	2.7	255' - 30" RCP	31,500	Replace existing arch
J5.152 to J5.151	3.8	0.6	2.28	4	19	24" VCP	170'	(0.0025) 0.0064	10	3.1	170' - 30" RCP	21,600	Replace existing 24" VCP
J5.159 to J5.151	2.4	0.6	1.44	3	12	1.2'x2' B.A.	270'	(0.0038)	5	2.6	270' - 24" RCP	29,050	Replace existing arch
J5.151 to J5.155	1.6	0.6	7.40	6	57	24" VCP	355'	(0.0003) 0.0004	1	0.3	575' - 48" RCP	130,450	Replace existing 24" VCP
J5.155 to J5.157	3.5	0.6	9.50	8	67	24" VCP	220'	(0.0003) -0.0004	1	0.3			
J5.157 to J5.163	2.6	0.6	11.06	9	75	24" VCP	250'	(0.0003)	1	0.3	250' - 4'x5' Box	93,400	Replace existing 24" VCP. Redirect water to pump station #4
J5.163 to J5.162	3.3	0.6	139.64	42	558	3.4'x4' B.A.	305'	(0.0003)	5	0.4		Adequate	Relief by pump station #4
J5.162 to J4.16	8.4	0.8	146.36	44	571	4'x6' Box	560'	(0.0003) -0.0031	15	0.6		Adequate	Relief by pump station #4
												3,607,850 712,600 4,329,450	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Calhoun Street East

The Calhoun Street East watershed drains 184 acres via an existing 4.5 foot wide brick arch which runs eastward along Calhoun Street to the Cooper River. Existing drainage facilities also include a 3.5 foot wide brick arch running southward along Meeting Street that connects with the brick arch on Calhoun Street. The area is located along either side of Calhoun Street from Concord Street on the east to King Street on the west, and includes the area between King Street and Meeting Street from Calhoun Street to Mary Street.

It is recommended that the existing brick arch on Meeting Street be replaced with dual 4'x5' box sections and the existing brick arch on Calhoun Street be replaced with dual 5'x6' boxes from Meeting Street to Alexander Street. At this location the size increases to a 6'x6' box section which conveys runoff to a proposed pump station which will be located near the intersection of Calhoun Street and East Bay Street. Runoff from the downstream areas along Marsh Street will also be redirected to the proposed pump station via a new 4'x6' box section which will replace the existing 24" VCP.

TABLE 19

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
CALHOUN STREET WEST (CONTINUED)													
J6.56 to J6.55	4.6	0.7	3.22	4	27	24" VCP	245'	(0.0009) 0.0006	6	1.9	245' - 30" RCP	30,400	Replace existing 24" VCP
J6.55 to J6.36	1.4	0.7	4.20	5	36	24" VCP	395'	(0.00026) 0.0006	8	2.6	395' - 36" RCP	69,850	Replace existing 24" VCP
J6.36 to J6.33	3.9	0.7	99.77	25	499	3.7'x3' Box	290'	(0.00026)	16	1.4	790' - Dual 6'x6' Boxes	633,600	Flow to pump station #5
J6.33 to J6.30	9.6	0.7	106.49	27	522	3.1'x3' Box	350'	(0.00026)	12	1.3		Adequate	J6.36 to J6.33 & J6.33 to pump station
J6.31 to J6.30	15.1	0.7	10.57	6	81	24" VCP	260'	(0.0013)	7	2.2	305' - 4'x6' Box 75' - 4'x6.5' Box	147,800	Redirect water to Pump Station #5. J6.31 to pump station #5
J6.30 to J6.29	2.7	0.9	119.49	29	574	3.1'x3' Box	60'	(0.00026)	12	1.3			Redirect water to pump station; See J6.31 to J6.30 for associated cost
J6.60 to J6.59	7.6	0.7	5.32	6	41	24" VCP	245'	(0.002)	9	2.8	245' - 42" RCP	50,050	Replace 24" VCP
J6.59 to J6.58	3.1	0.7	7.49	8	52	24" VCP	300'	(0.0011)	7	2.1	300' - Dual 30" RCP	73,450	Replace 24" VCP
J6.58 to J6.29	6.8	0.7	12.25	10	80	24" VCP	345'	(0.0011)	7	2.1	345' - Dual 36" RCP	128,800	Replace 24" VCP
J6.29 to J6.28	0.3	0.9	132.01	31	620	3.1'x3' Box	230'	(0.00026)	12	1.3	430' - 4'x6' Box	161,550	Redirect water to pump station #5. Replace box
J6.28 to J6.27	1.6	0.7	133.13	33	606	3.1'x3' Box	200'	(0.00026)	12	1.3			Replace box
J6.27 to J6.26	10.3	0.9	142.40	34	641	3.1'x3' Box	220'	(0.00026)	12	1.3	220' - Dual 42" RCP	96,500	Redirect water to pump station #5
J6.61 to J6.26	9.6	0.9	8.64	5	73	30" VCP	320'	(0.0051) 0.003	25	5.2	320' - Dual 36" RCP	114,300	Relief system to pump statin #5. Replace 30" VCP.
J6.26 to J6.25	3.3	0.9	154.01	36	678	3.5'x3' Box	260'	(0.00026) 0.0017	15	1.4		Adequate	Peak flow reduced by pump station
J6.25 to J6.23	2.9	0.9	156.62	38	678	3.5'x3' Box	210'	(0.00026) 0.0009	15	1.4		Adequate	Peak flow reduced by pump station
J6.23 to J6.22	3.4	0.9	159.68	39	678	5.3'x4' Box	590'	(0.00026) 0.0009	37	1.7		Adequate	Peak flow reduced by pump station
J6.22 to J6.21	3.6	0.9	162.92	43	678	5.4'x4.5' Box	340'	(0.00026) -0.0008	44	1.8		Adequate	Peak flow reduced by pump station
J6.21 to J6.20	1.3	0.9	164.09	45	678	5.5'x5' Box	120'	(0.00026) 0.0029	53	1.9		Adequate	Peak flow reduced by pump station
J6.20 to J6.18	0.3	0.9	164.36	46	678	5.5'x5' Box	345'	(0.00026) 0.0005	53	1.9		Adequate	Peak flow reduced by pump station
J6.18 to J6.17	2.0	0.9	166.16	48	678	6'x5' Box	340'	(0.00026) 0.0005	59	2.0		Adequate	Peak flow reduced by pump station
												3,200,800	SUBTOTAL
												640,200	UPSTREAM IMPROVEMENTS
												3,841,000	TOTAL

TABLE 19

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT/FT)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
CALHOUN STREET WEST -5a, J-5c, J-6b, J-6c, J-6d)													
J5.111 to J5.109	9.0	0.9	8.10	5	39	4'x3.5' B.A.	270'	(0.0044) 0.0027	67	5.2		Adequate	
J5.109 to J5.106	3.0	0.9	10.80	7	79	6'x4' B.A.	290'	(0.0045) 0.0027	210	9.4		Adequate	
J5.121 to J5.120	8.6	0.7	6.02	7	44	5'x3' B.A.	120'	(0.0014) 0.0005	42	3.0		Adequate	
J5.120 to J5.119	0.8	0.7	11.62	8	81	4.5'x3' B.A.	585'	(0.0014) 0.0005	36	2.9	570' - 36" RCP	125,400	Parallel system
J5.119 to J5.118	12.5	0.7	20.37	12	124	4.5'x3' B.A.	85'	(0.0075) -0.0037	84	6.7			Parallel system
J5.118 to J5.117	1.0	0.7	21.07	13	126	4.5'x3' B.A.	270'	(0.0047) -0.0037	67	5.3	270' - 42" RCP	54,850	Parallel system
J5.117 to J5.106	7.8	0.7	26.53	15	151	5.5'x3.5' B.A.	355'	(0.002) 0.0019	70	3.9	355' - 5'x4' Box	126,000	Parallel system
J5.108 to J5.106	2.50	0.7	1.75	4	15	5.25'x3.75' B.A.	600'	(0.0082) 0.0028	146	8.0		Adequate	
J5.106 to J5.104	7.4	0.9	45.74	17	252	5.75'x4' B.A.	340'	(0.002) -0.0017	86	4.2	505' - 5'x6' Box	188,600	Parallel system
J5.104 to J5.100	2.4	0.9	47.90	19	256	4.5'x4' B.A.	165'	(0.002) -0.0017	63	3.9			
J5.103 to J5.102	5.7	0.7	3.99	6	31	24" VCP	265'	(0.0034) 0.0011	11	3.6	265' - 36" RCP	47,900	Replace existing 24" VCP
J5.102 to J5.100	2.6	0.7	5.81	8	41	24" VCP	195'	(0.0034) 0.0059	11	3.6	195' - 42" RCP	40,450	Replace existing 24" VCP
J5.100 to J5.99	1.5	0.7	54.76	20	290	4'x5' B.A.	165'	(0.0032) 0.0017	86	5.0	525' - 6'x6' Box	208,350	Parallel system
J5.99 to J6.37	2.0	0.7	56.16	21	292	5'x3.5' B.A.	360'	(0.0032) 0.0017	78	4.8			Parallel system
J5.96 to J5.95	9.5	0.7	6.65	8	45	36" Brick Pipe	260'	(0.0035) 0.003	28	4.0	260' - 30" RCP	32,100	Parallel system
J5.95 to J5.93	2.8	0.7	8.61	10	56	1.75'x3' B.A.	140'	(0.0016) 0.0021	9	2.1	335' - 42" RCP	70,350	Parallel system
J5.93 to J5.94	1.7	0.7	9.80	11	63	2.2'x3' B.A.	195'	(0.0016) 0.0016	14	2.4			Parallel system
J5.94 to J6.37	1.5	0.7	10.85	12	66	2.8'x3' B.A.	190'	(0.0016) 0.0079	20	2.6	190' - 42" RCP	39,500	Parallel system
J6.54 to J6.53	12.1	0.7	8.47	9	58	24" VCP	215'	(0.002) 0.0017	9	2.8	365' - Dual 36" RCP	141,550	Replace existing 24" VCP
J6.53 to J6.52	2.9	0.7	10.50	10	69	24" VCP	150'	(0.0001) -0.0081	2	0.6			
J6.52 to J6.51	12.9	0.7	19.53	11	125	24" VCP	325'	(0.0001) -0.0037	2	0.6	980' - 4'x6.5' Box	374,650	Replace existing 24" VCP
J6.51 to J6.50	2.3	0.7	21.14	13	127	1'x3.3' B.A.	230'	(0.0006) -0.0037	2	0.9			Replace existing B.A.
J6.50 to J6.37	2.6	0.7	22.96	15	131	2.5'x2.5' B.A.	425'	(0.0006) 0.0041	8	1.5			Replace existing B.A.
J6.37 to J6.36	4.1	0.7	92.84	23	473	5'x3.5' Box	310'	(0.0006) 0.0019	43	2.5	310' - Dual 5'x6' Boxes	244,800	Replace existing 5'x3.5' Box

(CONTINUED)

Calhoun Street West

The Calhoun Street West watershed drains 212.6 acres along Calhoun Street and is bounded by King Street on the east, Bee Street on the north, Lockwood Drive on the west and Montagu Street on the south. Existing drainage facilities consist of a 4 foot wide box that runs westward along Calhoun Street, outfalling into the Ashley River.

A pump station to be located at the old Charleston Museum site is recommended for this watershed, and will convey the stormwater runoff from the area to the Marina Lake. Two systems are proposed which will connect the pump station to the exiting tidal drain on Calhoun Street. The first system will convey runoff from the area east of Rutledge Avenue to the pump station and consist of dual 6'x6' box sections from the pump station to Calhoun Street and along Calhoun Street to Smith Street. The second system consist of a 4'x6' box section which will convey runoff from the area west of Rutledge Avenue to the pump station.

In addition to the improvements along Calhoun Street, the existing drainage facilities on Smith Street, Pitt Street, Coming Street, Barre Street, and Ashley Avenue require improvements, as well as numerous upstream systems which require replacement.

TABLE 20

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
V.A. HOSPITAL (J-6a, J-6c, J-6d)													
J6.104 to J6.103	2.56	0.8	2.05	8	14	30" RCP	50'	(0.0462) 0.0016	76	15.6		Adequate	
J6.103 to J6.102	6.18	0.8	6.99	13	42	30" RCP	35'	(0.0462) 0.0034	76	15.6	35' - 30" RCP	5,900	Parallel system.
J6.102 to J6.101	2.43 0.87	0.8 0.9	9.71	14	56	30" RCP	205'	(0.009)	34	6.9	205' - 30" RCP	25,700	Parallel system. Flow to existing pump station
J6.94 to J6.92	0.98	0.9	0.88	5	7	30" RCP & 24" RCP	140'	(0.005) -0.0005	39	5.0	140' - 24" RCP	16,000	Replace existing 24" RCP
J6.92 to J6.90	1.07	0.9	1.84	6	14	30" RCP & 24" RCP	140'	(0.0036) 0.0019	33	4.3		Adequate	
J6.91 to J6.90	3.46	0.8	2.78	12	17	24" RCP	140'	(0.0036) 0.0029	14	4.4	140' - 30" RCP	18,150	Replace 24" RCP
J6.90 to J6.86	0.90	0.8	5.34	13	32	48" RCP	230'	(0.0036) -0.0022	75	5.9	230' - 36" RCP	41,950	Replace 48" RCP, increase slope
J6.89 to J6.87	1.91	0.8	1.53	11	10	24" RCP	275'	(0.0063)	16	4.9		Adequate	
J6.87 to J6.86	1.65	0.9	3.02	13	18	24" RCP	50'	(0.0005) -0.0124	4	1.4	50' - 30" RCP	7,650	Replace 24" RCP
J6.99 to J6.97	1.83	0.8	1.46	3	12	30" RCP	170'	(0.0029) -0.0003	19	3.9	170' - 30" RCP	21,600	Replace existing 30" RCP (negative slope)
J6.98 to J6.97	1.46	0.9	1.31	7	10	30" RCP	45'	(0.0029) 0.0169	19	3.9		Adequate	
J6.97 to J6.96	1.36	0.8	3.86	8	27	1.5'x4' Box	70'	(0.0017) 0.0031	16	2.7	295' - 36" RCP	52,950	Replace existing 1.5'x4' box
J6.96 to J6.86	0.80	0.8	4.50	9	31	30" RCP	225'	(0.0017) 0.0096	15	3.0			Replace 30" RCP
J6.86 to J6.81	1.60	0.9	14.30	15	82	60" RCP	295'	(0.0005) 0.0012	50	2.6	295' - 60" RCP	81,600	Replace or relay existing 60" RCP

(CONTINUED)

TABLE 20

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
V.A. HOSPITAL (CONTINUED)													
J6.84 to J6.83	1.17	0.9	1.05	4	9	24" RCP	190'	(0.0016) 0.0037	8	2.5		Adequate	with proposed pump station
J6.83 to J6.82	1.54	0.9	2.44	5	21	30" RCP	120'	(0.0016) 0.0049	14	2.9		Adequate	
J6.82 to J6.81	0.38	0.9	2.78	6	21	30" RCP	100'	(0.0004) 0.0034	7	1.4		Adequate	
J6.81 to J6.66	2.90	0.8	19.40	17	107	60" RCP	180'	(0.0004) 0.003	45	2.3	180' - 60" RCP	56,550	Replace or relay existing 60" RCP. Flow to pump station #8
J6.79 to J6.77	1.69	0.9	1.52	7	11	30" RCP	220'	(0.001) 0.0013	11	2.3		Adequate	
J6.78 to J6.77	3.42	0.8	2.74	9	19	24" RCP	90'	(0.0005) -0.0042	4	1.4	90' - 30" RCP	12,300	Replace existing 24" RCP
J6.77 to J6.74	3.17	0.8	6.80	10	45	36" RCP	280'	(0.0009) 0.0032	17	2.4	280' - 48" RCP	68,200	Replace 36" RCP
J6.74 to J6.73	2.91	0.8	9.13	12	56	36" RCP	130'	(0.0009) -0.0065	17	2.4	130' - 48" RCP	30,500	Replace 36" RCP
J6.73 to J6.72	1.46	0.8	10.3	13	62	42" RCP	210'	(0.0009) 0.0028	26	2.7	210' - 48" RCP	47,400	Replace 42" RCP
J6.72 to J6.69	2.33	0.8	12.16	15	69	42" RCP	400'	(0.0009) 0.0019	26	2.7	660' - 48" RCP	154,450	Replace 42" RCP
J6.69 to J6.68	0.96	0.8	12.93	18	70	42" RCP	160'	(0.0009) 0.0035	26	2.7			Replace 42" RCP
J6.68 to J6.67	1.74	0.9	14.50	19	78	48" RCP	100'	(0.0042) 0.0001	81	6.4			Replace 48" RCP
J6.65 to J6.63	2.92	0.8	36.24	20	192	5'x8' Box	120'	0.0045	264	6.6			To be removed for installation of force main from pump station
												640,900	SUBTOTAL
												128,200	UPSTREAM IMPROVEMENTS
												769,100	TOTAL

VA Hospital

The VA Hospital drainage basin drains 55.7 acres around the VA Hospital. Existing drainage facilities include two systems which discharge into the Ashley River via a 5'x8' box culvert under Lockwood Drive. In addition, there is an existing pump station located on Doughth Street which conveys runoff from the area north of the VA Hospital to the Ashley River.

A pump station located along the east side of Lockwood Drive is recommended for this area. The proposed pump station will eliminate the tidal influence which presently limits the capacity of the system. In addition, upstream improvements will include a system which will serve the area near the intersection of Spring Street and Lockwood Drive that is frequently inundated during periods of high tide and moderate to heavy rainfall. During final design of this system the existing pump station on Doughth Street should be re-evaluated to determine if it could be abandoned as a result of the new pump station.

TABLE 21

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
PORT AREA #1 (K-5d)													
K5.8 to K5.7	11.63	0.9	10.47	10	69	40"x65" CMP	215'	(0.0005) 0.0003	25	1.6	215' - Dual 36" RCP	78,800	Parallel system
K5.7 to K5.6	4.45	0.9	14.48	11	93	40"x65" CMP	130'	(0.0005) 0.01	25	1.6	330' - Dual 42" RCP	150,750	Parallel system
K5.6 to K5.5	1.24	0.9	15.60	12	95	40"x65" CMP	200'	(0.0005)	25	1.6			
												229,550	SUBTOTAL
												45,950	UPSTREAM IMPROVEMENTS
												275,500	TOTAL
PORT AREA #2 (K-5d)													
K5.15 to K5.14	1.51	0.9	1.36	5	12	18"x29" CMP	110'	-0.0006	0	0	280' - Dual 24" RCP	60,100	Replace 18"x29" CMP. Outlet via Port Area #3
K5.14 to Outfall	0.7	0.9	1.99	6	15	18"x29" CMP	90'		0	0			
												60,100	SUBTOTAL
												12,050	UPSTREAM IMPROVEMENTS
												72,150	TOTAL
PORT AREA #3 (K-5d)													
K5.10 to K5.9	5.81	0.9	5.23	5	44	18"x29" CMP	90'	0	0	0	440' - Dual 30" RCP	109,700	Replace 18"x29" CMP
K5.9 to Outfall	0.6	0.9	5.77	6	44	18"x29" CMP	50'	0	0	0			
												109,700	SUBTOTAL
												21,950	UPSTREAM IMPROVEMENTS
												131,650	TOTAL

Port Area 1

The Port Area 1 watershed is a 17.3 acre area in the port area that is drained by an existing 40"x65" CMP system. A parallel system consisting of dual 36" RCP's enlarging to dual 42" RCP's is recommended to provide the required capacity. It should be noted that these improvements are on private property (South Carolina State Ports Authority) and provide drainage for this property only.

Port Area 2

The Port Area 2 is located within the Port Area and drains 5.9 acres via an existing 18"x29" CMP. A system of dual 30" RCP's is proposed to replace the existing 18"x29" CMP. It should be noted that these improvements are on private property (South Carolina State Ports Authority) and provide drainage for this property only.

Port Area 3

The Port Area 3 watershed is a 2.2 acre area within the port area that is drained by an existing 18"x29" CMP. Recommended improvements include replacing the existing system with dual 24" RCP's which will connect with the proposed system for the Port Area 2. It should be noted that these improvements are on private property (South Carolina State Ports Authority) and provide drainage for this property only.

TABLE 22

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
REID STREET (J-5a, J-5b, K-5c, K-5d)													
K5c.35 to K5c.32	4.6	0.7	0.82	7	6	24" VCP	320'	(0.0114) 0.0064	21	6.7		Adequate	
K5c.32 to K5c.18	2.24	0.7	2.39	9	16	24" VCP	500'	(0.0095) 0.0097	19	6.1		Adequate	
K5c.18B to K5c.18A	1.55	0.7	1.09	3	9	3.5'x3.5' B.A.	450'	(0.0036)	50	4.5		Adequate	
K5c.18A to K5c.18	9.95	0.7	8.06	6	62	3.5'x3.5' B.A.	320'	(0.0036)	50	4.5	320' - 24" RCP	34,100	Parallel system
K5c.28 to K5c.27	14.93	0.7	10.45	10	68	24" VCP	60'	(0.0063) 0.001	16	4.9	490' - Dual 36" RCP	183,850	Replace 24" VCP
K5c.27 to K5c.24	0.43	0.7	10.75	11	69	24" VCP	260'	(0.0063) 0.0019	16	4.9			Replace 24" VCP
K5c.24 to K5.23	1.2	0.7	11.59	13	70	24" VCP	170'	(0.0097) 0.001	19	6.1			Replace 24" VCP
K5.23 to K5c.21	2.2	0.7	13.13	14	76	24" VCP	315'	(0.0019) 0.0019	9	2.7	315' - Dual 42" RCP	127,000	Replace 24" VCP
K5c.21 to K5c.20	3.5	0.7	15.58	16	87	24" VCP	285'	(0.0003)	3	1.1	285' - Dual 48" RCP	132,450	Replace 24" VCP
K5c.20 to K5c.18	9.44	0.7	22.19	18	120	24" VCP	240'	(0.0003)	3	1.1	240' - 4'x6.5' Box	96,000	Replace 24" VCP
K5c.18 to K5.17	5.1	0.7	36.21	20	192	5'x4' B.A.	485'	(0.0003) -0.0008	28	1.5	485' - 4'x6.5' Box	193,000	Replace existing arch
K5.17 to K5.16	10.9 6.85	0.7 0.9	50.01	23	255	5'x4' B.A.	335'	(0.0003)	28	1.5	400' - 6'x6' Box	167,050	Replace existing arch Flow to pump station #3
K5.16 to K5.1	9.1	0.9	58.20	25	291	4.7'x4.25' B.A.	460'	(0.0003)	28	1.5		Adequate	Relief by pump station #3
K5.2 to K5.1	4.6	0.9	4.14	5	35	24" CMP	210'	(0.001) 0.0001	4	1.3	210' - 36" RCP	41,600	Replace 24" CMP
K5.1 to K5.3	5.0	0.9	66.84	28	324	4.5'x4.8' B.A.	250'	(0.001) 0.0016	55	2.9		Adequate	Peak discharge reduced by pump station
K5.3 to Outfall	2.65	0.9	69.22	30	332	4.2'x5' B.A.	690'	(0.0002)	23	1.3		Adequate	
												975,050	SUBTOTAL
												195,050	UPSTREAM IMPROVEMENTS
												1,170,100	TOTAL

Reid Street

The Reid Street watershed is located immediately north of the Calhoun Street East watershed and is drained by a 5 foot wide box that runs eastward along Reid Street from America Street , through the port area, and into the Cooper River.

Recommended improvements include replacing the existing system on America Street which connects with the Reid Street system. The new system consists of dual 36" RCP's, dual 42" RCP's, and dual 48" RCP's. The existing 4' wide box system on Reid Street also requires replacement with a 6'x6' box section which will convey runoff to a proposed pump station located at the intersection of Reid Street and East Bay Streets. The remainder of the drainage system will be adequate as a result of the proposed pump station.

TABLE 23

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
SPRING STREET (J-5a, J-6a, J-6b, J-6c, J-6d, K-5c, K-6c, K-6d)													
K5c.52 to K5c.48	10.6	0.9	9.54	9	65	24" VCP	665'	(0.0014) 0.0009	7	2.3	735' - Dual 36" RCP	266,800	Replace existing 24" VCP
K5c.48 to K5c.47	4.6	0.8	13.22	13	78	30" VCP	70'	(0.0014) 0.0000	13	2.7			Replace existing 30" VCP
K5c.47 to K6.26	10.6	0.8	21.70	14	126	30" VCP	420'	(0.0014) 0.0060	13	2.7	815' - 4'x6' Box	300,150	Replace existing 30" VCP
K6.26 to K6.25	3.5 2.4	0.6 0.8	25.72	17	141	36" VCP	395'	(0.0014) 0.0060	22	3.1			Replace existing 36" VCP
J6.44 to J6.40	6.3	0.6	3.78	8	26	24" VCP	320'	(0.0003) -0.0006	3	1.1	150' - 36" RCP, 320' - Dual 30" RCP, 535' - Dual 36' RCP	298,950	Redirect water to J6.111
J6.40 to J6.38	3.7	0.6	6.00	10	39	24" VCP	180'	(0.0003) 0.0034	3	1.1			
J6.38 to J6.124	5.0	0.6	9.00	11	58	24" VCP	300'	(0.0003) 0.0034	3	1.1			
J6.124 to J6.47	5.4	0.6	12.24	13	73	5'x3' B.A.	425'	(0.0003) -0.0009	19	1.4	425' - Dual 48" RCP, 480' - Dual 36" RCP	366,000	Replace existing arch and redirect flow for Calhoun Street East (J5.127)
J6.47 to J6.48	2.9 1.3	0.6 0.8	15.02	16	86	5'x3' B.A.	160'	(0.0003) -0.0009	19	1.4	570' - Dual 54" RCP	315,800	Replace existing arch
J6.48 to K6.25	19.2	0.6	26.54	17	149	5'x3' B.A.	410'	(0.0003) 0.0040	19	1.4			Replace existing arch
K6.25 to K6.24	9.6	0.6	58.02	20	308	5'x3' Box	250'	(0.0003) 0.0005	19	1.4	490' - 6'x7' Box	212,550	Replace existing box
K6.24 to K6.23	6.8	0.6	62.10	22	320	5'x3' Box	240'	(0.0003) -0.0014	19	1.4			Replace existing box
K6.23 to J6.110	14.0	0.6	70.50	24	356	5'x3' Box	780'	(0.0003) -0.0014	19	1.4	780' - 6'x8' Box	351,000	Replace existing box
J6.114 to J6.112	3.1 1.4	0.6 0.9	3.12	4	27	2'x2' B.A.	385'	(0.0033) 0.0137	11	3.0	385' - 30" RCP	49,500	Replace existing arch
J6.112 to J6.110	2.5	0.6	4.62	7	34	24" VCP	1010'	(0.0033) 0.0008	11	3.6	120' - 30" RCP, 990' - Dual 48" RCP	452,000	Replace existing 24" VCP
J6.110 to J6.109	20.0	0.6	87.12	29	418	5'x3' Box	420'	(0.0003) 0.0006	19	1.4	1000' - Dual 6'x6' Box	788,200	Replace existing box J6.110 to J6.109A
J6.109 to J6.25	2.2 3.3	0.9 0.6	91.08	32	424	5'x3' Box	865'	(0.0003) 0.0012	19	1.4	250' - Dual 6'x6' Box	96,000	Relief system J6.109A to pump station #9
J6.107 to J6.28	19.3	0.9	17.37	9	118	24" VCP	240'	(0.0014) 0.0086	7	2.3	280' - 54" RCP, 420' - 48" RCP	173,050	J6.106 to pump station #9
J6.28 to J6.25	2.3	0.6	18.75	11	120	24" VCP	160'	(0.0014) 0.0086	7	2.3		Adequate	Relief by pump station #9

(CONTINUED)

TABLE 23

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SPRING STREET (CONTINUED)													
J6.25 to J6.24	5.9	0.6	113.37	38	482	5'x3' Box	20'	(0.0003) 0.006	19	1.4		Adequate	Relief by pump station #9
K6.5 to K6.2	4.1 9.5	0.6 0.9	11.01	14	64	24" VCP	490'	(0.0026)	10	3.2	770' - Dual 36" RCP	278,600	Replace 24" VCP
K6.2 to K6C.11	2.4	0.6	12.45	17	68	24" VCP	280'	(0.0026)	10	3.2			
K6c.10 to K6c.11	0.9	0.6	0.54	2	5	24" RCP	160'	(0.0012) 0.0009	7	2.2		Adequate	
K6c.11 to K6c.22	1.3	0.6	13.77	19	74	24" RCP	515'	(0.0012) 0.0044	7	2.2	515' - Dual 42" RCP	212,800	Replace 24" VCP
K6c.22 to K6c.23	1.9	0.6	14.91	22	77	4'x4' Box	200'	(0.0012) 0.0044	55	3.4		Adequate	
K6.1 to K6c.23	5.8	0.9	5.22	5	44	24" VCP	790'	(0.0013)	7	2.2	210' - 36" RCP, 580' - Dual 30" RCP	188,600	Replace 24" VCP
													Relief system K6c.23
K6c.23 to J6.16	4.0	2.4 0.6	22.53	23	115	4'x4' Box	330'	(0.0012) -0.0064	55	3.4		Adequate	to J6.14A to J6.23A. Cost under Fishburn Watershed
J6.16 to J6.14	3.8	2.28 0.6	24.81	25	124	4'x4' Box	170'	(0.0012) 0.0099	55	3.4	730' - Dual 36" RCP	265,100	Relief system J6.14 to J6.14A
J6.14 to J6.24	2.3 21.0	0.9 0.6	39.48	26	193	4'x4' Box	615'	(0.0012) 0.0029	55	3.4		Adequate	Peak flow reduced by relief system
J6.24 to J6.23	1.9 1.9	0.9 0.6	155.70	39	654	5'x3' Box	205'	(0.0003) 0.0014	25	1.6			To be abandoned
J6.23 to J6.22	9.6	0.6	161.46	40	40 662	5'x3' Box	200'	(0.0003) 0.0014	25	1.6		Adequate	Relief by pump station
J6.22 to J6.21	6.7 10.0	0.6 0.9	174.48	41	123 707	5'x4' Box	225'	(0.0003) -0.0012	25	1.6	225' - 54" RCP	63,100	Parallel system
J6.21 to J6.20	9.7	0.9	183.21	42	733	5'x3' Box	240'	(0.0003) 0.0015	25	1.6	240' - 4'x5' Box	86,900	Parallel system
J6.20 to J6.18	8.0 5.3	0.6 0.9	192.78	43	761	5'x3' Box	240'	(0.0003) -0.0063	25	1.6	240' - 4'x6' Box, 1075' - 6'x6' Box	93,150 426,250	J6.20 to J6.18 J6.18 to pump station #7
J6.18 to J7.14	20.0	0.9	210.78	44	822	5'x5' Box	610'	(0.0003) -0.0063	50	2.0		Adequate	Relief by pump station
												5,284,500	SUBTOTAL
												1,056,900	UPSTREAM IMPROVEMENTS
												6,341,400	TOTAL

Spring Street

The Spring Street watershed is the largest basin in the Peninsular City area and drains approximately 295 acres. The area drained is located on either side of the Crosstown Expressway and is bounded on the south by Bee Street, on the east by King Street, on the north by Fishburne Street and on the south by Lockwood Drive Extension. Existing drainage facilities consist of a 4 foot wide box which runs westward along Spring Street, discharging into the Ashley River, and provides less than 6 percent of the required capacity.

Recommended improvements for this basin begins at the intersection of Spring and Meeting Streets and replaces the existing brick arch with dual 36" RCP to King Street. At King Street it is proposed to continue with a 4'x6' box that enlarges to a 6'x8' box running to Rutledge Avenue. Dual 6'x6' boxes are then needed to a proposed pump station located near the intersection of Cannon Street and President Street. The pump station will provide relief for the downstream system but improvements will still be required, and include a 4'x6' box parallel to the existing box on Spring Street from Westcott Street to Hagood Avenue, then northward along Hagood Avenue to a proposed pump station which will also serve the Fishburne watershed.

TABLE 24

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
FISHBURNE STREET (J-6a, J-7b, K-6a, K-6b, K-6c, K-6d)													
K6.4 to K6c.6	31.4	0.6	18.84	12	106	24" VCP	485'	(0.0001)	2	0.6	485' - Dual 36" RCP	176,200	Replace 24" VCP
K6c.1 to K6c.3	18.5	0.6	11.10	15	58	24" RCP	290'	(0.0021)	9	2.9	290' - Dual 30" RCP	71,200	Replace 24" RCP
K6c.3 to K6c.4	5.8	0.6	14.58	17	73	24" RCP	290'	(0.0021)	9	2.9	290' - Dual 36" RCP	104,200	Replace 24" RCP
K6c.4 to K6c.6	6.2	0.6	18.30	19	88	24" RCP	610'	(0.0021)	9	2.9	610' - Dual 42" RCP	246,250	Replace 24" RCP
K6c.6 to K6c.8	6.7	0.6	41.16	23	185	24" RCP	280'	(0.0001) 0.0050	2	0.6	780' - 5'x6' Box	296,900	Replace 24" RCP
K6c.8 to K6c.15	4.5	0.6	43.86	25	193	24" VCP	500'	(0.0001) -0.0011	2	0.6	—	—	Replace 24" VCP
K6c.17 to K6c.15	10.1 37.1	0.25 0.60	24.79	23	112	24" VCP	600'	(0.0052) 0.0034	14	4.5	600' - 48" RCP	132,750	Replace 24" VCP
K6c.15 to K6c.32	2.8	10.5 0.45	0.6 76.21	27	324	2.1'x4' Box	1190'	(0.0001)	6	0.8	1190' - Dual 5'x6' Box	912,250	Replace box
K6c.32 to J6.4	17.9 11.9	0.9 0.25	95.30	35	372	8' F.B. Channel	520'	(0.0001)	69	1.0	520' - Dual 5'x6' Box	407,050	Fill existing channel
J6.4 to J6.5					372	48" RCP	30'		55	4.4	80' - Dual 6'x7' Box	73,950	To pump station #7
J6.7 to J6.5	11.5 4.1	0.25 0.6	5.34	11	31	24" RCP	380'	(0.0001)	2	0.6	1200' - 4'x8' Box	524,650	Relief system K6C.23 to pump station #7
J6.5 to J6.12	4.9	0.6	103.58	39	373	8' F.B. Channel	280'	(0.0001)	69	1.0		Adequate	Relief by pump station
J6.12 to J6.13					373	36" CMP	70'	(0.0001)	22	3.1		Adequate	Relief by pump station
J6.13 to J6.2	16.0 2.4	0.7 0.9	116.94	41	409	28' F.B. Channel	1230'	(0.0001) 0.0024	269	1.3	900' - 50' F.B. Channel	148,350	Relief by pump station
J7.9 to J7.7	3.6	0.9	3.24	8	21	30" RCP	340'	(0.0052) 0.0064	26	5.2		Adequate	
J7.7 to J7.5	1.6 6.1	0.9 0.25	6.21	10	37	42" RCP	200'	(0.0052) 0.0007	63	6.5		Adequate	
J7.5 to J6.2	2.0 1.7	0.9 0.25	8.44	11	49	42" RCP	460'	(0.0052) 0.0060	63	6.5		Adequate	
J6.2 to J6.1	2.4	0.25	125.98	49	409	5'x8' Box	180'		225	5.6	180' - Dual 6'x8' Boxes	153,600	Parallel culverts
												3,247,350	SUBTOTAL
												649,500	UPSTREAM IMPROVEMENTS
												3,896,850	TOTAL

Fishburne Street

The Fishburne Street drainage basin is located north of the Crosstown Expressway and is bordered on the east by Coming Street and on the west by Lockwood Drive. The 219.7 acre watershed is drained by a 2'x4' box running westward along Fishburne Street before discharging into a large drainage channel which discharges into the Ashley River via a 5'x8' concrete box under Lockwood Drive.

The recommendation is to replace the existing system on Fishburne Street with dual 36" RCP's from Rutledge Avenue to Ashley Avenue, and a 5'x6' box section from Ashley Avenue to President Street. From this point to the proposed pump station dual 5'x6' boxes are required. The proposed pump station is recommended to be located on the west side of Hagood Avenue at the intersection of Hagood and Line Streets and will discharge into the existing channel which outlets to the Ashley River. This pump station will also handle a portion of the water from the Spring Street watershed.

TABLE 25

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL .(CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
COOPER STREET (K-5a, K-5c, K-6b, K-6d)													
K6b.32 to K6b.30	2.7	0.9	2.43	10	15	24" RCP	100'	(0.0024) 0.0033	10	3.1		Adequate	Available head
K6b.30 to K6b.29					15	24" RCP	30'	(0.0024) 0.0077	10	3.1		Adequate	Available head
K6b.29 to K6b.34	2.6	0.9	4.77	11	28	30" RCP	470'	(0.0024) 0.0014	17	3.5	470' - 24" RCP	51,000	Parallel system
K6b.34 to K6.14	8.0 0.8	0.45 0.90	9.09	14	48	36" RCP	645'	(0.0024) 0.0027	28	4.0	645' - 30" RCP	78,750	Parallel system
K6.9 to K6.10	4.8	0.45	2.16	4	16	24" RCP	425'	(0.0023) 0.002	9	3.0	535' - 24" RCP	59,350	Parallel system
K6.10 to K6.13	1.1	0.9	3.15	7	21	24" RCP	110'	(0.0023) 0.0002	9	3.0	〃	〃	
K6.13 to K6.14	7.2	0.45	6.39	8	41	24" RCP	405'	(0.0023) 0.0044	9	3.0	405' - 36" RCP	74,600	Replace 24" RCP
K6.14 to K5c.1	5.6	0.7	19.40	18	95	36" RCP	325'	(0.0027) 0.0019	30	4.2	510' - 42" RCP	109,950	Parallel system
K5c.1 to K5c.2A	2.2	0.7	20.94	20	101	36" RCP	185'	(0.0027)	30	4.2	〃	〃	Parallel system
K6.18 to K6.20	2.2	0.9	1.98	3	15	24" RCP	70'	(0.0012) -0.0297	7	2.2	350' - 30" RCP	47,950	Replace 24" RCP
K6.20 to K6.22	1.1	0.9	2.97	4	22	24" RCP	280'	(0.0012) 0.0093	7	2.2	〃	〃	Replace 24" RCP
K6.22 to K5C.8	1.5 5.7	0.9 0.6	7.74	6	54	24" RCP	825'	(0.0012) 0.0020	7	2.2	825' - 42" RCP	167,400	Replace 24" RCP
K5c.8 to K5c.6	14.1	0.9	20.43	12	114	24" VCP	330'	(0.0012) 0.0017	7	2.2	730' - 4'x6' Box	272,900	Replace 24" VCP
K5c.6 to K5c.3	3.0	0.6	22.29	14	118	24" VCP	170'	(0.0012) 0.0025	7	2.2	〃	〃	Replace 24" VCP
K5c.3 to K5c.2A	3.0 0.8	0.6 0.9	24.81	15	129	24" VCP	230'	(0.0012)	7	2.2	〃	〃	Replace 24" VCP
K5c.2A to K5a.43	1.2	0.7	45.75	21	215	36" RCP	540'	(0.0027)	30	4.2	1270' - Dual 4'x6' Box	948,000	Replace 36" RCP
K5a.43 to K5a.41	1.1	0.9	46.74	25	215	42" RCP	730'	(0.0027)	45	4.7	〃	〃	Replace 42" RCP

(CONTINUED)

TABLE 25

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
COOPER STREET (CONTINUED)													
K5a.37 to K5a.33	2.6	0.7	1.82	4	13	30" VCP	410'	(0.0036) 0.0009	21	4.3		Adequate	
K5a.33 to K5a.32	2.1	0.45	2.77	7	18	30" VCP	315'	(0.0036) 0.0017	21	4.3		Adequate	
K5a.32 to K5a.29	1.8	0.45	3.58	9	22	30" VCP	550'	(0.0036) 0.0007	21	4.3		Adequate	
K5a.29 to K5a.41	1.0 0.7	0.25 0.9	4.46	13	25	30" VCP	25'	(0.0036) 0.0007	21	4.3		Adequate	With available head
K5c.4 to K5a.46	1.0	0.9	0.9	3	7	24" RCP	350'	(0.0076) 0.0051	17	5.4		Adequate	
K5a.46 to K5a.50	2.5	0.45	2.30	5	15	24" RCP	275'	(0.0018) -0.0017	8	2.6	275' - 30" RCP	35,650	Replace 24" RCP
K5a.52 to K5a.50	33.8	0.45	15.21	16	78	24" RCP	180'	(0.0029)	11	3.4	180' - Dual 36" RCP	67,000	Replace 24" RCP
K5a.50 to K5a.40	2.9	0.45	18.55	17	93	30" RCP	250'	(0.0018) 0.0064	15	3.1	250' - Dual 36" RCP	90,600	Replace 30" RCP
K5a.39 to K5a.40	3.2 4.5	0.9 0.45	4.91	5	37	24" VCP	185'	(0.0054)	14	4.6	185' - 36" RCP	34,100	Replace 24" VCP
K5a.40 to K5a.41	0.7	0.9	24.09	19	116	30" RCP	120'	(0.0008)	10	2.0	120' - Dual 42" RCP	52,100	Replace 24" RCP
K5a.41 to K5a.41A	1.1 0.8	0.9 0.6	75.29	31	301	42" RCP	510'	(0.0022)	58	4.6	815' - Dual 4'x6' Box	620,400	K5a.41 to K5A.22.1
K5a.41A to K5a.21	4.6 1.1	0.6 0.9	79.04	34	304	54" RCP	440'	(0.0008)	48	3.0	200' - Dual 4'x6' Box	144,000	K5a.22.1 to pump station #2
												2,853,750	SUBTOTAL
												570,750	UPSTREAM IMPROVEMENTS
												3,424,500	TOTAL

Cooper Street

The Cooper Street watershed drains the area surrounding the Highway 17 and I-26 interchange. Existing drainage facilities consists of a parallel system of 30" VCP, 42" VCP, and 54" RCP on either side of the Cooper River Bridges extending from King Street to East Bay.

Recommended improvements include the construction of a stormwater pump station near the intersection of Morrison Drive and Jackson Street. The pump station will allow new systems to be installed at a greater slope, thus decreasing the pipe size required, and will also provide protection during periods of high tide. In addition, the pump station will enable the existing drainage facilities to function better due to increase hydraulic capacity. Also included is the replacement of the existing drainage facilities along the south side of the Cooper River Bridges. The recommended system is composed of dual 4'x6' box sections which conveys the runoff to the proposed pump station.

TABLE 26

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
JACKSON STREET (K-5a, K-6b)													
K6b.18 to K6b.19	3.1 1.5	0.70 0.45	2.85	6	20	24" VCP	70'	(0.0025) -0.0043	10	3.1	70' - 24" RCP	8,900	Parallel system
K6b.19 to K6b.21	1.0 0.8	0.7 0.45	3.91	7	26	24" VCP	350'	(0.0025) 0.0032	10	3.1	755' - 30" RCP	93,300	Parallel system
K6b.21 to K5a.2	2.1	0.7	5.38	9	33	24" VCP	405'	(0.0025) 0.0024	10	3.1			
K5a.2 to K5a.3	3.2	0.45	6.82	12	38	24" VCP	315'	(0.0025) 0.002	10	3.1	315' - 36" RCP	56,350	Parallel system
K5a.4 to K5a.3	4.4	0.6	2.64	5	20	24" VCP	350'	(0.0025)	10	3.1	350' - 24" RCP	37,100	Parallel system
K5a.3 to K5a.7	1.4 2.0	0.6 0.30	10.90	14	58	24" VCP	540'	(0.0022) 0.0019	9	2.9	540' - 42" RCP	109,700	Parallel system
K5a.8 to K5a.7	10.8	0.6	6.48	6	45	24" VCP	350'	(0.0023) 0.0043	9	3.0	350' - 36" RCP	62,250	Replace 24" VCP
K5a.7 to K5a.11A	3.6 1.6	0.6 0.3	20.02	18	98	3.5'x3.5' Box	520'	(0.0022)	52	4.3	520' - 42" RCP	105,850	Parallel system
K5a.17 to K5a.16	1.6	0.6	0.96	4	7	24" RCP	280'	(0.0022) 0.0004	9	2.9		Adequate	
K5a.16 to K5a.11A	1.5	0.6	1.86	6	13	24" RCP	535'	(0.0022)	9	2.9		Adequate	With available head
K5a.11A to K5a.11	6.4	0.6	25.72	21	121	3.5'x3.5' Box	70'	(0.0022)	52	4.3	70' - 4'x6' Box	28,600	Replace 3.5'x3.5' box
K5a.14 to K5a.11	4.4	0.7	3.08	11	18	24" RCP	340'	(0.0017) 0.0013	8	2.6	340' - 30" RCP	43,200	Replace 24" RCP
K5a.11 to K5a.9	3.0 0.5	0.6 0.7	30.95	22	142	3.5'x3.5' Box	140'	(0.0017) -0.0134	46	3.7	90' - 4'x6' Box	35,800	To pump station #2
												581,050	SUBTOTAL
												116,250	UPSTREAM IMPROVEMENTS
												697,300	TOTAL
EAST BAY NORTH (K-5a, K-5b, K-5c, K-5d)													
K5a.27 to K5a.26	6.0	0.9	5.40	5	40	24" RCP	270'	(0.0023) 0.0063	9	3.0	310' - 42" RCP	57,850	Relief system
K5a.26 to K5a.25	1.6	0.9	6.84	7	45	24" RCP	180'	(0.0023) 0.0041	9	3.0	180' - Dual 36" RCP	67,000	Replace 24" RCP
K5a.25 to K5a.23	0.80	0.90	7.56	8	48	30" RCP	150'	(0.0023) 0.0041	17	3.5	150' - Dual 36" RCP	56,800	Replace 30" RCP
K5a.23 to K5a.20	4.0	0.9	11.16	9	69	30" RCP	440'	(0.0023) 0.0006	17	3.5	440' - Dual 36" RCP	86,550	Parallel system
												268,200	SUBTOTAL
												53,650	UPSTREAM IMPROVEMENTS
												321,850	TOTAL

Jackson Street

The Jackson Street watershed is located immediately north of the of the Cooper River bridges and drains 52.9 acres which includes Archer School, East Bay School, and the surrounding apartment complexes. This basin is drained by a 24" VCP which extends westward along Jackson Street from the outfall under Morrison Drive to Meeting Street.

A pipe system parallel to the existing system is recommended from Meeting Street to Morrison Drive to provide the required capacity with a 4'x6' box section under Morrison Drive. The new box culvert will discharge into a proposed pump station which is recommended to provide needed slope for the replacement systems and to provide stormwater runoff during periods of high tide. The proposed location for the pump station is on the east side of Morrison Drive at the intersection of Morrison Drive and Jackson Street, and will provide relief for the Cooper Street system.

East Bay North

The East Bay North watershed drains a total of 12.4 acres located along either side of East Bay Street and bounded on the south by Columbus Street and on the north by Jackson Street. Existing drainage facilities consist of a system of 24" RCP and 30" RCP extending northward along East Bay Street from Blake Street to the discharge point near the Cooper River Bridge.

Recommended improvements include replacing the existing system with dual 36" RCP's from Cooper Street to the outfall in the Cooper River.

TABLE 27

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
HUGER STREET (K-5a, K-6a, K-6b, K-6c, K-6d)													
	3.5	0.25											
	5.6	0.70						(0.0054)			480' -		
K6b.1 to K6b.3	15.5	0.45	11.78	13	65	24" VCP	480'	0.0027	14	4.6	48" RCP	107,400	Replace 24" VCP
	3.6	0.45						(0.0059)			215' -		
K6b.6 to K6b.5	3.9	0.70	4.35	8	28	24" VCP	215'		15	4.8	30" RCP	26,900	Replace 24" VCP
	3.0	0.70						(0.0068)			470' -		
K6b.5 to K6b.3	4.6	0.45	8.52	9	53	24" VCP	470'		16	5.1	42" RCP	96,250	Replace 24" VCP
	4.8	0.7						(0.0011)			780' - Dual		
K6b.3 to K6b.8	19.1	0.45	32.26	16	165	30" VCP	690'	0.0011	12	2.4	4'x6' Box	640,600	Replace 30" RCP
	4.3	0.7						(0.0011)			15' F.B.		Outlet to New Market Creek
K6b.8 to K6b.9	13.0	0.45	41.12	21	193	30" VCP	470'	0.0011	12	2.4	Channel	8,650	K6b.8 to K6b.8A
	1.6	0.45						(0.0011)			290' -		Replace 30" VCP. Peak flow reduced
K6b.9 to K6b.14	8.7	0.70	47.93	24	213	30" VCP	290'	0.0005	12	2.4	42" RCP	61,700	by relief system
	4.7	0.70						(0.0037)			350' -		
K6b.17 to K6b.15			3.29	4	24	24" VCP	350'		12	3.8	30" RCP	44,350	Replace 24" VCP
	7.6	0.7						(0.0062)			340' -		
K6b.15 to K6b.14			8.61	6	60	24" VCP	340'		15	4.9	42" RCP	68,300	Replace 24" VCP
	8.0	0.7						(0.0011)			525' - Dual		
K6b.14 to K6b.23			62.14	26	267	30" VCP	525'		12	2.4	48" RCP	249,400	Replace 30" VCP
												1,303,550	SUBTOTAL
												260,750	UPSTREAM IMPROVEMENTS
												1,564,300	TOTAL

Huger Street

The Huger Street watershed drains 111.5 acres between Meeting Street on the east and Ashley Avenue on the west. The watershed is drained by a 30" VCP which extends eastward along Huger Street to Meeting Street then north along Meeting Street to Newmarket Creek.

It is recommended that the existing system along Huger Street from King Street to Meeting Street be replaced with a dual 4'x6' box section which will outlet into Newmarket Creek along the east right-of-way at I-26. The remainder of the Huger Street system will also require improvement with 42" RCP's and 48" RCP's being required along Huger Street and Meeting Street to the outlet at Newmarket Creek.

TABLE 28

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
RUNEY STREET (K-6b,L-6)													
K6b.28 to K6b.27	8.8	0.7	6.16	6	43	24" RCP	300	(0.0048) -0.0003	14	4.3	300' - 36" RCP	38,050	Parallel system
												38,050	SUBTOTAL
												7,650	UPSTREAM IMPROVEMENTS
												45,700	TOTAL
MEETING STREET NORTH (K-6b,L-6)													
L6.17A to L6.16	0.3 5.0	0.35 0.9	4.61	9	29	24" RCP	950'	(0.0028)	10	3.3	950' - 36" RCP	181,750	Parallel system
L6.16 to L6.15	10.4	0.9	13.97	15	73	24" RCP	510'	(0.0028)	10	3.3	510' - 54" RCP	155,400	Parallel system
L6.15 to L6.14	6.0 7.1	0.7 0.45	21.37	18	105	24" RCP	350'	(0.0028)	10	3.3	350' - 54" & 36" RCP	165,500	Replace 24" RCP
L6.14 to L6.11	4.3 10.1	0.7 0.45	28.93	20	137	24" RCP	360'	(0.0028)	10	3.3	360' - Dual 54" RCP	204,450	Replace 24" RCP
L6.4 to L6.6	0.8 31.5	0.9 0.45	14.90	14	79	24" RCP	300'	(0.0013)	7	2.2	300' - 60" RCP	98,650	Replace 24" RCP
L6.6 to L6.9	6.1	0.45	17.65	16	90	24" RCP	300'	(0.0013)	7	2.2	300' - 60" RCP	98,650	Parallel system
L6.9 to L6.10	3.6 4.7	0.7 0.45	22.29	18	109	24" RCP	600'	(0.0013)	7	2.2	1130' - 72" RCP	431,650	Replace 24" RCP
L6.10 to L6.11	1.3 3.0	0.7 0.45	24.55	22	113	24" RCP	530'	(0.0013)	7	2.2			
L6.11 to L6.12	6.5 9.7	0.45 0.7	63.20	26	272	24" RCP	300'	(0.0029)	11	3.4	1410' - Dual 5'x6' Box	1,136,650	Abandon existing 24" RCP & 30" RCP
L6.12 to L6.13	1.2 2.7	0.6 0.45	65.14	28	274	24" RCP	420'	(0.0029)	11	3.4			
L6.13 to K6b.25	2.5 16.2	0.45 0.7	77.61	31	310	30" RCP	690'	(0.0029)	19	3.9			
												2,472,700	SUBTOTAL
												494,550	UPSTREAM IMPROVEMENTS
												2,967,250	TOTAL

Runey Street

The Runey Street watershed drains 8.8 acres of industrial and commercial development located between I-26 and Meeting Street. Approximately 50 percent of the area is presently undeveloped. The existing 24" RCP outfall into Newmarket Creek is inadequate and a parallel 36" RCP is recommended.

Meeting Street North

The Meeting Street North watershed drains the area on each side of Meeting Street between the intersection of Morrison Drive and Meeting Street, and Newmarket Creek. Existing facilities consist of a pipe conduit on Meeting Street which discharges into Newmarket Creek. The existing drainage facilities are inadequate providing less than 35 percent of the required capacity. A new pipe conduit system along Meeting Street consisting of 72" RCP, 60" RCP, 54" RCP and 48" RCP is recommended to provide the needed capacity.

TABLE 29

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
DUNNEMAN STREET (K-7)													
K7.11 to K7.40	1.8 2.0	2.0 0.3	1.68	15	9	24" RCP	375'	(0.0017) 0.0017	8	2.6		Adequate	Available head
K7.40 to K7.38	2.0 2.0	0.3 0.6	3.48	18	17	24" RCP	165'	(0.0017) 0.0017	8	2.6	165' - 36" RCP	26,050	Replace 24" RCP
K7.38 to K7.35	2.7	0.4	4.56	19	22	24" RCP	210'	(0.0017) 0.0017	8	2.6	210' - 36" RCP	31,000	Replace 24" RCP
K7.35 to K7.34	2.0	0.9	6.36	20	30	24" RCP	510'	(0.0017) 0.0017	8	2.6	450' - 36" RCP	64,300	Parallel system. Excavation in marsh required
												121,350	SUBTOTAL
												24,300	UPSTREAM IMPROVEMENTS
												145,650	TOTAL
CITADEL SOUTH (K-6a, K-6c, K-7, K-7d)													
K7d.11 to K7d.6	9.5 5.7	0.25 0.6	5.80	10	35	24" RCP	400'	(0.0036) -0.0058	12	3.7	400' - 36" RCP	62,550	Parallel system
K7d.6 to K7d.4	17.7	0.6	16.42	13	90	30" RCP	255'	(0.0036) 0.0001	21	4.3	255' - 48" RCP	47,200	Parallel system
K7d.4 to K6c.36	8.1	0.6	21.28	15	111	36" RCP	540'	(0.0036) 0.0039	35	4.9	540' - 48" RCP	99,000	Parallel system
K6c.36 to K7d.1	7.4	0.6	25.72	19	123	36" RCP	270'	(0.0036) 0.0028	35	4.9	270' - 54" RCP	63,450	Parallel system
												272,200	SUBTOTAL
												54,450	UPSTREAM IMPROVEMENTS
												326,650	TOTAL
CITADEL NORTH (K-6a, K-7d)													
K7.23 to K7.24	3.0 33.5	0.45 0.25	9.73	27	41	24" RCP	100'	(0.0051) 0.0050	14	4.5	100' - 36" RCP	17,900	Replace 24" RCP
K7.24 to K7.26	3.2 1.7	0.25 0.6	11.55	28	49	24" RCP	450'	(0.0051) 0.0019	14	4.5	1280' - 42" RCP	196,200	Replace 24" RCP
K7.26 to K7.29	2.5	0.6	13.05	31	52	24" RCP	380'	(0.0051) 0.0073	14	4.5			
K7.29 to K7.31	2.9	0.6	14.79	34	57	24" RCP	450'	(0.0051) 0.0044	14	4.5			
												214,100	SUBTOTAL
												42,850	UPSTREAM IMPROVEMENTS
												256,950	TOTAL
CONGRESS STREET (K-6c)													
K6c.33 to K6c.34	1.8 2.9	0.6 0.9	1.08	5	9	24" RCP	500'	(0.0027) 0.0023	10	3.2		Adequate	
K6c.34 to K6c.34A	7.2 2.7	0.6 0.3	8.82	12	54	24" RCP	530'	(0.0067) -	16	5.1	530' - 42" RCP	110,800	Replace existing 24" RCP
												110,800	SUBTOTAL
												22,200	UPSTREAM IMPROVEMENTS
												133,000	TOTAL

Dunneman Street

The Dunneman Street watershed drains 12.5 acres of residential development located along Dunneman Street from Rutledge Avenue to the Ashley River. An existing system of 24" RCP from the Ashley River to Eighth Avenue provides less than 50 percent of the required capacity. A replacement system of 36" RCP is recommended.

Citadel South

The Citadel South watershed drains 48 acres of The Citadel via a system of 24" RCP, 30" RCP, and 36" RCP which outlets into the Ashley River marsh. The existing system povides less than 30 percent of the required capacity. Recommended improvements consist of a parallel system of 36" RCP, 48" RCP, and 54" RCP.

Citadel North

The Citadel North watershed drains a total of 46.8 acres of residential development along the northern edge of The Citadel which also includes a portion of Hampton Park. The existing drainage facilities consist of a 24" RCP system which discharges into the Ashley River and is inadequate. Replacement of the system with a 42" RCP is recommended.

Congress Street

The Congress Street watershed drains 14.6 acres located immediately southeast of The Citadel between Huger Street on the north and Congress Street on the south. Existing drainage facilities consist of a 24" VCP that runs west on Congress Street and outfalls into the Ashley River marsh.

Replacement of the 24" VCP with a 42" RCP is recommended.

TABLE 30

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
GROVE STREET (K-6a, K-6b, K-7, L-6)													
L6.3 to K6a.7	29.8	0.45	13.41	12	75	24" RCP	700'	(0.0006) 0.001	5	1.5			Relief provided by Simons Street system L6.3 to L6.3A
K6a.7 to K6a.5	1.0 0.9	0.9 0.45	14.72	17	75	24"RCP	300'	(0.0006) 0.001	5	1.5		Adequate	Peak discharge reduced by relief system
K6a.5 to K6a.3	9.8 26.0 7.8	0.9 0.45 0.25	37.19	19	179	24" RCP	135'	(0.0006) 0.001	5	1.5	135' Dual 4'x7' Box	112,050	Remove 24" RCP
K6a.3 to K6a.2	13.0 19.6	0.45 0.25	47.94	20	228	24" RCP	715'	(0.0006) 0.001	5	1.5	715' - Dual 4'x8' Box	629,350	Remove 24" RCP
K6a.2 to K6a.1	3.9	0.45	49.70	25	228	30" RCP	480'	(0.0006) 0.001	17	1.8	480' - Dual 4'x8' Box	422,400	Remove 30" RCP
K6a.1 to K7.17	2.4	0.45	50.78	28	228	3.5'x3' Brick Arch	490'	(0.0006) 0.0008	17	1.8	490' - Dual 4'x8' Box	430,950	Remove 3.5'x3' Brick Arch
K7.17 to K7.15	7.0	0.45	53.93	31	228	3.5'x3' Brick Arch	400'	(0.0006) 0.0008	17	1.8	1120' - Dual 4'x8' Box	995,950	Relief system K7.17 to K7.15A. Remove 3.5'x3' Brick Arch
K7.15 to K7.10	9.4	0.45	58.16	34	228	3.5'x3' Brick Arch	540'	(0.0006) 0.0008	17	1.8		Adequate	Relief system
K7.10 to K7.7	2.5	0.45	59.29	38	228	3.5'x3' Brick Arch	470'	(0.0006) 0.0011	17	1.8	470' - 24" RCP	36,400	Parallel system
K7.7 to K7.4	30.4	0.45	72.97	41	255	3.5'x3' Brick Arch	500'	(0.0006) 0.0011	17	1.8	500' - 4'x6' Box	193,450	Parallel system
K7.4 to K7.2	2.0	0.45	73.87	44	255	3.5'x3' Brick Arch	450'	(0.0006) 0.0011	17	1.8	450' - 4'x6' Box	168,750	Parallel system
K7.2 to K7.1	3.4	0.45	75.40	47	255	3.5'x3' Brick Arch	400'	(0.0006) 0.0011	17	1.8	400' - 4'x6' Box	147,850	Parallel system
												3,137,150	SUBTOTAL
												627,450	UPSTREAM IMPROVEMENTS
												3,764,600	TOTAL
SIMMONS STREET (K-6a, K-7, L-6, L-7)													
L6.2 to L6.1	0.6	0.45	0.27	4	2	18" RCP	60'	0.004	7	4.0	980' - 54" RCP	276,750	L6.3 to L6.3A Relief system for Grove Street
L6.1 to K7.20	109.9	0.45	49.73	38	179	Marsh	960'						
K7.20 to K7.19					179	Dual 30" RCP	110'	0.0002	56	5.7	110' - Dual 54" RCP	55,800	Parallel system
												332,550	SUBTOTAL
												66,550	UPSTREAM IMPROVEMENTS
												399,100	TOTAL
10TH AVENUE (L-6, L-7)													
L7.5 to L7.3	2.6 30.0	0.25 0.45	14.15	13	78		350'				415' - 18" RCP 690' - 24" RCP 495' - 36" RCP 260' - 42" RCP 320' - 48" RCP	258,800	Relief system L7.5A to L7.5B
L7.3 to L7.2	0.8	0.45	14.51	15	78	24" RCP	320'	(0.0069)	16	5.2	500' - 18" RCP 345' - 30" RCP	66,100	Replace existing system L7.3A to L7.2
												324,900	SUBTOTAL
												65,000	UPSTREAM IMPROVEMENTS
												389,900	TOTAL

Grove Street

The Grove Street watershed drains 168.9 acres of residential development located along either side of Grove Street and west of I-26. Existing drainage facilities consist of a brick arch which extends from the outfall into the Ashley River marsh eastward along Grove Street to Eleventh Avenue and a pipe conduit system from this proint to Rutledge Avenue. The existing drainage facilities are inadequate.

Recommended improvements include a relief system from Rutledge Avenue to the marsh at the end of Simons Street which will reduce the discharge to the downstream area. In addition to the Simons Street relief system, replacement of the existing system along Grove Street is required. The first segment consists of dual box sections along Grove Street from Rutledge Avenue to Ninth Avenue, then along Ninth Avenue to the Ashley River marsh. The second segment consists of a parallel box section along Grove Street from Eighth Avenue to the Ashley River.

Simons Street

The Simons Street watershed drains 110.5 acres of residential development located between Rutledge Avenue and Tenth Avenue. The existing drainage system is inadequate and consist of a series of small pipe conduits (18" diameter and less) which discharge into the marsh near Simons Street. Recommended improvements for this area include a relief system down Simons Street from Rutledge Avenue which will provide relief for the Grove Street watershed, and a system of dual 54" RCP culverts parallel to the dual 30" RCP under Tenth Avenue.

Tenth Avenue

The Tenth Avenue watershed drains 33 acres of residential development and is bounded by North Ashley Avenue on the east, Marlow Street on the north, Alberta Drive on the south, and the Ashley River on the west. Existing drainage facilities consist of a 24" RCP which outlets into the Ashley River marsh west of Tenth Avenue and is inadequate. Recommended improvements include a relief system composed of 48" RCP, 42" RCP, 36" RCP, 24" RCP and 18" RCP along Hester Street from Maple Street to the Ashley River marsh. Also included is replacing the existing 24" RCP along Tenth Avenue with a 30" RCP.

TABLE 31

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
NORTH ROMNEY STREET (L-6)													
L6.36 to L6.39	2.8	0.25	0.70	7	5	24" RCP	140'	(0.0008) 0.0050	6	1.8		Adequate	
L6.39 to L6.50	71.9 15.8	0.25 0.6	28.16	33	110	Marsh	640'	(0.0008) 0.0018				Adequate	
L6.50 to L6.51					110	36" RCP	110'	(0.0008) 0.0018	28	4.0	110' - Dual 48" RCP	36,000	Parallel system
L6.51 to L6.42	11.0	0.35	32.01	34	123	Marsh	240'	(0.0008) 0.0021				Adequate	
L6.42 to L6.45					123	36" RCP	170'	(0.0008) -0.0014	28	4.0	170' - Dual 48" RCP	55,000	Parallel system
L6.56 to L6.58	9.0	0.35	3.15	9	20	24" RCP	110'	(0.0091) 0.0017	15	4.8	110' - 18" RCP	7,000	Parallel system
L6.58 to L6.45	1.3	0.35	3.61	17	20	18' F.B. Channel	1060'	(0.0005) 0.0017	715	3.4		Adequate	
L6.45 to L6.40			35.62	37	130	18' F.B. Channel	60'	(0.0005) -0.0463	715	3.4		Adequate	
L6.41 to L6.40	7.1	0.6	4.26	12	24	24" RCP	100'	(0.0102) 0.0114	20	6.3	100' - 18" RCP	7,050	Parallel system
L6.40 to L6.46	1.3	0.6	40.66	38	146	18' F.B. Channel	130'	(0.0041) 0.0078	2048	9.7		Adequate	
L6.46 to L6.48					146	30" RCP & 36" RCP	80'	0.020	47	4.0	80' - Dual 48" RCP	25,400	Parallel system
												130,450	SUBTOTAL
												26,100	UPSTREAM IMPROVEMENTS
												156,550	TOTAL
MORRISON DRIVE NORTH (L-6)													
L6.59 to L6.60	6.2	0.9	5.58	6	39	24" RCP	125'	(0.0013) 0.0036	7	2.2	125' - 48" RCP	23,050	Replace 24" RCP
L6.60 to L6.53	14.6	0.7	15.80	14	84	3' F.B. Channel	1030'	(0.0013) 0.0036	104	2.9	350' - Dual 42" RCP	104,400	Channel adequate Replace 18" RCP
L6.53 to L6.52					84	24" RCP	80'	(0.0039) 0.0012	14	4.5	80' - Dual 36" RCP	160,150	Parallel pipes
L6.52 to L6.54	3.4	0.7	18.18	16	93	4' F.B. Channel	250'	(0.0039) 0.0012	207	2.2		Adequate	
L6.54 to L5.55					93	24" RCP	60'	(0.0039) 0.0012	14	4.5	60' - 54" RCP	72,850	Parallel pipe
												360,450	SUBTOTAL
												72,100	UPSTREAM IMPROVEMENTS
												432,550	TOTAL
ALGONQUIN (L-6,M-6)													
M6.93 to M6.91	17.2	0.7	12.04	17	60	24" RCP	510'	(0.0048)	14	4.3	510' - 42" RCP	80,050	Replace 24" RCP
M6.91 to M6.90	24.2 36.2	0.7 0.25	38.03	20	181	30" CMP	130'	(0.0048)	16	3.3	130' - Dual 48" RCP	46,300	Replace 30" CMP
M6.90 to L6.34	6.8 24.70	0.7 0.25	48.97	25	215	Marsh	800'	(0.0048)				Adequate	Retention in marsh
L6.34 to L6.35					215	5'x4' B.A.	90'	(0.0048) 0.0002	113	6.2	90' - 4'x4' Box	28,000	Parallel pipe
												154,350	SUBTOTAL
												30,900	UPSTREAM IMPROVEMENTS
												185,250	TOTAL

North Romney Street

The North Romney Street watershed is located between Morrison Drive on the west and the Cooper River on the east and drains 120.2 acres. The land use in the area varies greatly from cemetery (74.7 acres) to apartment complexes (8.4 acres). The existing drainage system consist of culverts at roadway crossings which outlet into the surrounding marsh. These existing culverts are inadequate and parallel systems are recommended at Brigade Street and North Romney Street.

Morrison Drive North

The Morrison Drive North watershed drains 24.2 acres of commercial development located on each side of Morrison Drive from Brigade Street on the north to Conroy Street on the south. The existing drainage facilities consist of a series of roadway culverts and open channels which are inadequate. Recommended improvements include a parallel 54" RCP under the Seaboard Systems Railroad, dual 36" RCP parallel to the existing 36" RCP under the Seaboard Systems Railroad spur track, dual 42" RCP under Romney Street, and various channel improvements.

Algonquin

The Algonquin watershed is located east of Meeting Street between Greenleaf Street on the north and Algonquin Road on the south. The existing system of pipe conduits, open channels, and roadway culverts drains 109.1 acres of industrial development and cemetery, and is inadequate. A replacement system of 42" RCP and 48" RCP is recommended. This includes excavation in the marsh which will require a South Carolina Coastal Council permit.

TABLE 32

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
HERIOT STREET (L-6, M-6)													
L6.20 to L6.19	5.1	0.45	2.30	9	14	24" RCP	190'	(0.0014) 0.0024	7	2.3	190' - 30" RCP	23,950	Replace 24" RCP
L6.18 to L6.19	5.3 4.8	0.7 0.45	5.87	8	38	24" RCP	50'	(0.0124) -0.0058	22	6.9	50' - 36" RCP	11,500	Replace 24" RCP
L6.19 to L6.22	2.6 3.6	0.7 0.45	11.61	11	67	30" RCP	400'	(0.0048) 0.0007	25	5.0	400' - 42" RCP	85,800	Replace 30" RCP
L6.27 to L6.25	4.8	0.7	3.36	8	22	24" RCP	90'	(0.0026) 0.0051	10	3.2	250' - 30" RCP	32,700	Replace 24" RCP
L6.25 to L6.22	0.3	0.9	3.63	9	23	24" RCP	160'	(0.0131) 0.0070	22	7.1			
L6.22 to L6.24	1.6	0.9	16.68	14	88	36" RCP	180'	(0.0048) -0.0012	40	5.7	970' - 48" RCP	227,100	Relief system L6.28 to L6.28A
L6.24 to L6.28	0.8	0.9	17.40	15	90	36" RCP	350'	(0.0048) 0.0021	40	5.7			
L6.28 to L6.31	5.6	0.7	21.32	17	107	36" RCP	440'	(0.0048) 0.0057	40	5.7			
L6.31 to M6.58	1.33	0.9	22.52	20	107	36" RCP	170'	(0.0048)	40	5.7			Outfall to marsh dredging may be required
M6.61 to M6.60	6.3 9.5	0.7 0.45	8.69	19	42	36" RCP	70'	(0.0049) 0.0216	40	5.7		Adequate	
M6.60 to M6.59	19.9	0.7	22.62	20	107	5' F.B. Channel	30'	(0.0049) 0.0040	263	6.0		Adequate	
M6.59 to M6.58	8.9	0.8	52.26	24	233	4'x4.5' Box	250'	(0.015) 0.0005	128	7.1		Adequate	Due to relief system
												381,050	SUBTOTAL
												76,250	UPSTREAM IMPROVEMENTS
												457,300	TOTAL
PEACHTREE STREET (L-6, L-7)													
L7.1	87.1	0.45	39.20	19	188	15" VCP			2	1.4			3 - Relief systems
											790' - 48" RCP 480' - 42" RCP 560' - 36" RCP	385,850	Relief system on Peachtree Street L7.1E to L7.1
											40' - 24" RCP 240' - 18" RCP	385,850 77,200	SUBTOTAL UPSTREAM IMPROVEMENTS
												463,050	TOTAL
											830' - 48" RCP 550' - 42" RCP 570' - 36" RCP	457,650	Relief system on Sans Souci Street L7.1C to L7.1D
											285' - 30" RCP 280' - 24" RCP 280' - 18" RCP	457,650 91,500	SUBTOTAL UPSTREAM IMPROVEMENTS
												549,200	TOTAL
											230' - 42" RCP 930' - 36" RCP 270' - 30" RCP	359,900	Relief system on Mt. Pleasant Street L7.1A to L7.1B
											1360' - 24" RCP 80' - 18" RCP	359,900 72,000	SUBTOTAL UPSTREAM IMPROVEMENTS
												431,900	TOTAL

Heriot Street

The Heriot Street watershed drains 80.4 acres of commercial and industrial development located between King Street Extension on the east and I-26 on the west. The existing drainage facilities consists of a pipe conduit system which runs along the west side of I-26 from Heriot Street northward to the discharge point under Mechanic Street. This existing system is inadequate and a replacement system of 30" RCP, 36" RCP, and 42" RCP is recommended.

Peachtree Street

The Peachtree Street watershed drains 87 acres of residential development located along either side of Peachtree Street. The existing 15" VCP outfall provides less than 2 percent of the required capacity. Recommended improvements include three relief systems, located on Mt. Pleasant Street, Sans Souci Street and Peachtree Street which outlet to the Ashley River. The three systems will require excavation in the marsh to provide a free outlet and will require South Carolina Coastal Council permits.

TABLE 32A

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
GREENLEAF (M-5, M-6)													
M5.7 to M5.6	32.1	0.5	16.05	28	67	24" RCP	60	(0.0083) -0.006	12	3.8	700'-4' F.B. Channel and 48" RCP	28,400	Parallel system
												28,400	SUBTOTAL
												5,700	UPSTREAM IMPROVEMENTS
												34,100	TOTAL
MILFORD WEST (M-6)													
M6.30 to M6.31	5.6	0.7	3.92	9	24	24" RCP	40	(0.0125) 0.0065	12	3.8	24" RCP	3,200	Parallel pipe
M6.31 to M6.32	2.0	0.7	5.32	10	32	2' F.B. Channel	40	(0.0005) 0.0040	17	1.3	2' F.B. Channel	400	Increase sideslope
M6.32 to M6.33					32	24" RCP	100	0.0037	12	3.8	36" RCP	12,600	Replace 24" RCP
M6.33 to M6.34	2.4	0.7	7.00	11	41	2' F.B. Channel	100	(0.005) 0.017	18	1.4	4' F.B. Channel	900	
M6.34 to M6.35					41	36" RCP	60	(0.0083) 0.0012	22	3.1	36" RCP	8,000	Parallel Pipe
M6.35 to M6.36	4.2	0.7	9.94	12	56	3' F.B. Channel	220	(0.0005) 0.0005	65	1.8		Adequate	
M6.36 to M6.37					56	48" Steel Pipe	200	(0.0527) 0.0005	75	6.0	1100'-4' F.B. Channel and 200'-48" RCP	39,800	24" CMP ties into 48" 48" steel pipe without junction box. Replace 48" steel pipe and ditch to Ashley River.
												64,900	SUBTOTAL
												13,000	UPSTREAM IMPROVEMENTS
												77,900	TOTAL
BRASWELL (M-6, M-7)													
M6.39 to M6.38	2.5	0.7	1.75	5	13	24" RCP	60	(0.0083) 0.0053	12	3.8		Adequate	
M6.38 to M6.42	0.6	0.7	2.17	6	15	2' F.B. Channel	30	(0.0023) 0.0190	31	2.7		Adequate	
M6.42 to M6.43					15	30" RCP	100	(0.0070) 0.0037	24	4.9		Adequate	
M6.40 to M6.41	1.8	0.7	1.26	4	9	24" RCP	40	(0.0125) 0.0073	12	3.8		Adequate	
M6.41 to M7.50	6.1	0.7	7.70	15	40	2' F.B. Channel	1330	(0.0015) 0.0019	16	2.0	3' F.B. Channel	8,650	
M7.50 to M7.51					40	30" RCP	40	(0.0125) 0.0058	24	4.9	30" RCP	3,750	Parallel pipe
M6.44 to M6.45	0.6	0.7	0.42	4	3	24" RCP	60	(0.0017) 0.0017	12	3.8		Adequate	
M6.45 to M6.46	0.5	0.7	0.77	5	6	2' F.B. Channel	120	(0.0013) 0.0013	15	1.8		Adequate	
M6.46 to M6.17					6	24" RCP	40	(0.0055) 0.0055	12	3.8		Adequate	
M6.47 to M6.48	0.3	0.7	0.98	6	7	2' F.B. Channel	40	(0.0028) 0.0028	12	2.7		Adequate	
M6.48 to M6.49					7	24" RCP	40	(0.0033) 0.0033	12	3.8		Adequate	
M6.49 to M7.52	1.8	0.7	2.24	13	12	2' F.B. Channel	900	(0.0005) 0.0003	21	1.4		Adequate	
M7.52 to M7.53					12	24" RCP	60	(0.0083) 0.0060	12	3.8		Adequate	
M7.51 to M7.54	3.9	0.7	12.67	18	62	3' F.B. Channel	250	(0.0005) 0.0034	20	1.3	6' F.B. Channel	2,500	
M7.54 to M7.55					62	36" RCP	230	(0.0097) 0.0028	38	5.4	36" RCP	25,950	Parallel pipe
												40,900	SUBTOTAL
												8,200	UPSTREAM IMPROVEMENTS
												49,100	TOTAL

Greenleaf

The Greenleaf watershed is located in the neck area of the Peninsular City and drains 32 acres located along the south side of Greenleaf Street. The area is dominated by industrial development, the major portion of which is the Exxon Oil Company property.

Existing drainage facilities consist of a roadside ditch and driveway culverts running along the south side of Greenleaf Street and discharging to the Cooper River via 24" RCP under the railroad. Recommended improvements consist of placing a 48" RCP parallel to the 24" RCP and 700 feet of 4 foot flat bottom ditch from the crossing to Greenleaf Street.

Milford West

The Milford West watershed drains 14 acres of industrial development located along either side of Milford Street and lying west of Interstate 26. Existing drainage facilities consist of a ditch and driveway culvert system along the south side of Milford Street which discharges into the Ashley River. All of the existing system is inadequate and either replacing the roadway culverts or placing parallel culverts is recommended.

Braswell

The Braswell watershed drains 18 acres of industrial development along the access road to the Braswell Shipyard. Existing drainage facilities consist of a roadside ditch on either side of the road which conveys runoff westward from I-26 to the Ashley River. The majority of the existing drainage facilities are adequate with the exception of the 36" RCP which discharges to the Ashley River and the 30" RCP (M7.50 to M7.51) located along the south side of the access road. For these two locations parallel pipe culverts are recommended. A low area is located above the inlet to the 36" RCP outlet pipe and serves as a retention area. During final design, the effect of this area should be analyzed and the proposed pipe size adjusted if necessary.

TABLE 33

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ELGIN STREET (M-6,N-6)													
M6.81 to M6.80	9.8	0.7	6.86	13	38	24"RCP	60'	(0.0083) -0.0032	12	3.8	60' - 36" RCP	9,600	Replace 24" RCP
M6.80 to M6.79	1.7	0.7	8.05	14	43	3' F.B. Channel	40'	(0.0005) 0.003	11	1.2	40' - 36" RCP	7,400	Fill existing channel
M6.79 to M6.77					43	24" RCP	200'	(0.0043) 0.0044	13	4.1	200' - 36" RCP	24,850	Replace 24" RCP
M6.77 to M6.83	0.8	0.7	8.61	16	44	24" RCP	265'	(0.0043) 0.0044	13	4.1	265' - 36" RCP	32,000	Replace 24" RCP
M6.83 to M6.84	4.3	0.7	11.62	18	57	3' F.B. Channel	30'	(0.0003) 0.0193	5	0.8	30' - 42" RCP	7,000	Fill existing channel
M6.84 to M6.85					57	24" RCP	50'	(0.0440) 0.0222	14	4.5	50' - 42" RCP	9,800	Replace 24" RCP
M6.85 to M6.71	0.6	0.7	12.04	19	58	6' F.B. Channel	25'	(0.0004) 0.0840	60	1.7		1,200	Clean existing channel
M6.71 to M6.72					58	24" RCP	110'	(0.0139) 0.0143	14	4.5	110' - 42" RCP	106,450	Parallel system
M6.64 to M6.65	3.4 7.9	0.7 0.45	5.94	9	37	24" RCP	345	(0.0043)	13	4.1	345' - 36" RCP	42,600	Upstream improvements needed
M6.66 to M6.67	5.1	0.7	3.57	11	21	24" RCP	130'	(0.0066)	16	5.1	120' - 30" RCP	15,250	Replace 24" RCP
M6.65 to M6.68	1.5	0.7	10.56	12	59	24" RCP	175'	(0.0066)	16	5.1	190' - 42" RCP	25,650	Replace 24" RCP
M6.74 to M6.73	1.1	0.7	0.77	2	6	24" RCP	180'		22	7.0		Adequate	
M6.76 to M6.75	1.2	0.7	0.84	2	6	24" RCP	80'		22	7.0		Adequate	
M6.73 to M6.68	16.6	0.7	13.23	5	98	5' F.B. Channel	550'	(0.0032) 0.0037	192	4.8		Adequate	
M6.68 to M6.69	2.4	0.7	25.47	15	132	4' F.B. Channel	410'	(0.0032) 0.0099	188	4.7		Adequate	
M6.69 to M6.70					132	48" RCP	120'	0.00	78	8.0	120' - 42" RCP	58,000	Parallel pipe
M6.70 to M6.70A	66.5	0.7	72.02	22	331	Marsh	1300'					Adequate	
					331	Bridge						Adequate	
												339,800	SUBTOTAL
												68,000	UPSTREAM IMPROVEMENTS
												407,800	TOTAL
ST. LAWRENCE (L-6)													
L6.32 to L6.33	30.7	0.25	7.68	25	34	6.3'x4.0' R.A.	100'	(0.0029) -0.0125	121	5.1		Adequate	

Elgin Street

The Elgin Street watershed drains 122.9 acres of predominantly industrial development and is bounded by Milford Avenue on the south, Meeting Street on the west, Pittsburgh Avenue on the north and the Cooper River on the east. The existing drainage facilities are divided into two branches. Each branch crosses the Seaboard Systems Railroad prior to discharge to the Cooper River. An existing system of open channels and roadway culverts make up the existing systems, which are inadequate.

Recommended improvements include replacing the existing system between Elgin Street and the Seaboard Systems Railroad with a line of 36" RCP and 42" RCP. The other branch is adequate with the exception of a section of the upstream system near Cherry Street which should be replaced with a 42" RCP and 30" RCP. The existing culvert under the Seaboard Systems Railroad is also inadequate and a parallel 42" RCP is recommended.

St. Lawrence

The St. Lawrence watershed is located between Huguenin Avenue and the Cooper River and drains 30.7 acres of the Magnolia and St. Lawrence cemeteries. The runoff from the area discharges into a lake prior to the outlet into the Cooper River via a 6'x4' brick arch which is adequate.

TABLE 34

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
DOSCHER AVENUE (M-6)													
M6.22 to M6.21	23.9	0.7	16.73	13	92	24" RCP	60'	(0.0038) 0.0052	12	3.8	60' - 54" RCP	22,700	Replace existing system
M6.21 to M6.20	4.7	0.7	20.02	14	106	24" RCP	70'	(0.0038) 0.0133	12	3.8	95' - 54" RCP	22,600	Replace 24" RCP
M6.20 to M6.19	1.4 4.2	0.7 0.25	22.05	15	115	3' F.B. Channel	25'	(0.0038) -0.0064	134	4.8			Fill existing channel
M6.19 to M6.16					115	36" RCP	100'	(0.0038) 0.0143	36	5.0	100' - 54" RCP	123,400	Replace 36" RCP
M6.16 to M6.13	2.0 2.1	0.9 0.25	24.38	16	124	3'x3' Brick Arch	70'	(0.0038) 0.0071	45	5.0	370' - 60" RCP	174,850	Replace arch
M6.13 to M6.11	1.0 1.8	0.9 0.25	25.73	17	129	36" RCP	210'	(0.0038) 0.0020	36	5.0			Replace 36" RCP
M6.11 to M6.10	2.8	0.25	26.43	18	130	5' F.B. Channel	30'	(0.0038) 0.0080	186	5.2			Fill existing channel
M6.10 to M6.9					130	36" RCP	60'	(0.0038) 0.0018	36	5.0			Replace 36" RCP
M6.9 to M6.8	4.0 1.3	0.7 0.25	29.56	19	142	7' F.B. Channel	110'	(0.0038) 0.0017	241	5.5		Adequate	
M6.8 to M6.7					142	36" RCP	60'	(0.0043) 0.0062	38	5.4	60' - 60" RCP	20,300	Replace 36" RCP
M6.29 to M6.28	1.6	0.7	1.12	5	8	24" RCP	110'	(0.0079) 0.0099	17	5.5		Adequate	
M6.28 to M6.27	3.9	0.7	3.85	6	27	24" RCP	110'	(0.0079) 0.0088	17	5.5	110' - 24" RCP	10,200	Parallel pipe
M6.27 to M6.25					27	36" RCP	30'	(0.0079) -0.0013	42	5.9		Adequate	
M6.26 to M6.25	2.0	0.7	1.40	3	10	24" RCP	50'	(0.0032) 0.0084	11	3.5		Adequate	
M6.25 to M6.24			5.25	7	35	36" RCP	230'	(0.0052) 0.0055	42	5.9		Adequate	
M6.24 to M6.23	1.9	0.7	6.58	9	41	36" RCP	140'	(0.0052) 0.0052	42	5.9		Adequate	
M6.23 to M6.7	1.2	0.7	7.42	10	45	36" RCP	130'	(0.0052) 0.0092	42	5.9		Adequate	With available head
M6.7 to M6.6	0.35	0.25	37.07	20	178	36" RCP	60'	(0.0043) 0.0068	38	5.4	60' - Dual 54" RCP	26,050	Replace 36" RCP
M6.6 to M6.5	1.0	0.7	37.77	21	178	7' F.B. Channel	130'	(0.0043) 0.0061	256	5.8		Adequate	
M6.5 to M6.2					178	36" RCP	100'	(0.0192) 0.0061	36	6.9	100' - Dual 48" RCP	38,900	Parallel pipe
M6.4 to M6.3	1.9	0.35	0.67	5	5	24" RCP	90'		20	6.4		Adequate	
												439,000 87,800 526,800	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
MILFORD STREET (M-5, M-6)													
M6.88 to M5.1	72.4	0.7	50.68	29	210	36" CMP	300'	(0.005) 0.002	17	2.4	360' - 4'x8' Box, 80' - Dual 48" RCP	320,400	Abandon 36" CMP Channel improvements needed downstream
												320,400 64,100 384,500	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Doscher Avenue

The Doscher Avenue watershed drains 63 acres of commercial and industrial development along either side of the intersection of Elgin Street and Meeting Street. The existing drainage facilities consist of a pipe conduit and open channel system which conveys runoff from the area to the discharge point under Doscher Avenue into the Ashley River marsh. The existing system provides less than 40 percent of the required capacity.

Recommended improvements include replacing the existing system with a series of 54" RCP and 60" RCP from Meeting Street to Doscher Avenue. Upstream improvements along Meeting Street are required to reduce the impact of an existing flooding problem which occurs on Meeting Street during periods of moderate to heavy rainfall.

Milford Street

The Milford Street watershed drains 72.4 acres of industrial development located south of Milford Street. The existing drainage system consist of a 36" CMP culvert under the Seaboard Systems Railroad and is inadequate. Replacing the existing system with a 4'x8' box section is recommended. This will require excavation in the marsh area down stream of the outfall and will require a South Carolina Coastal Council permit.

TABLE 35

HYDRAULIC ANALYSIS FOR PENINSULAR AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
AUSTIN AVENUE (M-6, M-7, N-6, N-7)													
N6.1 to N6.2	9.5 27.9	0.45 0.70	23.81	24	106	36" RCP	65'	(0.009) -0.0612	55	7.8	65' - 36" RCP	45,600	Parallel system
N6.2 to N6.3					106	36" RCP	40'	(0.009) 0.1223	55	7.8	40' - 36" RCP	27,000	Parallel system
N6.3 to N6.4	2.4	0.25	24.41	25	107	5' F.B. Channel	20'	(0.005) -0.0028	123	5.1	20' - Dual 36" RCP	27,000	Fill existing channel
N6.4 to N6.5					107	4'x4' box	45'	(0.0222) 0.0064	105	6.6		Adequate	Available head
N6.62 to N6.63	0.8 0.3	0.70 0.25	0.64	3	5	24" RCP	140'	(0.0074) 0.0003	15	4.8		Adequate	
N6.63 to N6.9	2.5 2.0	0.7 0.25	2.89	11	17	3' F.B. Channel	1060'	(0.0035) 0.0035	32	3.2		Adequate	
N6.9 to N6.8					17	24" RCP	100'	(0.010) -0.0018	15	4.8		Adequate	Available head
N6.5 to N6.6	0.50 0.50	0.25 0.9	28.34	26	122	6' F.B. Channel	20'	(0.005) -0.032	143	5.3	75' - 36" RCP	62,050	Fill existing channel
N6.6 to N6.7					122	36" RCP	55'	(0.0091) 0.010	45	6.4			Parallel system
N6.7 to N6.10	1.4	0.25	28.69	27	122	7' F.B. Channel	140'	(0.0007) 0.0085	215	2.9		Adequate	
N6.10 to N6.11					122	48" RCP	80'	(0.0125) -0.0055	75	6.5	80' - 48" RCP	13,600	Parallel system
N6.11 to N6.12	6.2 1.5	0.7 0.25	33.41	28	140	7' F.B. Channel	65'	(0.0015) 0.0005	314	4.2		Adequate	
N6.12 to N6.13					140	36" RCP	120'	(0.0083) 0.0058	53	7.4	120' - Dual 48" RCP	46,200	Parallel system
N6.15 to N6.13	16.2 2.9	0.7 0.25	12.07	24	54	24" RCP	300'	(0.0133) 0.0258	23	7.2	300' - 30" RCP	27,850	Parallel pipe
N6.14 to N6.13	1.7	0.25	0.43	4	3	24" RCP	135'	(0.0093) 0.0371	19	6.0	1290' - 13' F.B. Channel, 135' - dual 4'x7' box, & 270' 4'x8' box	272,200	Relief system N6.13 to N6.13A; N6.13A to N6.13B, & N6.13B to N7.9
N6.13 to N6.17			45.91	29	191	36" RCP	220'	(0.0015) 0.0058	22	3.2		Adequate	Due to relief system
N6.18 to N6.21	5.4 2.5	0.25 0.45	2.48	6	17	24" RCP	60'	(0.0083) -0.0068	14	4.5		Adequate	
N6.21 to N6.22	1.4	0.25	2.83	7	19	3' F.B. Channel	20'	(0.020) 0.0195	215	10.0		Adequate	Possible channel erosion
N6.22 to N6.23					19	24" RCP	60'	(0.0083) 0.0017	14	4.5		Adequate	
N6.23 to N6.24			3.11	8	20	3' F.B. Channel	20'	(0.0350) 0.0295	219	12.4		Adequate	Possible channel erosion
N6.24 to N6.25					20	24" RCP	90'	(0.0056) -0.0039	14	4.5		Adequate	Available head
N6.25 to N6.26	4.1	0.25	4.14	10	25	9' F.B. Channel	380'	(0.0001) 0.0001	31	0.8		Adequate	
N6.26 to N7.9					25	24" RCP	210'	(0.0186) 0.0305	14	4.5		Adequate	Relief to new system from N6.14
N6.17 to N7.1	12.4 24.1	0.45 0.25	61.66	31	247	11' F.B. Channel	435'	(0.0015) 0.0000	321	4.1		Adequate	
												521,500	SUBTOTAL
												104,300	UPSTREAM IMPROVEMENTS
												625,800	TOTAL

Austin Avenue

The Austin Avenue watershed is located at the northern City boundary near the intersection of Meeting Street and Spruill Avenue. An existing system of pipe conduits, open channels and roadway culverts convey the runoff to the Ashley River. Approximately 60 percent of the existing drainage facilities are adequate, but the systems near the upper reaches of the system are inadequate and require improvement.

Recommended improvements consist of a relief system which will divert the runoff from the existing culvert under I-26, northward to the Austin Avenue bridge, at which point the system will cross under I-26 and run southwestward along the west right-of-way of I-26 to the Ashley River marsh. The relief system consist of a 13 foot flat bottom channel, a 4'x8' box section, and a dual 4'x7' box section. Also included is a new system of culverts under Highway 78 (King Street) and the Southern Railroad.

SECTION B

WEST OF THE ASHLEY AREA

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EXPLANATION OF HYDRAULIC DATA TABLES

The Hydraulic Data Tables contain information, by watershed areas, for each of the drainage facilities within the respective area. The data listed in each column is as follows:

Column 1: Location of the system to be analyzed, listing upstream manhole number and downstream manhole number.

Column 2: Drainage Area to system to be analyzed in acres.

Column 3: Runoff coefficient for the area listed in Column 2. (See Table 1)

Column 4: Total CA is the sum of Column 2 times Column 3 plus CA for areas upstream of the point of analysis.

Column 5: Travel time is the time required for runoff to reach the point of analysis from the most remote point within in the watershed.

Column 6: Discharge (Q) equals CIA where CA is the total found in Column 4 times the rainfall intensity (I) in inches per hour from Figure No. 3 using the travel time in Column 5.

Column 7: Existing system description.

Column 8: Length of existing system.

Column 9: Slope of existing system. Both the physical slope (actual slope of system) and the hydraulic slope (water surface profile) are listed for each system. The hydraulic slope is placed in parenthesis and is used to compute the capacity of the existing system.

Column 10: Capacity of existing system in cubic feet per second computed from Manning's equation.

Column 11: Velocity of existing system in feet per second. Discharge divided by flow area.

Column 12 & 13: Recommended Improvements. List improvements required (Column 12) and associated cost (Column 13).

Column 14: Comments

The West Ashley Area is the largest area in the Study Area and is comprised largely of residential development. The commercial development is concentrated along the major traffic arteries of Highway 7, Highway 17, Highway 61, and Highway 171. This area also contains large tracts of undeveloped land west of Highway 61 and along Highway 17, which is expected to develop in the near future.

The existing stormwater drainage facilities consist mainly of open channels with culverts at roadway and driveway crossings. A limited number of pipe conduit systems are in place along the major traffic arteries. The major portion of the existing systems are inadequate and require improvement.

Several of the drainage systems provide drainage for areas which lie outside the City of Charleston boundaries. In the evaluation, the entire drainage area was considered and the recommended improvements are based upon improvement of the entire watershed drainage system. Improvements to drainage facilities that benefit the County, or other governmental entity as well as the City should be approached as a cooperative effort.

The drainage facilities within each watershed, recommended improvements and associated costs are described in the following paragraphs.

TABLE 36

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ALBEMARLE POINT (I-7, J-7)													
J7.39 to J7.38	4.4	0.7	3.08	5	23	18" RCP	80'	(0.0033) 0.005	7	4.0	80' - 36" RCP	10,300	Replace 18" RCP
J7.38 to J7.46	2.6	0.45	4.25	8	27	2' F.B. Channel	130'	(0.001) 0.0322	30	2.0		Adequate	
J7.46 to J7.47	2.6	0.45	4.25	8	27	24" RCP	120'	(0.0205) 0.0023	14	4.5	120' - 36" RCP	14,600	Replace 24" RCP
												24,900	SUBTOTAL
												5,000	UPSTREAM IMPROVEMENTS
												29,900	TOTAL
ALBEMARLE I (I-7)													
I7.4A	0.9	0.9	0.81	3	6	15" RCP	230	(0.0157)	7	5.7		Adequate	
ALBEMARLE II (I-7)													
I7.3	3.4	0.6	2.04	5	15	15" RCP	180	(0.02)	8	6.4	180' - 30" RCP	15,850	Replace existing
												15,850	SUBTOTAL
												3,200	UPSTREAM IMPROVEMENTS
												19,050	TOTAL
ALBEMARLE III (I-7.													
I7.4	2.4	0.6	1.44	5	11	15" RCP	250	(0.0224)	8	6.8	250' - 24" RCP	18,800	Replace existing
												18,800	SUBTOTAL
												3,800	UPSTREAM IMPROVEMENTS
												22,600	TOTAL
CRESCENT SOUTH (I-7)													
I7.11	6.8	0.35	2.38	12	13	18" RCP	220	(0.01)	9	5.1	220' - 24" RCP	15,200	Replace existing
												15,200	SUBTOTAL
												3,050	UPSTREAM IMPROVEMENTS
												18,250	TOTAL

Albemarle Point

The Albemarle Point watershed is located south of Highway 17 on Albemarle Road and drains 7.0 acres of industrial development. The existing drainage facilities discharge into the Ashley River and provide approximately 50 percent of the recommended capacity. A parallel system of 36" RCP's is recommended to provide adequate capacity.

Albemarle I

The Albemarle I watershed drains the area located between Albemarle Road and Porter Gaud School. Runoff from the area is conveyed to the Ashley River via a 15" RCP which is adequate.

Albemarle II

The Albemarle II watershed drains 3.4 acres along the eastern side of Porter Gaud School. Replacement of the existing 15" RCP with a 30" RCP is recommended for this area.

Albemarle III

The Albemarle III watershed drains 2.4 acres along the southern portion of Porter Gaud School. The existing 15" RCP outfall to the Ashley River is inadequate, and replacement with a 24" RCP is recommended.

Crescent South

The Cresent South watershed drains the southeastern corner of the Cresent Subdivision along the east end of Guerard Road. Existing drainage facilities consist of an 18" RCP from Guerard Road to Wappoo Creek and provide approximately 70 percent of the recommended capacity. Replacing the existing 18" RCP with a 24" RCP is recommended.

TABLE 37

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SOUTH WINDEMERE (I-7, I-8)													
I7.32 to I7.31	1.24 20.7	0.35 0.45	9.75	20	46	36" CMP	60'	(0.0052) 0.0027	27	3.8	130' - 42" RCP	23,650	Replace 36" CMP
I7.31 to I7.29	0.46	0.45	9.96	21	47	36" CMP	70'	(0.0052) 0.014	27	3.8			
I7.30 to I7.29	14.45	0.35	5.06	14	27	24" RCP	110'	(0.0309)	34	11.0		Adequate	
I7.29 to I7.28	3.7	0.45	16.69	22	77	36" RCP	135'	(0.0065) 0.0044	47	6.6	135' - 36" RCP	26,250	Parallel system
I7.28 to I7.27	6.6	0.45	19.66	23	88	36" RCP	30'	(0.0065) -0.0015	47	6.6	170' - 42" RCP	34,300	Parallel system
I7.27 to I7.25	2.9	0.7	21.69	24	97	36" RCP	140'	(0.003) -0.0015	32	4.5			
I7.25 to I8.3	3.0 16.01	0.7 0.45	30.99	29	130	Marsh					17' F.B. Channel	16,000	Excavation in marsh
I8.3 to I8.5					130	30" RCP & 36" RCP	75'	(0.0052) -0.0036	66	4.9	50' - Dual 42" RCP	18,500	Parallel system
												118,700	SUBTOTAL
												23,750	UPSTREAM IMPROVEMENTS
												142,450	TOTAL
WAPPOO HEIGHTS (I-7)													
I7.18 to I7.19	5.95	0.35	2.08	8	13	24" RCP	440'	(0.0023) 0.0011	9	3.0	440' - 36" RCP	61,350	Replace 24" RCP
I7.19 to I7.20	2.2	0.35	2.85	11	17	24" RCP	120'	(0.0053) 0.0023	14	4.5	120' - 36" RCP	17,300	Replace 24" RCP
I7.20 to I7.24	0.82	0.45	3.22	12	18	24" RCP	190'	(0.0053) 0.004	14	4.5	190' - 36" RCP	25,950	Replace 24" RCP
												104,600	SUBTOTAL
												20,950	UPSTREAM IMPROVEMENTS
												125,550	TOTAL
CRESCENT WEST (I-7)													
I7.15 to I7.16	21 3	0.35 0.9	10.05	16	51	5.3'x6' RCP	90'	0.0027	186	5.8		Adequate	Upstream improvements may be needed. Available storage in lake
I7.13 to I7.14	8 4.3	0.35 0.9	16.72	27	71	30" CMP	85'	(0.0016)	20	4.1		Adequate	Available storage in lake
CRESCENT EAST (I-7)													
I7.12	20.2	0.45	9.09	17	45	18" RCP	250'	(0.0146) -	11	6.2	250' - 36" RCP	32,700	Replace 18" RCP
												32,700	SUBTOTAL
												6,550	UPSTREAM IMPROVEMENTS
												39,250	TOTAL

South Windemere

The South Windemere watershed drains portions of the Windemere and South Windemere subdivisions located at the intersection of Folly Road and Wesley Drive. Existing drainage facilities consist of a stormwater conduit which crosses Folly Road and serves the northern portion of the Crescent subdivision and South Windemere Shopping Center. This system outlets into a tidal channel which discharges through two existing culverts under Locke Lane. The existing system provides approximately 35 percent of the recommended capacity.

To provide adequate capacity, the existing 36" CMP should be replaced with a 42" RCP and a parallel 36" RCP and 42" RCP culvert system placed across Folly Road. This would require that the existing marsh area between Folly Road and Locke Lane be excavated, which will require a South Carolina Coastal Council permit. The final improvement required is a system of dual 48" RCP's parallel to the existing culvert under Locke Lane.

During design, attention should be given to an existing low area on the east side of Folly Road between Yeamans Road and Sayle Road. This area experiences flooding problems on a regular basis. An easement will probably be required for correction of the problem.

Wappoo Heights

The Wappoo Heights watershed is located along Folly Road from Broughton Road to the Wappoo Cut bridge. The existing system consists of a 24" RCP along the west side of Folly Road which discharges into Wappoo Creek at the north end of the Wappoo Cut bridge and provides approximately 80 percent of the recommended capacity. To provide the recommended capacity, the existing 24" RCP needs to be replaced with a 36" RCP.

Crescent West

The Crescent West watershed drains the western portion of the Crescent subdivision. Drainage facilities for this area consists of two culverts which connect two existing lakes. The two lakes provide adequate storage area for the runoff generated and no improvements are required.

Crescent East

The Crescent East watershed is located to the east of the above described watershed and drains the eastern portion of the Crescent subdivision. The existing 18" RCP outfall from Guerard Road to Wappoo Creek provides less than 25 percent of the recommended capacity and should be replaced with a 36" RCP. Upstream improvements are also recommended to relieve the present flooding problems on Cochran Drive.

TABLE 38

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
WINDEMERE EAST (I-7, I-8, J-7, J-8)													
J8.48 to J8.46	40.3	0.45	18.14	11	105	30" RCP	60'	(0.0044)	24	4.8	110' - 36" RCP; 500' - Dual 36" RCP & 180' - 3'x6' Box	197,200	Relief system J8.48A to J8.46A
J8.47 to J8.46	3.25	0.45	1.46	17	7	30" RCP	50'	(0.0044)	24	4.8		Adequate	Remove 30" RCP for relief system
J8.46 to J8.49	0.6	0.45	19.86	18	105	30" RCP	150'	(0.0044)	24	4.8	560' - 11' F.B. Concrete lined channel and 340' - 3'x8' Box	214,800	Abandon 30" RCP J8.46A to I8.14
J8.49 to I8.15	0.2	0.45	19.96	19	105	24" RCP	100'	(0.0044)	13	4.1			Abandon 24" RCP
I8.15 to I8.14	3.9 3.3	0.45 0.7	24.03	20	114	24" RCP	45'	(0.0007) 0.002	5	1.6			Abandon 24" RCP
I8.14 to I8.13	1.8 4.5	0.7 0.45	27.32	21	128	24" RCP	225'	(0.0007)	5	1.6	270' - Dual 3½'x6½' Box	162,250	Remove 24" RCP
I8.13 to I8.12	2.54	0.45	28.46	23	128	24" RCP	45'	(0.0007) -0.0027	5	1.6			Remove 24" RCP
I8.12 to I8.11	2.12 8.32	0.7 0.45	33.68	24	150	24" RCP	225'	(0.0007) 0.0038	5	1.6	275' - Dual 3½'x8' Box	204,800	Remove 24" RCP
I8.11 to I8.10	1.56 4.94	0.7 0.45	36.99	26	159	24" RCP	50'	(0.0007) 0.012	5	1.6			Remove 24" RCP
I8.10 to I8.7	1.24	0.45	37.55	27	160	24" RCP	120'	(0.0007) 0.0024	5	1.6	120' - Dual 3½'x8' Box	106,200	Remove 24" RCP
												885,250	SUBTOTAL
												177,050	UPSTREAM IMPROVEMENTS
												1,062,300	TOTAL
COBURG DAIRY ROAD (I-8)													
I8.34 to I8.35	6.1	0.25	1.53	14	8	24" RCP	65'	(0.0055) 0.0055	14	4.5		Adequate	
COLLETON DRIVE (I-8, J-8)													
I8.33	17.4	0.45	7.83	15	41	18" CMP	190'	(0.0192) -	13	7.1	190' - 36" RCP	24,150	Replace 18" CMP
												24,150	SUBTOTAL
												4,850	UPSTREAM IMPROVEMENTS
												29,000	TOTAL
WINDEMERE WEST (I-8)													
I8.30	14.75	0.45	6.64	14	35	18" RCP	215'	(0.0146)	12	6.7	215' - 30" RCP	18,700	Replace 18" RCP
												18,700	SUBTOTAL
												3,750	UPSTREAM IMPROVEMENTS
												22,450	TOTAL

Windemere East

The Windemere East watershed drains 108 acres of the Windemere section of the City of Charleston. The existing system consist of a 30" RCP which crosses the Seaboard System Railroad and runs along the west side of Locke Lane, discharging into the Wappoo Creek marsh. The existing system provides less than 10 percent of the recommended capacity. Replacement of the system with dual box culverts along Locke Lane is recommended. Upstream improvements are also required on Berkeley Drive and Stocker Road to convey the runoff to the proposed system.

Coburg Dairy Road

The Coburg Dairy Road drainage basis is located on the southern end of Coburg Dairy Road and is part of the Byrnes Down section of the City of Charleston. The drainage system serves only the private property owned by Coburg Dairy. The system is adequate and no improvements are required.

Colleton Drive

The Colleton Drive watershed is located in the Byrnes Down section of the City. The area lies south of the Seaboard Systems Railroad between Nicholson Drive on the east and Coburg Dairy Drive on the west. The existing 18" RCP outfall from Colleton Drive to Wappoo Creek provides less than 35 percent of the recommended capacity. Replacing the existing 18" RCP with a 36" RCP is recommended to provide the required capacity.

Windemere West

The Windemere West drainage basin is located between Tarleton Drive on the north and Jamaica Drive on the south, and drains a portion of the South Windemere subdivision. The existing drainage conduit is a 18" RCP which conveys runoff from the intersection of Lord Ashley Drive and Chadwick Drive into Wappoo Creek. This system provides less than 35 percent of the required capacity and replacement with a 30" RCP to provide adequate capacity is recommended.

During final design, attention should be directed to the two existing outfalls near the intersection of Chadwick Drive and Rebellion Road. The two outfalls are a 12" RCP and a 15" RCP respectively. Residents of this area experience flood problems during most heavy rainfalls. Replacement of the two outfalls with 18" RCP is recommended.

TABLE 39

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
HIGHWAY 17 SOUTH (J-7, J-8)													
J7.24 to J7.26	1.2	0.7	0.84	6	6	24" RCP	1040'	(0.0023) 0.0012	9	3.0		Adequate	
J7.26 to J7.31	3.34	0.7	3.18	13	17	24" RCP	335'	(0.0023) 0.0018	9	3.0	335' - 30" RCP	49,800	Replace existing system
J7.31 to J7.34	1.19	0.7	4.01	15	21	30" RCP	120'	(0.0016)	14	2.9	120' - 24" RCP	17,550	Parallel system
J7.40 to J7.34	14.9	0.45	6.71	23	30	24" RCP	340'	(0.0027) -0.01	10	3.2	340' - 36" RCP	63,550	Replace 24" RCP
J7.34 to J7.35	3.5	0.7	13.17	25	48	30" RCP	210'	(0.0016)	14	2.9	210' - 42" RCP	46,350	Parallel system
J7.35 to J7.37	1.4	0.7	14.15	26	61	30" RCP	250'	(0.0016) 0.0005	14	2.9	250' - 48" RCP	66,250	Parallel system
J7.37 to J7.13	3.9	0.7	16.88	28	71	30" RCP	550'	(0.0088)	33	6.8	550' - 48" RCP	126,800	Parallel system
												370,300	SUBTOTAL
												74,100	UPSTREAM IMPROVEMENTS
												444,400	TOTAL
HIGHWAY 17 NORTH (J-7, J-8)													
J7.21 to J7.18	4.8 6.1	0.7 0.45	6.11	7.0	40	24" RCP	380'	(0.0028) 0.0006	10	3.3	380' - 42" RCP	82,000	Replace 24" RCP
J7.18 to J7.16	2.6	0.7	7.93	10	48	30" RCP	545'	(0.0028) 0.0006	19	3.8	545' - 42" RCP	116,650	Replace 30" RCP
J7.16 to J7.14	2.4	0.7	9.61	14	51	36" RCP	515'	(0.0028) 0.0067	31	4.3	515' - 30" RCP	69,350	Parallel system
												268,000	SUBTOTAL
												53,600	UPSTREAM IMPROVEMENTS
												321,600	TOTAL
WOODWARD (J-7, J-8)													
J7.45 to J7.44	37.9 4.0 4.4	0.45 0.9 0.7	23.74	31	95	30" CMP	80'	(0.0018) 0.04	20	4.1		Adequate	Available storage in lake; upstream improvements may be required
ST. ANDREWS BLVD. (J-7, J-8)													
J7.42 to J7.41	10.6 4.1	0.45 0.7	7.64	14	40	24" RCP	60'	(0.0673) 0.0035	12	37	60' - 36" RCP	10,000	Parallel system
												10,000	SUBTOTAL
												2,000	UPSTREAM IMPROVEMENTS
												12,000	TOTAL

Highway 17 South

The Highway 17 South watershed is located along the south side of Highway 17 and extends from Stocker Road on the west to the Ashley River on the east. The existing drainage facilities consist of two pipe conduits, one on Folly Road and one on Highway 17. These systems join near the intersection of Folly Road and Highway 17 and run eastward before discharging into the Ashley River marsh near the intersection of St. Andrews Boulevard and Highway 17. The existing system provides less than 40 percent of the recommended capacity.

Recommended improvements consist of a parallel system of 42" RCP and 48" RCP along Highway 17 which discharges into the marsh. Construction will require that new sidewalks be built along both Folly Road and Highway 17 and excavation in the marsh which will require a South Carolina Coastal Council permit.

Highway 17 North

The Highway 17 North watershed drains the area along the north side of Highway 17 from Parish Road to the intersection of Folly Road. Existing drainage facilities consist of a pipe conduit running parallel to Highway 17 and discharging into the Ashley River marsh on the north side of St. Andrews Boulevard. An existing capacity of approximately 40 percent of the recommended is available from this system. Replacement with a 42" RCP is recommended to improve the system, and provide the required capacity.

Woodward

Approximately 80 percent of the 46 acres drained by the Woodward watershed is located outside the City of Charleston boundary. The 20 percent which is within the City boundary drains the southern portion of the Westwood subdivision. The runoff from this area goes into a detention pond located between Woodward Road and Sheldon Road prior to discharge into the Ashley River. Due to the available storage provided by the lake, the existing facilities are adequate.

St. Andrews Boulevard

The St. Andrews Boulevard watershed drains approximately 15 acres located along St. Andrews Boulevard. The entire 15 acres are outside the present City of Charleston boundaries. The existing 24" RCP outfall is inadequate to carry the required flow and a parallel 36" RCP from St. Andrews Boulevard to the Ashley River is recommended.

TABLE 40

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
BYRNES DOWNS (J-8)													
J8.9 to J8.11	8.6	0.7	6.02	9	37	30" RCP	100'	(0.026) 0.0135	57	11.7			Adequate with relief system
J8.12 to J8.13	4.7	0.45	8.14	10	49	30" RCP	315'	(0.0023) -0.0014	17	3.5			Adequate with relief system
J8.13 to J8.14	6.3	0.45	10.98	12	61	30" RCP	50'	(0.002) 0.002	16	3.2	910' - 36" RCP	120,150	Relief system J8.13 to J8.13A
J8.14 to J8.15	1.3	0.45	11.57	13	64	30" RCP	300'	(0.0006)	9	1.8			Adequate with relief system
J8.15 to J8.16	2.5	0.45	12.70	15	66	30" RCP	50'	(0.0006) 0.0034	9	1.8			
J8.16 to J8.17	2.0	0.45	13.60	16	69	30" RCP	150'	(0.004) -0.0027	22	4.6	870' - 36" RCP	112,400	Relief system J8.16 to J8.16A
J8.17 to J8.18	7.9	0.45	17.16	17	86	30" RCP	175'	(0.0028) 0.0032	19	3.8			Adequate with relief system
J8.18 to J8.19	0.5	0.45	17.39	18	86	30" RCP	210'	(0.0025) 0.0024	18	3.6			
J8.19 to J8.20	1.2	0.45	17.93	19	86	4.5' F.B. Channel	135'	(0.0025)	54	3.3			
J8.26 to J8.27	60.5 3.9	0.45 0.7	29.96	20	142	36" RCP	120'	(0.0116) 0.0001	62	8.8	450' - 4.5'x8' Box, 560' - 4.5'x6' Box,	865,300	Relief system J8.26A to J8.24
J8.27 to J8.28	2.3	0.45	31.00	21	146	36" RCP	160'	(0.0116) 0.001	62	8.8	180' - Dual 54" RCP, 510' - 54" RCP		Adequate with relief system
J8.28 to J8.29	3.3	0.45	32.49	22	149	36" RCP	30'	(0.0031) -0.0037	32	4.6	870' - 42" RCP 450' - 36" RCP 430' - 30" RCP		
J8.29 to J8.30	2.4	0.45	33.57	23	151	36" RCP	280'	(0.0031) -0.0044	32	4.6			
J8.30 to J8.31	5.1	0.45	35.87	25	158	36" RCP	40'	(0.0015) -0.0005	22	3.2			
J8.31 to J8.32	3.5	0.45	37.45	26	161	36" RCP	170'	(0.0015) 0.0006	22	3.2			
J8.32 to J8.25	2.0	0.45	38.35	27	163	36" RCP	580'	(0.0015) 0.0023	22	3.2			
J8.25 to J8.24	7.5	0.45	41.73	31	167	36" RCP	65'	(0.0015)	22	3.2			
J8.24 to J8.20	0.4	0.25	41.83	32	167	4.5' F.B. Channel	140'	(0.0015)	42	2.5	Change sideslope to 2 vertical to 1 horizontal	2,200	
J8.20 to J8.21	0.6	0.35	59.97	33	234	48" RCP	70'	(0.0025)	58	4.6	70' - Dual 60" RCP	34,050	Parallel system
												1,134,100	SUBTOTAL
												226,850	UPSTREAM IMPROVEMENTS
												1,360,950	TOTAL
WESTWOOD (J-8)													
J8.8 to J8.4	34.6	0.45	15.57	18	76	24" RCP	580'	(0.0005) 0.0005	4	1.4	1090' - 4'x4' Box	270,600	Remove 24" RCP
J8.4 to J8.2	7.9	0.45	19.13	22	88	24" RCP	510'	(0.0046) 0.0002	13	4.2			Remove 24" RCP
J8.2 to J8.1	6.3	0.45	21.97	25	97	24" RCP	40'	(0.0092) 0.0015	19	6.0	140' - 4'x6' Box	60,500	Remove 24" RCP
J8.1 to J8.5	32.2	0.45	36.46	26	157	24" RCP	100'	(0.0092) 0.0035	19	6.0			Remove 24" RCP
J8.5 to J8.6	2.7	0.7	38.35	27	163	36" RCP	100'	(0.0092) 0.0088	55	7.8	100' - 54" RCP	26,900	Parallel system
J8.6 to J8.7	3.0	0.7	40.45	28	170	42" RCP	150'	(0.0092) 0.0024	84	8.7	150' - 54" RCP	30,850	Parallel system
												388,850	SUBTOTAL
												77,800	UPSTREAM IMPROVEMENTS
												466,650	TOTAL

Byrnes Downs

The Byrnes Downs watershed is located along either side of Highway 17 between Campbell Drive on the east and Timmerman Drive on the west and drains a total of 79 acres of which 64 acres is outside the City of Charleston boundary. The existing drainage system is divided into two branches. One system runs from Highway 17 to the Seaboard Systems Railroad and is located between Timmerman Drive and Nicholson Street. The second system also runs from Highway 17 to the Seaboard Systems Railroad and is west of the intersection of Yeadon Avenue and Lyttleton Avenue. The existing systems provide less than 40 percent of the recommended capacity.

Recommended improvements consist of a box section along Nicholson Drive from Highway 17 to the discharge point under the Seaboard Coastline Systems. Also included are new pipe conduits on Highway 17, Yeadon Drive, and Lyttleton Drive. Excavation of marsh area is required at the outfall and will require a South Carolina Coastal Council permit.

The exclusive function of the proposed pipe conduit system on Highway 17 is to provide drainage for those areas which are outside the present City of Charleston boundaries. During final design, the City may option to omit this section unless those areas outside the City wish to provide financial assistance. In the event those areas outside the City decide not to participate in the project the City may also wish to decrease the size of the recommended box section along Nicholson Street if assurances are made that the discharge from the upstream area will not increase in the future.

Westwood

The Westwood drainage basin is located between St. Andrews Boulevard on the north and Highway 17 on the south and drains approximately 87 acres. Existing drainage facilities consist of a pipe conduit between Moore Drive and Riverdale Drive which runs northeast under St. Andrews Boulevard and discharges into the Ashley River. The existing system provides less than 50 percent of the recommended capacity and replacement with a 4'x6' box culvert system from the upstream end of the system to St. Andrews Boulevard and a parallel 54" RCP under St. Andrews Boulevard to the discharge point is recommended.

TABLE 41

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
ST. ANDREWS SHOPPING CENTER (J-8, J-9, K-9)													
J9.126 to J9.129	22	0.45	9.9	23	45	24" RCP	190'	(0.0011) 0.003	24	4.5	190' - 48" RCP	34,750	Replace existing 24" RCP
J9.129 to J9.123	24.42	0.45	20.89	24	93	2.5' F.B. Channel	770'	(0.0013) 0.0016	71	2.7	770' - 3' F.B. Channel	5,900	
J9.123 to J9.122	8.26	0.45	24.61	28	103	24" RCP	80'	(0.0013) 0.0012	14	4.5	80' - Dual 42" RCP	28,350	Parallel pipe
J9.122 to J9.106	1.7	0.45	25.38	29	105	4' F.B. Channel	140'	(0.0013)	48	2.4	140' - 4' F.B. Channel	3,750	
J9.112 to J9.113	6.5 10.6	0.25 0.45	6.4	9	40	30" RCP	70'	(0.0014) -0.006	24	4.9	70' - 30" RCP	14,600	Parallel system
J9.113 to J9.114	4.1	0.45	8.25	10	50	3' F.B. Channel	220'	(0.0014) -0.0053	58	2.6		Adequate	
J9.114 to J9.116	3.8	0.45	9.96	11	58	30" RCP	80'	(0.0014) -0.0012	13	2.7	80' - 48" RCP	23,550	Parallel system
J9.116 to J9.117	3.0	0.45	11.31	12	63	30" RCP	30'	(0.0014) -0.0013	13	2.7	30' - 48" RCP	9,600	Parallel system
J9.117 to J9.118	5.6	0.45	13.83	13	76	4.5' F.B. Channel	250'	(0.0014)	71	2.7		Adequate	Available depth
J9.118 to J9.121	6.6	0.45	16.80	14	89	30" RCP	175'	(0.0014) 0.0011	13	2.7	175' - Dual 48" RCP	71,050	Replace 30" RCP
J9.121 to J9.106	6.8 1.4	0.45 0.25	20.21	15	105	4' F.B. Channel	390'	(0.0012) 0.0014	49	2.4	390' - 4' F.B. Channel	4,150	Regrade and clean channel
J9.106 to J9.107	0.3	0.45	45.73	30	187	36" RCP	90'	(0.0012) 0.002	37	5.2	90' - Dual 48" RCP	47,800	Parallel system
J9.107 to J9.108	0.6	0.45	46.00	31	187	4' F.B. Channel	250'	(0.0012) -0.0015	48	2.4	250' - 8' F.B. Channel	3,250	
J9.111 to J9.110	38.3	0.45	17.24	18	84	24" RCP	80'	(0.0037) -0.0006	14	4.5	80' - 48" RCP	22,350	Parallel system
J9.110 to J9.109					40	3' F.B. Channel	40'	(0.0037) 0.0158	82	4.1		Adequate	
J9.109 to J9.108	4.2	0.45	19.13	19	92	48" RCP	55'	(0.0037) 0.005	75	6.0	55' - 30" RCP	4,950	Parallel system
J9.108 to J9.102			65.13	32	257	2.5' F.B. Channel	165'	(0.0012) 0.0088	55	2.5	Dual - 48" RCP	100,450	Fill existing channel
J9.102 to J9.93	39.9	0.45	83.09	33	324	Dual 36" RCP	430'	(0.0009) 0.0023	35	2.5	3 - 4'x6' box culverts	347,550	Replace existing system
J9.93 to J9.69	25.2	0.45	94.43	36	349	7' F.B. Channel	1420'	(0.0011) -0.0005	139	2.9	1420' - 25' Channel	51,850	Marsh
J9.69 to J9.70	1.3	0.45	95.02	44	349	4'x4.5' Box	40'	(0.0011) -0.0005	62	3.4		See J9.71 to J9.72	
J9.87 to J9.70	12.4	0.7	8.68	5	64	24" RCP	950'	(0.0067) 0.0038	16	5.1	950' - 36" RCP	172,750	Parallel system

(CONTINUED)

TABLE 41

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ST. ANDREWS SHOPPING CENTER (CONTINUED)													
J9.70 to J9.71	3.1	0.7	105.87	45	349	4'x4' Box	100'	(0.0011) 0.0065	53	3.3		See J9.71 to J9.72	
J9.85 to J9.71	2.4	0.7	1.68	5.0	12	24" RCP	1530'	(0.0044) 0.0056	13	4.1		Adequate	
J9.71 to J9.72	5.1	0.7	111.12	46	361	4'x4' Box	50'	(0.0011) -0.0012	53	3.3	190' - Dual 4'x10' Box Culvert	212,900	Parallel system
J9.72 to J9.73					361	14' F.B. Channel	130'	(0.0011) 0.0018	610	4.3		Adequate	
J9.73 to J9.75	1.1	0.7	111.89	46	364	Dual 48" RCP	65'	(0.0011) 0.0008	150	6	65' - Dual 4'x10' Box Culvert	73,800	Replace dual 48" RCP
J9.75 to J9.63	4.4	0.35	113.43	48	364	17' F.B. Channel	580'	(0.0011) -0.0077	565	4.2		Adequate	
J9.80 to J9.79	3.44 2.0	0.7 0.45	3.31	6	23	24" CMP	70'	(0.0014) 0.0026	13	4.1	70' - 30" RCP	5,700	Replace 24" CMP
J9.79 to J9.78	0.75	0.45	3.65	7	24	2.5' F.B. Channel	210'	(0.0048) 0.0048	22	3.2		Adequate	Available depth
J9.78 to J9.77	1.7	0.45	4.42	8	28	24" CMP	150'	(0.0186) 0.0186	27	8.5	150' - 30" RCP	11,850	Replace 24" CMP
J9.68 to J9.65	69.9	0.45	31.46	40	112	30" RCP	250'	(0.0035) 0.005	21	4.3	250' - 48" RCP	63,150	Parallel system. Drains area outside city limits
J9.65 to J9.63	4.7 2.4 1.1	0.7 0.45 0.9	35.83	42	124	30" RCP	220'	(0.0035) -0.0065	21	4.3	220' - 54" RCP	49,950	Parallel system
J9.63 to J8.41			153.68	51	469	14' F.B. Channel	450'	(0.0011) 0.0042	610	4.4		Adequate	
J8.38 to J8.37	3.3	0.45	1.49	5	11	24" RCP	160'	(0.0038) 0.0009	12	3.8		Adequate	
J8.37 to J8.35	1.2	0.9	2.57	6	18	36" RCP	340'	(0.0038) 0.0014	36	5.0		Adequate	
J8.35 to J8.41	9.3	0.9	10.94	8	70	36" RCP	400'	(0.0038) 0.0048	72	5.0		Adequate	
J8.41 to J9.9	10.1	0.45	169.17	55	491	14' F.B. Channel	150'	(0.0011) 0.0149	610	4.4		Adequate	
J9.9 to J9.10					491	Dual 48" RCP	90'	(0.0009) 0.0032	150	6.0	100' - Dual 8'x10' Box Culvert	50,400	Parallel system
												1,414,400	SUBTOTAL
												282,900	UPSTREAM IMPROVEMENTS
												1,697,300	TOTAL

St. Andrews Shopping Center

The St. Andrews Shopping Center watershed drains a total of 353 acres of which approximately 75 percent is located within the City of Charleston boundaries. Existing drainage facilities consist of an open channel and culvert system which extends northward from the Seaboard Systems Railroad to an abandoned railroad at West Oak Forest Drive. The majority of the existing drainage facilities are inadequate and require improvement.

Recommended improvements include two 4'x10' box culverts parallel to the existing 4'x4' box culvert at the Highway 17 crossing and a 25' flat bottom channel to Keats Road. Also included are two 8'x10' box culverts under the Seaboard Systems Railroad. These may be omitted with permission to construct an open channel through the existing railroad which has been abandoned.

During final design special attention should be given to an existing low area which exists between St. Clair Drive and Sherwood Drive. The existing area is drained by a 24" RCP that is inadequate. Replacement with a 48" RCP is recommended.

The improvements require that excavation take place within existing marsh areas. This work will require permission from the South Carolina Coastal Council.

TABLE 42

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
PARKWOOD ESTATES NORTH (J-9)													
J9.31 to J9.30	1.3 10.1	0.7 0.45	5.46	10	33	24" RCP	90'	(0.0014) 0.0031	14	4.5	90' - 36" RCP	11,250	Replace 24" RCP
J9.30 to J9.26	16.3	0.45	12.80	11	74	3' F.B. Channel	720'	(0.0014) 0.0028	41	2.3	720' - 3' F.B. Channel	4,100	Alter sideslopes
J9.26 to J9.27					74	36" RCP	80'	(0.0074) 0.0000	37	5.6	80' -. 36" RCP	10,100	Parallel system
J9.29 to J9.28	2.7	0.45	1.22	13	7	24" RCP	90'	(0.0053) 0.0011	14	4.5		Adequate	
J9.28 to J9.27	0.9	0.45	1.63	14	9	2' F.B. Channel	740'	(0.0053) 0.0059	59	4.3		Adequate	
J9.27 to J9.21	1.5	0.45	15.11	15	79	3.5' F.B. Channel	200'	(0.0074)	94	5.7		Adequate	
J9.21 to J9.22					79	36" RCP	40'	(0.0074)	50	7.0	260' - 36" RCP	38,050	Parallel system
J9.22 to J9.23	1.1	0.45	15.61	16	80	36" RCP	70'	(0.0032) 0.0027	33	4.6			
J9.23 to J9.24	1.0	0.45	16.06	17	80	36" RCP	110'	(0.0032) 0.0055	33	4.6			
J9.24 to J9.25	1.9	0.45	16.92	18	83	36" RCP	40'	(0.006) -0.0055	45	6.3			
												63,500 12,700 76,200	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
PARKWOOD ESTATES SOUTH (J-9)													
J9.19 to J9.20	19.8	0.45	8.91	23	40	24" RCP	60'	(0.0009) 0.009	14	4.5	60' - 36" RCP	7,600	Parallel system
												7,600 1,500 9,100	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
PARKWOOD HEIGHTS (J-9)													
J9.18 to J9.14	15.1	0.45	6.80	15	35	24" RCP	190'	(0.0032)	11	3.5	190'-36" RCP	27,150	Replace 24" RCP
J9.14 to J9.13	1.8	0.45	7.61	16	39	30" RCP	50'	(0.002) -0.0013	16	3.2	50'-36" RCP	8,500	Replace 30" RCP
J9.13 to I9.6	1.1	0.45	8.11	17	41	30" RCP	215'	(0.0095) 0.0077	35	7.0	215'-36" RCP	23,850	Replace 30" RCP
												59,500 11,900 71,400	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Parkwood Estates North

The Parkwood Estates North drainage area is located south of Highway 17 and is bounded on the east by Farmfield Road and on the west by Canterberry Road. The existing drainage facilities are inadequate and consist of an open channel and culvert system which outlets under Canterberry Road into the Wappoo Creek marsh. Recommended improvements include a parallel 36" RCP at the Canterberry Road crossing. Excavation in the marsh may be necessary and will require approval of the South Carolina Coastal Council prior to construction.

Parkwood Estates South

The Parkwood Estates South watershed drains 19.8 acres of the Parkwood Estates subdivision and is located south of the Seaboard Systems Railroad between Cassina Road on the east and Canterberry Road on the west. The existing 24" RCP outfall which crosses Canterberry Road at the intersection of Handel Lane provides less than 35 percent of the recommended capacity. A parallel 36" RCP is recommended for this system.

Parkwood Heights

The Parkwood Heights watershed joins the Parkwood Estates South watershed on the east. Existing drainage facilities consist of a pipe conduit which commences at an existing drainage ditch located between Forestwood Drive and Kensington Drive and runs southward to the outlet into the Wappoo Creek marsh. The existing system provides approximately 75 percent of the recommended capacity. Replacement of the existing system with a 36" RCP is recommended.

TABLE 43

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
HARRISON ACRES NORTH (J-9)													
J9.36 to J9.34	5.6	0.45	2.52	15	13	24" RCP	35'	(0.0086) -0.8	18	5.8		Adequate	
J9.34 to J9.32	1.2	0.45	3.06	16	16	24" RCP	110'	(0.0086) 0.44	18	5.8		Adequate	
J9.37 to J9.35	1.8	0.45	0.81	5	6	24" CMP	35'	(0.0092) -0.9	12	3.9		Adequate	
J9.35 to J9.33	1.1	0.45	1.31	6	9	24" CMP	110'	(0.0092) 0.035	12	3.9		Adequate	
HARRISON ACRES SOUTH (J-9)													
J9.44 to J9.43	7.9	0.45	3.56	11	21	18" RCP & 18" CMP	250'	(0.0016) 0.0009	6	2.1	250' - 36" RCP	38,700	Replace existing system
J9.43 to J9.41	1.4	0.45	4.19	13	23	18" RCP & 24" CMP	230'	(0.0019)	10	1.9	230' - 36" RCP	30,400	Replace existing system
J9.41 to J9.38	2.9	0.45	5.50	15	29	18" RCP & 24" CMP	400'	(0.0019)	10	1.9	400' - 36" RCP	53,200	Replace existing system
												122,300	SUBTOTAL
												24,500	UPSTREAM IMPROVEMENTS
												146,800	TOTAL
INDIGO POINT I (J-9)													
Catch Basin to J9.49	3.8	0.45	1.71	10	10	24" RCP	40'	0.003	11	3.4		Adequate	
INDIGO POINT II (J-9)													
Catch Basin to Outfall	3.6	0.45	1.62	10	10	24" RCP	60'	0.003	11	3.4		Adequate	

Harrison Acres North

The Harrison Acres North watershed drains approximately 10 acres of the Harrison Acres subdivision and is located south of the Seaboard Systems Railroad on the east side of Markfield Drive. The existing 24" RCP and 24" CMP outfall into Vorhees Canal and is adequate. However, Vorhees Canal must be improved (see K-Mart discussion for improvements) to provide adequate capacity for this area.

Harrison Acres South

The Harrison Acres South watershed drains approximately 13 acres of the Harrison Acres subdivision and joins the Harrison Acres North watershed described above. The existing 18" RCP and 24" CMP system which discharges into Vorhees Canal is inadequate. A replacement system of 36" RCP is recommended for this area.

Indigo Point I

The Indigo Point I watershed drains the eastern portion of the Indigo Point Subdivision. The 3.8 acre watershed is drained through a 24" RCP which discharges into the Wappoo Creek marsh. The existing 24" RCP is adequate. Some flooding problems have been experienced in this area but these can be attributed to the channel through the marsh. A South Carolina Coastal Council permit will be required to make improvements to the existing discharge channel.

Indigo Point II

The Indigo Point II watershed joins the Indigo Point I watershed on the west and drains 3.6 acres of the Indigo Point Subdivision. Existing drainage facilities consist of a 24" RCP which discharges to the Wappoo Creek marsh from Eliza Court. The existing pipe has adequate capacity but the discharge channel through the marsh requires improvement which will require a South Carolina Coastal Council permit.

TABLE 44

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
K MART (J-9, J-10, K-9, K-10)													
K10.2 to K10.1	26	0.45	11.70	21	55	24" RCP	80'	(0.0011) 0.0045	14	4.5	80' - Dual 30" RCP	14,250	Parallel system
K10.1 to J10.94	12.4	0.45	17.28	23	78	3' F.B. Channel	250'	(0.0011) 0.0013	84	2.7		Adequate	
J10.94 to J10.95					78	24" RCP	65'	(0.0011) 0.0028	14	4.5	65' - 48" RCP	11,000	Parallel system
J10.95 to J10.70	38.3	0.45	34.52	25	152	3' F.B. Channel	300'	(0.0011) 0.0042	88	2.7	6' F.B. Channel	12,250	
J10.70 to J10.71					152	30" RCP	90'	(0.0011) -0.0021	12	2.4	90' - Dual 60" RCP	42,150	Flow to bypass existing 30" RCP
J9.130 to J9.132	2.1	0.45	0.95	7	6	Dual 18" RCP	60'	-0.0035	15	4.2		Adequate	
J9.132 to J10.71	7.0	0.45	8.27	19	40	5' F.B. Channel	1745'	0.0005 0.0016	39	1.6		Adequate	Available depth
J10.64 to J10.65	39.0	0.45	17.55	22	81	36" RCP	70'	(0.0007) 0.0096	28	4.0	70' - 48" RCP	11,250	Parallel system
J10.65 to J10.66	4.4 21.4	0.7 0.45	30.26	28	127	5.5' F.B. Channel	850'	(0.0007) -0.0006	160	2.6		Adequate	
J10.66 to J10.67					127	30" RCP	110'	(0.0007) 0.0023	18	3.7	110' - Dual 54" RCP	47,200	Remove existing 30" RCP
J10.67 to J10.68	1.25	0.45	30.82	29	128	5.5' F.B. Channel	70'	(0.0007) -0.0039	160	2.6		Adequate	
J10.68 to J10.71					128	30" RCP	70'	-0.0039	20	4.1	70' - Dual 54" RCP	30,400	Remove existing 30" RCP
J10.71 to J10.80	1.2	0.45	74.15	27	315	5' F.B. Channel	290'	(0.0005) 0.0007	109	2.1	2400' - 20' F.B. Channel	241,950	Relief channel J10.71 to J10.92A
J10.80 to J10.78					315	Dual 24" RCP	70'	0.002	26	4.1			Adequate with relief
J10.78 to J10.77	4.5	0.45	76.18	28	320	4' F.B. Channel	150'	(0.0005) -0.0006	84	2.0			
J10.77 to J10.76					320	36" RCP	50'	0.0006	29	4.1			
J10.76 to J10.72	9.3 7.0	0.45 0.70	85.27	29	354	4' F.B. Channel	100'	(0.0005) 0.0053	61	1.8			
J10.72 to J10.74					354	Dual 24" RCP	60'	0.006	26	4.1			
J10.74 to J10.82	4.0	0.45	87.07	30	357	6' F.B. Channel	60'	(0.0005) -0.0008	93	2.0			
J10.82 to J10.84					357	Dual 24" RCP	50'	-0.0024	26	4.1			
J10.84 to J10.86	4.0	0.45	88.87	4	357	6' F.B. Channel	50'	(0.0005) 0.0026	70	1.9			
J10.86 to J10.88					357	Dual 24" RCP	50'	0.0060	26	4.1			
J10.88 to J10.90	4.0	0.45	90.67	32	358	6' F.B. Channel	30'	0.0005 -0.008	67	1.9			
J10.90 to J10.92					358	Dual 24" RCP	70'	0.0066	26	4.1			
J10.92 to J10.50	28.0 28.7	0.7 0.45	123.19	38	443	5' F.B. Channel	760'	(0.0005) 0.002	54	1.7	5' F.B. Paved Channel	124,150	
J10.50 to J10.47					443	Dual 48" RCP	140'	(0.0035) 0.0186	147	5.9	150' - Dual 5'x6' Box Culvert	130,600	Remove 48" RCP on west side
J10.60 to J10.58	4.9 15.4	0.7 0.45	10.36	25	46	24" RCP	685'	(0.0012) 0.0016	7	2.2	685' - 42" RCP	140,550	Parallel system
J10.58 to J10.57	4.4	0.45	12.34	30	51	24" RCP	450'	(0.0012) 0.001	7	2.2	450' - 48" RCP	101,050	Parallel system
J10.57 to J10.55	5.4	0.45	14.77	33	58	30" RCP	1085'	(0.0012) 0.0025	12	2.5	1085' - 48" RCP	238,200	Parallel system

(CONTINUED)

TABLE 44

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
K MART (CONTINUED)													
J10.55 to J10.56	6.6 1.3	0.9 0.45	21.30	40	76	30" CMP	80'	(0.0012) 0.0004	8	1.6	80' - 54" RCP	16,000	Parallel system
J10.56 to J10.52	0.2	0.9	21.48	41	76	30" RCP	475'	(0.0012) 0.0026	12	2.5	475' - 54" RCP	132,750	Parallel system
J10.52 to J10.47	2.3	0.9	23.55	44	79	30" RCP	230'	(0.0012) 0.0109	12	2.5	200' - 54" RCP	59,800	Parallel system
J10.47 to J10.44	12.6	0.7	155.56	45	513	55"x73" CMP	140'	(0.0035) -0.0053	112	4.7	60' - Dual 5'x8' Box Culvert	58,350	Replace 55"x73" CMP
J10.40 to J10.42	1.6	0.9	1.44	5	11	24" RCP	230'	(0.0051) 0.0027	14	4.5		Adequate	
J10.42 to J10.44	2.9	0.9	4.05	7	27	30" RCP	170'	(0.0051) 0.0270	25	5.2		Adequate	Available head
J10.44 to J10.45	0.3	0.7	159.92	46	519	55"x73" CMP	120'	(0.0035) 0.0014	112	4.7	150' - Dual 5'x8' Box Culvert	123,750	Replace 55"x73" CMP
J10.45 to J10.35	2.0	0.45	160.72	48	519	12' F.B. Channel	180'	(0.0006) 0.0005	395	3.1	180' - Dual 5'x8' Box Culvert	143,800	Fill in channel
J10.39 to J10.37	1.7	0.9	1.53	3	11	24" RCP	220'	(0.0071) 0.0033	17	5.2		Adequate	
J10.37 to J10.35	2.3	0.9	3.60	4	27	30" RCP	220'	(0.0071) 0.0076	30	6.1		Adequate	
J10.35 to J10.34	3.5	0.7	166.77	52	519	12" F.B. Channel	570'	(0.0006) 0.0005	395	3.1	330' - Dual 5'x8' Box Culvert and 240' - 26' F.B. Channel	339,750	Fill in part of existing channel J10.35 to J10.35A
J10.33 to J10.34	2.3	0.9	2.07	5	15	24" RCP	40'	(0.0595) -0.042	48	15.2		Adequate	
J10.34 to J9.61	4.5	0.45	170.87	56	519	12' F.B. Channel	430'	(0.0006) 0.0005	395	3.1	26' F.B. Channel	53,800	Marsh
J9.62 to J9.61	2.9	0.9	2.61	5	19	24" RCP	75'	(0.0309) 0.016	34	11.0		Adequate	
J9.61 to J9.59	9.3	0.45	177.67	60	519	12' F.B. Channel	100'	(0.0006) 0.0005	395	3.1	26' F.B. Channel	12,500	
J9.59 to J9.50					519	48" RCP & 54" RCP	100'	0.0110 -0.0013	310	11.2	160' - Dual 5'x9.5' Box Culvert and 70' - 42" RCP	171,000	Remove 54" RCP, 48" RCP and 3-48" RCP (J9.50 - J9.53)
J9.51 to J9.50	14.0	0.7	9.80	21	46	42" RCP	60'	(0.0628) 0.0590	218	22.7		Adequate	
J9.50 to J9.53	2.6	0.7	189.29	61	519	3-48" RCP	80'	(0.0110) 0.0038	392	10.4		Cost under item J9.59 to J9.50	
Voorhees Canal					519	12' F.B. Channel		0.0005	237	2.4	[illegible] F.B. & 800' - 30' F.B. Channel	279,000 2,535,500 507,100 3,042,600	Improvements to Channel SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

K Mart

The K Mart watershed is located along either side of Highway 17 and is bounded on the east by Briarcliff Drive and on the west by Wappoo Road and drains a total of 345 acres including areas of the Ardmore, Forest Acres, and White Oak Forest subdivisions. This area experiences severe flooding on occasion, most notably the area around Tom Parcell Chevrolet and the area between Mulberry Street on the north and the abandoned railroad on the south. Existing drainage facilities consist of a channel which runs northward from the outfall to Vorhees Canal under Markfield Drive to Acacia Street with culverts at roadway and railway crossings. Also there is a pipe conduit system along Highway 17 running westward from the channel. The existing drainage facilities are inadequate and provide less than 50 percent of the required capacity.

Recommended improvements include widening Vorhees Canal, new dual 5'x9½' box culverts to replace the existing 54" RCP and 48" RCP under Markfield Drive and dual 5'x8' box culverts crossing Highway 17. Numerous upstream improvements are also required, and each should be examined during design. The work associated with widening Vorhees Canal will require excavation in the marsh which must be approved by the South Carolina Coastal Council.

TABLE 45

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
STONO PARK (J-10, J-11)													
J10.15 to J10.13	16.5	0.45	7.43	11	43	36" RCP	90'	(0.0002)	9	1.3	60' - 36" RCP	9,300	Parallel system
J10.13 to J10.17	7.6	0.45	10.85	14	58	3' F.B. Channel	410'	(0.0008) 0.0018	61	2.2		Adequate	
J10.16 to J10.17	3.5	0.45	1.58	11	9	30" CMP	270'	(0.012) 0.012	25	5.2		Adequate	
J10.17 to J10.18	11.6	0.45	17.65	17	88	4' F.B. Channel	380'	(0.0008) 0.0018	61	2.2	380' - 4' F.B. Channel	1,750	Alter sideslopes
J10.18 to J10.19					88	36" RCP	80'	(0.0008) 0.0018	37	5.2	80' - 42" RCP	14,000	Parallel system
J10.19 to J10.20	20.0	0.35	24.65	25	108	6' F.B. Channel	1060'	(0.0008)	150	2.7	1,750' - 4.5' F.B. Channel	71,600	Redirect channel J10.19 to J10.19A
J10.20 to J10.21					108	36" CMP	60'	(0.0008)	31	4.4	& 40'-Dual 48" RCP		
J10.63 to J10.62	4.0 19.7	0.9 0.45	12.47	11	72	24" RCP	180'	(0.0128) 0.0043	22	7.0	180' - 48" RCP	28,100	Replace 24" RCP
J10.61 to J10.62	15.5	0.45	6.98	18	34	24" RCP	200'	(0.003) 0.0022	11	3.4	200' - 36" RCP	27,100	Parallel system
J10.62 to J10.21	5.4	0.45	21.88	19	105	30" RCP	1520'	(0.003)	19	4.0	1520'-42" RCP, 590'-48" RCP & 350'-54" RCP	422,250	Replace existing system and add parallel system
J10.21 to J10.27	23.8	0.45	57.24	29	238	36" RCP	550'	(0.0037) 0.0036	35	5.0	240'-48" RCP 1745'-54" RCP	454,650	Replace existing system
J10.27 to J10.28	8.1	0.45	60.89	33	238	36" CMP	70'	(0.0037) 0.0036	23	3.2			Replace existing system
J10.28 to J10.32	1.5	0.45	61.57	34	238	42" CMP	300'	(0.0037) 0.0036	35	3.6			Replace existing system
												1,028,750	SUBTOTAL
												205,750	UPSTREAM IMPROVEMENTS
												1,234,500	TOTAL
ROTHERWOOD (I-10, J-10)													
J10.12 to J10.3	11.5	0.45	5.18	11	30	24" RCP	300'	(0.0047) 0.0002	13	4.3	950' - 30" RCP	91,750	Relief system
J10.3 to J10.5	12.7	0.45	10.9	13	60	24" RCP	70'	(0.0018) -0.0038	30	4.5	70' - Dual 36" RCP	23,300	Replace 24" RCP
J10.5 to J10.7	0.8	0.45	11.26	14	60	4' F.B. Channel	60'	(0.0018) -0.0029	98	3.3		Adequate	
J10.7 to J10.8					60	36" CMP	90'	(0.0018) 0.0016	32	4.5	90' - 42" RCP	21,400	Parallel system
J10.8 to outfall	13.6	0.45	17.38	15	90	3' F.B. Channel	50'	(0.0018)	92	3.3		Adequate	
												136,450	SUBTOTAL
												27,300	UPSTREAM IMPROVEMENTS
												163,750	TOTAL
WAPPOO SHORES (J-10)													
J10.10 to J10.11	14.0	0.45	6.30	14	33	24" RCP	70'	(0.0024) -0.01	14	4.5	70' - 30" RCP	8,400	Parallel system
												8,400	SUBTOTAL
												1,700	UPSTREAM IMPROVEMENTS
												10,100	TOTAL

Stono Park

The Stono Park drainage basin drains 137 acres of residential development located along either side of Wappoo Road. The existing drainage system is separated into two branches, a pipe conduit system along Wappoo Road from Highway 17 to the outfall into Wappoo Creek, and a channel running southwest from the Seaboard Systems Railroad to Wappoo Road. The existing system provides approximately 70 percent of the recommended capacity.

Recommended improvements include a relief channel on the west side of Huntley Drive and culverts at Garden Street. Also included is a dual system of pipe conduits along Wappoo Road, replacing the existing system and extending from Highway 17 to the outfall into the Wappoo Creek marsh.

Rotherwood

The Rotherwood watershed drains approximately 39 acres of the Rotherwood and Wappoo Shores subdivision. Existing drainage facilities consist of a pipe conduit system from Sanford Road to Timothy Street, and a series of culverts and channels to the outfall in Wappoo Creek. The existing system provides 40 to 50 percent of the recommended capacity.

A relief system along Sanford Road, Betsy Road and Timothy Street is recommended. Also included are dual 36" RCP's to replace the existing 24" RCP under Timothy Street and a parallel 42" RCP at the location of an existing 36" RCP. The existing outfall channel is adequate but will require cleaning during construction which will require a South Carolina Coastal Council permit.

Wappoo Shores

The Wappoo Shores watershed is located in the Wappoo Shores subdivision of the West Ashley area. The 14 acre watershed extends northward from Timothy Street to Rotherwood Drive. An existing 24" RCP outfall provides less than 45 percent of the recommended capacity. A 30" RCP parallel with the existing 24" RCP is recommended. The outfall ditch from Timothy Street to Wappoo Creek should also be cleaned during the construction of the new system and will require a South Carolina Coastal Council permit.

TABLE 46

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
FOREST ACRES (K-9, K-10)													
	9.7	0.7						(0.0056)			895' -		
K9.37A to K9.36A	21.5	0.45	16.47	18	81	24" RCP	425'	0.0058	15	4.7	48" RCP	204,600	Replace existing system
K9.36A to K9.31A	1.8	0.7	17.73	31	83	24" RCP	300'	(0.0023) 0.0032	9	3.0			
K9.31A to K9.32A	3.1	0.45	19.13	23	86	36" RCP	50'	(0.0004) 0.0210	37	5.2			
K9.32A to K9.34A	10.1	0.7	26.20	24	117	36" RCP	120'	(0.0087) 0.0003	57	7.6			
K9.34A to K9.29A					117	4' F.B. Channel	75'	(0.0087) 0.0147	75	5.3	75' - 5' F.B. Channel	2,400	
K9.30A to K9.29A	10.0	0.7	7.00	10	42	30" RCP	70'	(0.0043) 0.0043	24	4.9	70' - 30" RCP	8,550	Parallel pipe
	7.2	0.25											
K9.29A to K9.16A	15.6	0.7	45.92	31	184	5' F.B. Channel	1010'	(0.0005)	44	1.6	1010' - 7' F.B. Channel	18,750	
K9.14A to K9.13A	5.9	0.45	2.66	5	20	18"x30" CMP	140'	(0.0179) 0.0088	17	5.4	140' - 30" RCP	12,600	Replace 18"x30" CMP
K9.13A to K9.12A	4.9	0.45	4.87	6	34	24" RCP	40'	(0.0123) 0.0083	22	6.9	165' - 36" RCP	25,150	Replace 24" RCP
K9.12A to K9.11A	1.0	0.45	5.32	7	35	24"x36" CMP	125'	(0.0002) 0.0017	3.3	0.7			Replace 22"x36" CMP
K9.11A to K9.18A	10.9	0.45	10.23	8	65	4' F.B. Channel	580'	(0.0002) 0.0014	11	0.8	580' - 5' F.B. Channel	4,700	
K9.18A to K9.16A	5.3	0.45	12.62	12	71	Dual 30" CMP	70'	(0.0002) 0.0004	40	4.1	70' - Dual 42" RCP	22,700	Replace dual 30" CMP
K9.16A to K9.20A	1.7	0.45	59.31	33	231	5' F.B. Channel	270'	(0.0002)	34	1.1	730' - 12' F.B. Channel	118,800	
K9.20A to K9.26A	39.6	0.45	77.31	36	286	5' F.B. Channel	460'	(0.0002) 0.0023	34	1.1			
K9.26A to K9.27A					286	24" & 36" RCP	135' & 85'	(0.0002) 0.0005	14 37	4.5 5.2	70' - Dual 4'x8' Box	83,650	Replace existing system
K9.27A to Pump Station	22.11	0.45	87.08	42	300	3' F.B. Channel	750'	(0.0027)	208	4.6	750' - 15' F.B.	8,650	
Pump Station					300						3-50,000 gpm pumps & 2,300' 66" Force Main	3,147,000	Rebuild pump station
												3,657,550	SUBTOTAL
												731,500	UPSTREAM IMPROVEMENTS
												4,389,050	TOTAL
FIFTH AVENUE (J-8, J-9, K-8, K-9)													
K9.4A to K9.3A	35.8	0.45	16.11	28	68	36" RCP	100'	(0.0037) -0.0028	37	5.2	100' - 36" RCP	14,650	Parallel system
K9.3A to K9.8A	18.8	0.45	24.57	29	102	9' F.B. Channel	240'	(0.0037) 0.004	283	5.6		Adequate	
K9.8A to K9.6A	8.8	0.7	30.73	30	126	3.5' x 4' Box	150'	(0.0037) 0.0039	81	5.8	200' - Dual 6'x10' Box	266,400	Peak discharge equals 430 CFS; includes discharge from Forest Acres.
K9.6A to K9.5A	2.6	0.7	32.55	31	130	3.5' x 4' Box	50'	(0.0037) -0.0106	81	5.8			
K9.5A to K8.6	4.6	0.45	34.62	32	137	6' F.B. Channel	620'	(0.0037) 0.0003	373	6.0	26' F.B. Channel	60,8950	
K8.6 to K8.5	8.0	0.45	38.22	36	141	36" RCP	75'	(0.0037) 0.008	37	5.2	75' - Dual 6'x10' Box	122,400	Parallel system
												454,300	SUBTOTAL
												92,900	UPSTREAM IMPROVEMENTS
												557,200	TOTAL

Forest Acres

The Forest Acres drainage basin is located on both sides of Highway 61 and is bounded on the east by the Fifth Avenue drainage basin and on the west by the Sherwood Forest and K Mart drainage basins. The basin collects runoff from approximately 170 acres and conveys it through a channel to an existing pump station located at the northeast corner of the intersection of Playground Road and the abandoned Seaboard Systems Railroad.

The existing drainage facilities are inadequate, providing less than 60 percent of the recommended capacity. Proposed improvements include replacement of all existing culverts and pipe conduit and widening of existing channels. Special attention should be given to an existing low area which exists in the apartment complex on Brookwood Circle during design.

Runoff is discharged by a stormwater pumping station and a 48" diameter force main which follows the northern edge of the abandoned railroad bed and discharges into the Ashley River. The pumping station has a design capacity of 20,000 gpm, which is approximately 20 percent of the recommended capacity of 100,000 gpm. Upgrading the existing pump station to a capacity of 100,000 gpm with two 66" diameter force mains is recommended.

Fifth Avenue

The Fifth Avenue drainage basin drains a total of 78.6 acres of residential development of which approximately 90 percent lies outside the City of Charleston boundaries. The area extends from the western boundary of Magnolia Road to the Ashley River. Existing drainage facilities include a channel and culvert system which is inadequate and should be replaced. Recommended improvements include a parallel 60" RCP crossing St. Andrews Boulevard and parallel dual 42" RCP at the Ellsworth Avenue crossing.

TABLE 47

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
SHERWOOD FOREST EAST (K-10)													
K10.15 to K10.16	2.7	0.7	1.89	5	14	24" RCP	120'	(0.0088) 0.0425	18	5.8		Adequate	
K10.16 to K10.14	7.4	0.45	5.22	6	37	3' F.B. Channel	420'	(0.0088) 0.0001	79	5.7		Adequate	Possible channel erosion
K10.12 to K10.14	1.5	0.7	1.05	5	8	24" RCP	95'	(0.007) 0.0195	16	5.2		Adequate	
K10.14 to K10.3	3.6	0.45	7.89	9	49	6' F.B. Channel	210'	(0.007) 0.0049	150	6.2		Adequate	
K10.3 to K10.5	21.9	0.45	17.75	21	83	Dual 18" RCP	70'	(0.007) 0.0009	8	4.3	70' - Dual 36" RCP	16,950	Replace dual 18" RCP
K10.5 to K10.6	17.8	0.45	25.76	22	118	Dual 24" RCP	70'	(0.01) 0.009	40	6.2	70' - Dual 42" RCP	23,200	Replace dual 24" RCP
K10.9 to K10.8	1.6	0.45	0.72	5	5	24" RCP	80'	(0.005) 0.0039	14	4.4		Adequate	
												40,150	SUBTOTAL
												8,050	UPSTREAM IMPROVEMENTS
												48,200	TOTAL
SHERWOOD FOREST WEST (K-10)													
K10.19 to K10.17	25.7	0.45	11.57	21	54	Dual 18" RCP	70'	(0.0035)	28	4.5	70' - Dual 36" RCP	19,400	Replace culverts
K10.17 to K10.21	2.1	0.45	12.52	22	58	3' F.B. Channel	50'	(0.0035)	62	3.7			Adequate
K10.21 to K10.23					58	24" RCP	150'	(0.0035)	12	3.7	150' - 48" RCP	26,350	Replace 24" RCP
K10.23 to outfall	26.2	0.45	24.31	23	109	18" RCP	330'	(0.0035)	5	3.0	330' - Dual 48" RCP	110,500	Replace 18" RCP
												156,250	SUBTOTAL
												31,250	UPSTREAM IMPROVEMENTS
												187,500	TOTAL

Sherwood Forest East

The Sherwood Forest East watershed is located in the northern portion of the Sherwood Forest subdivision and is bounded on the west by Crull Drive and on the east by Locksley Drive. All of the existing drainage structures within the drainage basin are adequate with the exception of the existing dual 24" RCP under Crull Drive which provides less than 35 percent of the recommended capacity. Replacement of the system with dual 42" RCP is recommended.

Sherwood Forest West

The Sherwood Forest West drainage basin drains 54 acres of the Sherwood Forest subdivision. The existing drainage system consist of a drainage channel which commences at King Richard Drive and conveys runoff to a pipe conduit system which crosses Pineview Road and discharges into the Citadel Mall channel. The existing systems are inadequate and should be replaced with larger diameter culverts.

During final design for this area special attention should be given to the area between Robinhood Drive and King Richard Drive which has a continuing problem with flooding. The existing channel from King Richard Drive to Pineview Drive should be improved along with the culverts under Pineview Drive.

TABLE 48

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
HAZELWOOD AVENUE (K-10, K-11, L-10, L-11)													
K11.19 to K11.18	6.8	0.45	3.06	11	18	24" RCP	90'	(0.0066) 0.0019	11	3.5	90' - 30" RCP	8,250	Replace 24" RCP
K11.18 to K11.16	2.2	0.45	4.05	12	23	3' F.B. Channel	100'	(0.0045) 0.0277	38	3.8		Adequate	
K11.17 to K11.16	5.5	0.45	2.48	7	16	Dual 18" RCP	70'	(0.0031) 0.0061	10	2.9	70' - Dual 24" RCP	17,200	Replace dual 18" RCP
K11.16 to K11.14			6.53	13	36	Dual 18" RCP	60'	(0.0128) 0.0027	20	5.8	60' - 30" RCP	13,500	Replace dual 18" RCP
K11.14 to K11.13	2.2	0.45	7.52	14	40	5' F.B. Channel	30'	(0.0128) 0.0027	394	9.8		Adequate	
K11.13 to K11.10					40	30" RCP	60'	(0.0128) 0.0003	40	8.2		Adequate	
K11.2 to K11.3	16.1	0.45	7.25	15	38	36" RCP	280'	(0.0027) 0.0137	30	4.2	280' - 42" RCP	40,500	Replace 36" RCP
K11.3 to K11.7	26.8	0.45	19.31	17	97	Dual 36" RCP	350'	(0.0027) 0.0011	60	4.2	615' - Dual 48" RCP	204,900	Replace dual 36" RCP
K11.7 to K11.10	2.8	0.7	21.27	19	102	Dual 36" RCP	190'	(0.0027) 0.0003	60	4.2			
K11.10 to K11.11			28.79	20	137	Dual 42" RCP	65'	(0.0027) 0.0003	91	4.7			
K11.11 to K11.22	6.8	0.7	33.55	24	149	8.5' F.B. Channel	520'	(0.0018) 0.0027	153	3.6		Adequate	
K11.22 to K11.20					149	Dual 48" RCP	85'	(0.0335) 0.0012	156	6.2		Adequate	
												284,350	SUBTOTAL
												56,900	UPSTREAM IMPROVEMENTS
												341,250	TOTAL
DUPONT NORTH (K-10)													
K11.37 to K11.34	11.8	0.45	5.31	13	29	24" RCP	440'	(0.0038) 0.0013	12	3.8	440' - 36" RCP	51,100	Replace 24" RCP
K11.34 to K11.33	6.8	0.45	8.37	16	43	18"x29" CMP	50'	(0.0038) 0.0052	8	2.5	300' - 42" RCP	49,500	Replace existing system
K11.33 to K11.36	6.0	0.45	11.07	17	55	24" RCP	250'	(0.0038) 0.0019	12	3.8			
												100,600	SUBTOTAL
												20,150	UPSTREAM IMPROVEMENTS
												120,750	TOTAL
ORLEANS ROAD WEST (K-11)													
K11.62 to K11.60	2.3	0.7	1.61	6	11	30" RCP	330'	(0.0021) 0.0032	16	3.3		Adequate	
K11.60 to K11.45	0.9	0.7	2.24	8	14	36" RCP	340'	(0.0083) 0.0033	53	7.4		Adequate	
K11.45 to K11.44	0.65	0.7	2.70	10	16	36" RCP	55'	(0.0083) -0.0047	53	7.4		Adequate	
ORLEANS ROAD EAST (K-11)													
K11.43 to K11.42	3.8	0.7	2.66	5	20	24" RCP	50'	(0.0288) 0.0012	55	17.5		Adequate	

Hazelwood Avenue

This watershed drains a total of 69 acres of which approximately 80 percent is located outside the City of Charleston boundaries. The area is located south of Savage Road and is bounded on the west by Orleans Road and on the south and east by Jaywood Circle. Existing drainage facilities consist of a open channel which runs behind the houses on Jaywood Circle and west to a pipe conduit system which commences at Hazelwood Drive and conveys the runoff to an open channel located east of Orleans Road that discharges into the Citadel Mall channel. The existing system is inadequate and recommended improvements include replacing the existing dual 36" RCP with dual 48" RCP.

Dupont North

The Dupont North watershed is located north of Highway 7 and is bounded on the north by Hazlewood Drive and on the south by the Citadel Mall channel. The existing pipe conduit system which discharges into the Citadel Mall channel provides less than 50 percent of the recommended capacity. Replacement of the system with a new 42" RCP and 36" RCP system is recommended.

Orleans Road West

The Orleans Road West watershed joins the Orleans Road East watershed on the east and drains the west side of Orleans Road. The existing 36" RCP outfall into the Citadel Mall channel is adequate.

Orleans Road East

The Orleans Road East watershed drains the eastern side of Orleans Road from Hazelwood Road to the Citadel Mall channel. The exiting 24" RCP outfall into the Citadel Mall channel is adequate.

TABLE 49

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SKYLARK DRIVE (J-11, K-11)													
J11.10 to J11.11	3.3	0.45	1.49	11	9	24" RCP	90'	(0.0017) 0.003	8	2.6		Adequate	Available head
J11.11 to J11.12	22.2	0.9	21.47	15	112	24" RCP	110'	(0.0017) 0.0004	8	2.6	110' - Dual 48" RCP	52,500	Parallel system
J11.12 to J11.13	6.3	0.9	27.14	16	138	30" RCP	40'	(0.0017) 0.0073	15	3.0	140' - 4'x6' Box	48,750	Parallel system
J11.13 to J11.14	1.65	0.45	27.88	17	139	42" RCP	100'	(0.0017) 0.0021	36	3.7			
J11.14 to J11.81	18.1	0.7	40.55	18	199	7' F.B. Channel	700'	(0.0017) 0.0008	153	3.6	7' F.B. Channel	9,000	
J11.81 to K11.74	19.0	0.45	49.10	23	221	42" RCP	560'	(0.0017) 0.0027	72	3.7	560' - Dual 6'x10' Box	426,750	Replace system
K11.84 to K11.74	4.8	0.45	2.16	6	15	30" RCP	340'	(0.0079) 0.0036	32	6.4		Adequate	
K11.74 to K11.72	4.8	0.45	53.42	27	227	42" RCP & 48" RCP	270'	(0.0017) 0.0014	87	4.1	270' - Dual 6'x10' Box	157,900	Replace system
												694,900	SUBTOTAL
												139,000	UPSTREAM IMPROVEMENTS
												833,900	TOTAL
CITADEL MALL WEST (K-11)													
K11.57 to K11.56	3.5	0.9	3.15	5	23	24" RCP	100'	(0.001) -0.0019	6	2.0	100' - 36" RCP	17,900	Parallel system
K11.56 to K11.53	1.6	0.9	4.59	6	32	30" RCP	400'	(0.0038) 0.0032	22	4.5	400' - 36" RCP	56,500	Parallel system
K11.53 to K11.51	6.3	0.9	10.26	9	74	42" RCP	170'	(0.0038) -0.0002	54	5.6	170' - 30" RCP	16,300	Parallel system
												90,700	SUBTOTAL
												18,150	UPSTREAM IMPROVEMENTS
												108,850	TOTAL
CITADEL MALL EAST (K-11)													
K11.68 to K11.65	11.7	0.9	10.53	5	78	48" RCP	340'	(0.0021) 0.0025	57	4.5	340' - 30" RCP	Private 32,650	Parallel system
K11.67 to K11.65	1.8	0.9	1.62	5	12	24" RCP	490'	(0.0012) 0.0048	14	4.3		Adequate	
K11.65 to K11.46	4.8	0.9	16.47	8	105	54" RCP	170'	(0.0196) 0.0039	238	15		Adequate	
												32,650	SUBTOTAL
												6,550	UPSTREAM IMPROVEMENTS
												39,200	TOTAL

Skylark Drive

The Skylark Drive watershed is located east of the intersection of Highway 17 and Highway 7 and drains a commercial and residential area including Parker Pontiac. The existing drainage facilities consist of a 48" RCP and 42" RCP which extends from the outfall point in the Citadel Mall channel, across Highway 7 and connects to a channel leading to the drainage structures under Highway 17. This existing system provides less than 50 percent of the recommended capacity. Recommended improvements include replacing the existing system under Highway 17 and Highway 7 with dual 6'x10' box culverts. Improvements to the Citadel Mall outfall channel will also be required (see discussion of Citadel Mall channel for recommended improvements).

Citadel Mall West

The Citadel Mall West drainage basin drains the southern portion of the Citadel Mall development. Existing drainage facilities consist of a pipe conduit which takes runoff from the Citadel Mall parking lot to the Citadel Mall channel. Recommended improvements consist of placing a 30" RCP and 36" RCP parallel to the existing pipe conduit. It should be noted that all of the existing drainage facilities are on private property.

Citadel Mall East

The Citadel Mall East drainage basin drains the eastern portion of the Citadel Mall development. The existing system is adequate except for the branch from K11.68 to K11.65 which provides less than 75 percent of the required capacity. Installation of a 30" RCP parallel to the existing 48" RCP is recommended. As with the Citadel Mall West watershed, all existing drainage systems are located on private property.

TABLE 50

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
CLEMSON (J-13, K-13, K-14)													
J13.5 to J13.6	19.9	0.25	4.98	15	26	24" RCP	80'	0.0018	12	3.8	80' - 36" RCP	10,300	Replace 24" RCP
J13.6 to J13.1					26	4.5' F.B. Channel	700'	(0.0005)	63	1.8		Adequate	
J13.1 to J13.2	17.3	0.25	9.31	19	45	24" RCP	60'	-0.0013	12	3.8	60' - Dual 36" RCP	16,450	Replace 24" RCP
J13.2 to J13.7					45	7.5' F.B. Channel	430'	(0.0005)	189	2.4		Adequate	
J13.7 to J13.8	22.7	0.25	14.99	22	69	30" RCP	110'	0.0062	18	3.7	110' - Dual 42" RCP	32,600	Replace 30" RCP
												59,350	SUBTOTAL
												11,900	UPSTREAM IMPROVEMENTS
												71,250	TOTAL
AGRICULTURAL STATION (K-13, K-14)													
K13.17 to K13.18	55 21	0.25 0.45	23.2	33	90	24" RCP	100'	(0.0013)	14	4.5	100' - Dual 48" RCP	35,050	Replace 24" RCP
K13.18 to K13.4	36	0.25	32.2	34	124	10' F.B. Channel	124'	(0.0013)	357	4.1		Adequate	
K13.4 to K13.1	36	0.25	41.2	43	140	18" RCP & 30" RCP & 36" RCP	100'	(0.0013)	143	14.1		Adequate	
												35,050	SUBTOTAL
												7,050	UPSTREAM IMPROVEMENTS
												42,100	TOTAL

Clemson

The Clemson watershed drains a portion of the Clemson University Experiment Farm located south of Highway 17. Existing drainage facilities consists of a series of drainage ditches with culverts at roadways. The ditches are adequate but the existing culverts are inadequate and will require improvement.

Agriculture Station

The Agriculture Station watershed drains a total of 148 acres which surround the U.S. Department of Agricultural Farm located north of Highway 17. The existing drainage system consist of a roadside ditch which discharges into Long Branch Creek. This existing system is adequate with the exception of the 24" RCP culvert which crosses under the entrance road to the agricultural station and replacement with dual 48" RCP is recommended.

TABLE 51

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
MARVIN (K-9, L-9)													
K9.42 to K9.41	15.8	0.45	7.11	22	33	27" x 43" CMP	80'	(0.0097) 0.0038	37	5.3		Adequate	
K9.41 to K9.46	3.9	0.45	8.87	23	40	36" RCP	150'	(0.0007) 0.008	57	8.1		Adequate	
K9.46 to K9.52	1.7	0.7	10.06	24	45	36" RCP	340'	(0.0097) 0.0068	57	8.1		Adequate	
K9.47 to K9.48	4.5	0.45	2.03	18	10	24" RCP	30'	(0.015) -0.0033	24	7.6		Adequate	
K9.48 to K9.52	11.6	0.45	7.25	19	35	24" RCP	170'	(0.015) 0.0153	24	7.6	170' - 30" RCP	27,000	Replace existing
K9.52 to K9.53	4.7	0.7	20.06	26	89	48" RCP	40'	(0.015) -0.02	152	12.1		Adequate	
K9.53 to Marsh					89	5' F.B. Channel	200'	(0.015)	609	11.6		Adequate	
												27,000	SUBTOTAL
												5,400	UPSTREAM IMPROVEMENTS
												32,400	TOTAL
TOWN CREEK DRIVE (K-9)													
K9.60 to K9.59	23.3	0.45	10.49	12	59	24" RCP	175'	(0.011) 0.0039	21	6.6	175' - 42" RCP	25,950	Parallel system
												25,950	SUBTOTAL
												5,200	UPSTREAM IMPROVEMENTS
												31,150	TOTAL
WESPANEE DRIVE (K-9)													
K9.57 to K9.54	4.7	0.45	2.12	5	16	24" RCP	120'	(0.0318) -0.0053	35	11.1		Adequate	
ST. AUGUSTINE DRIVE (K-9)													
K9.58	4.8	0.45	2.16	5	16	18" RCP	160'	(0.0259)	15	8.3		Adequate	Available head
ROYAL AVENUE (L-9, M-9)													
K9.64 to K9.63	3.7	0.45	1.67	7	11	24" RCP	170'	(0.007) 0.0070	14	4.5		Adequate	

Marvin

The Marvin watershed drains a total of 42 acres of the Lenevar and Old Town Acres subdivisions and is located along the west side of Highway 171 and extends from the southern boundary of Bamboo Drive to the northern boundary of Camelot Drive. The existing drainage system is adequate with the exception of one segment, manhole number K9.48 to K9.52 which provides only 69 percent of the recommended capacity. A 36" RCP is recommended which will replace the existing 24" RCP.

Town Creek Drive

The Town Creek Drive watershed drains 23.3 acres of the Wespanee subdivision. Runoff from the area is conveyed by a series of small roadside pipe conduits to a lake located between Town Creek Drive and Fort Royal Court. Adequate storage area is provided by the lake prior to discharge into the Ashley River and no improvements are recommended.

Wespanee Drive

The Wespanee Drive watershed drains a 4.7 acre area around the intersection of Wespanee Drive and St. Augustine Drive in the Wespanee subdivision. The existing 24" RCP outfall to the Ashley River is adequate.

St. Augustine Drive

The St. Augustine Drive watershed bounds the Wespanee Drive watershed on the west and drains the east end of St. Augustine Drive. The existing 18" RCP outfall is adequate.

Royal Avenue

The Royal Avenue watershed drains the area on either side of Royal Avenue between Wespanee Drive and Town Creek Drive. The existing 24" RCP outfall is adequate. A low area outside of the Royal Avenue watershed at the end of Fort Royal Court experiences flooding due to the low elevations in the area and the capacity of the existing 18" RCP outfall is limited by tidal influence.

TABLE 52

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
PLANTATION (K-9)													
K9.35 to K9.39	56.1	0.35	19.64	40	70	48" RCP	820'	(0.003) 0.0028	68	5.4		Adequate	
K9,39 to K9,21	5.9	0.35	21.71	49	70	48" RCP	780'	(0.003) 0.0016	68	5.4		Adequate	
K9.21 to Junction	7.3	0.35	24.27	54	70	48" RCP	200'	(0.003) 0.0016	68	5.4		Adequate	
K9.32 to K9.30	2.4	0.45	1.08	5	8	Dual 24" RCP	80'	(0.0009) 0.0024	28	4.5		Adequate	
K9.30 to K9.29	4.3	0.45	3.02	6	21	3.5' F.B. Channel	480'	(0.0009) 0.0001	40	2.0		Adequate	
K9.29 to K9.28					21	30" RCP	100'	(0.0009) 0.0000	24	4.9		Adequate	
K9.28 to K9.27	4.3	0.45	4.96	9	31	4' F.B. Channel	40'	(0.0009) 0.0115	139	2.8		Adequate	
K9.27 to K9.26	6.9	0.45	8.07	10	48	36" RCP	220'	(0.0009) 0.0014	17	2.5	220' - 54" RCP	47,800	Replace 36" RCP
K9.26 to Junction	9.8	0.45	12.48	11	72	36" RCP	440'	(0.0022)	27	3.8	440' - 54" RCP	102,200	Replace 36" RCP
Junction to K9.18	3.3	0.7	2.31	5	17	42" RCP	240'	(0.002)	78	4.0		Adequate	Carries part of flow from junction to K9,5,2
K9.16 to K9.14	10.4	0.45	4.68	11	27	30" CMP	215'	(0.0065) 0.0077	19	3.8	215' - 30" RCP	28,600	Remove 30" CMP
K9.14 to K9.18	3.7	0.7	7.27	12	41	36" CMP	240'	(0.0011)	12	1.8	240' - 48" RCP	48,150	Remove 36" CMP
K9.18 to K9.11	2.7	0.7	11.47	14	61	Dual 42" RCP	400'	(0.002)	78	4.0		Adequate	
K9.11 to K9.8	11.3	0.7	19.38	17	97	42" RCP	150'	(0.0027)	45	4.7	530' - 48" RCP	104,000	Parallel systems from K912 to K9.9
K9.8 to K9.3	5.2	0.7	23.02	18	113	42" RCP & 36" RCP	420'	(0.0104)	148	9.2		Adequate	
K9.3 to K9.4	2.0	0.7	24.42	21	115	42" RCP	50'	(0.0104) 0.0048	178	9.2		Adequate	
Junction to K9.5.2			43.68	35	166	54" RCP	1235'	(0.0028) 0.0013	90	5.7		Adequate	
K9.24.1 to K9.24.2	8.8	0.45	3.96	12	22	24" RCP	50'	(0.0081)	18	5.6		Adequate	Available head
K9.24.2 to K9.24	8.1 20.1	0.45 0.7	21,68	13	119	24" RCP	210'	(0.0081) 0,0155	18	5,6	210' - 54" RCP	49,100	Replace 24" RCP
K9,24 to K9.5.2	11.0	0.7	29.38	14	156	36" RCP	370'	(0.0109)	60	8,5	200' - 54" RCP	47,050	Replace 36" RCP
K9.5.2 to K9.5	1.2	0.9	74.14	43	252	72" RCP	250'	(0.0109)	383	13.5		Adequate	
												426,900	SUBTOTAL
												85,400	UPSTREAM IMPROVEMENTS
												512,300	TOTAL

Plantation

The Plantation drainage basin is located adjacent to Highway 171 in the West Ashley area. It is bounded on the south by Highway 61 and the Forest Acres drainage basin, on the west by Ashley Hall Road, and on the north by the Marvin drainage basin. The watershed drains approximately 185 acres of predominately residential development, the majority of which lies within the Old Town Acres, Murray Hill, and Heathwood subdivisions. The major drainage system along Carriage Lane is adequate, with improvements recommended in the upper reaches of the watershed and the existing system along Highway 61 from Winston Drive to Carriage Lane.

TABLE 53

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
CHARLESTOWNE (L-8, L-9)													
L9.11 to L9.10	7.8 28.6	0.7 0.45	18.33	26	79	24" RCP	80'	(0.0063) 0.0024	16	5.0	80' - 48" RCP	18,750	Replace 24" RCP
L9.14 to L9.10	2.5	0.45	1.13	8	7	24" RCP	45'	(0.0063) 0.0044	16	5.0		Adequate	
L9.10 to L9.9	4.0	0.45	21.26	27	90	40"x65" CMP	135'	(0.0063) 0.0113	88	5.5		Adequate	Available head
L9.9 to L9.15	13.9	0.45	27.52	35	105	Lake							
L9.15 to L9.17					105	36" CMP & 18" RCP	175'	(0.0122) 0.0085	52	4.5		Adequate	Available storage in lake
												18,750	SUBTOTAL
												3,750	UPSTREAM IMPROVEMENTS
												22,500	TOTAL
ROYAL PALM (L-9, M-9)													
M9.82 to M9.83	1.8 4.0	0.45 0.6	3.21	11	19	24" RCP	140'	(0.0036) 0.0053	12	3.7	520' - 30" RCP	Private	Replace Existing 24" RCP
M9.83 to L9.84	0.8	0.6	3.69	12	21	24" RCP	150'	(0.0033) 0.0072	11	3.6			
L9.84 to L9.85	1.1	0.6	4.35	13	24	24" RCP	230'	(0.0043) 0.0031	13	4.1			
L9.85 to L9.86	8.9 14.5	0.45 0.6	17.06	15	89	30" CMP	130'	(0.0457) 0.0136	49	10.1	130' - 42" RCP	18,150	Replace 30" CMP
												18,150	SUBTOTAL
												3,650	UPSTREAM IMPROVEMENTS
												21,800	TOTAL
PARKSHORE SOUTH (L-9, M-9)													
L9.89 to M9.90	3.1 11.2	0.6 0.45	6.90	12	39	24" RCP	150'	(0.0154) 0.0117	24	7.7	250' - 24" RCP	30,550	Parallel system
												30,550	SUBTOTAL
												6,100	UPSTREAM IMPROVEMENTS
												36,650	TOTAL

Charlestowne

The Charlestowne drainage basin is located between the Ashley River on the east, Southgate Drive on the north, Highway 171 on the west, and Old Towne Plantation Road on the south, and drains 56.8 acres of the Charlestowne Estates I subdivision through a system of roadside ditches and culverts. The existing system discharges into a lake between Donahue Drive and Old Towne Plantation Road prior to discharge into the Ashley River marsh, and is adequate, with the exception of the culvert which crosses Donahue Drive at Candy Lane. The existing 24" RCP at this location should be replaced with a 48" RCP culvert.

Royal Palm

The Royal Palm watershed drains 31.1 acres of the area around the Palms Apartments. The existing drainage facilities consist of a pipe conduit system which conveys runoff from the parking lot of the Palms Apartments to an outfall channel to the Ashley River. The existing system is inadequate and should be replaced with a new system of 30" RCP and 42" RCP.

Parkshore South

The Parkshore South drainage basin drains the area around the intersection of Parkshore Drive and Cecilia Drive. Approximately 50 percent of the area lies outside the City of Charleston boundaries. The existing 24" RCP outfall from Cecilia Drive to the Ashley River marsh is inadequate and a parallel 24" RCP is recommended.

TABLE 54

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SOUTHGATE (L-8, L-9, M-8, M-9)													
L9.8 to L9.7	2.3 3.1	0.9 0.45	3.47	11	20	24" RCP	50'	(0.0043) 0.0040	14	4.5	130' - 30" RCP	16,500	Replace ditch and culvert system
L9.7 to L9.6	1.2	0.45	4.01	12	22	2' F.B. Channel	40'	(0.0043) -0.0476	31	3.4			
L9.6 to L9.5					22	24" RCP	40'	(0.0043) 0.0030	14	4.5			
L9.5 to L9.4	1.8	0.45	4.82	13	27	2' F.B. Channel	30'	(0.0043) 0.001	31	3.4	355' - 36" RCP	57,200	Replace ditch and culvert system
L9.4 to L9.3					27	24" RCP	50'	(0.0043) -0.0034	14	4.5			
L9.3 to L9.2	2.1	0.45	5.77	14	31	2' F.B. Channel	70'	(0.0043) -0.0057	71	4.2			
L9.2 to L9.1					31	24" RCP	45'	(0.0043) 0.0067	14	4.5			
L9.1 to L8.35	0.7	0.45	6.09	15	32	2' F.B. Channel	60'	(0.0036) -0.0010	65	3.9			
L8.35 to L8.34					32	24" RCP	60'	(0.0036) 0.0045	14	4.5			
L8.34 to L8.33	1.9	0.45	6.95	16	35	2' F.B. Channel	40'	(0.0036) 0.0025	121	4.3			
L8.33 to L8.32					35	24" RCP	70'	(0.0085) 0.0019	14	4.5	290' - 36" RCP	46,450	Replace ditch and culvert system
L8.32 to L8.30	2.0	0.45	7.85	7	39	2' F.B. Channel	110'	(0.0085) -0.0005	158	6.6			
L8.30 to L8.29					39	24" RCP	60'	(0.0085) 0.0022	14	4.5			
L8.29 to L8.27	0.4	0.45	8.03	18	39	2.5' F.B. Channel	50'	(0.0085) 0.0092	105	6.0			
L8.27 to L8.26					39	24" RCP	80'	(0.0085) 0.0028	14	4.5	220' - 36" RCP	35,350	Replace ditch and culvert system
L8.26 to L8.25	4.1	0.45	9.88	19	47	3' F.B. Channel	90'	(0.0085) 0.0041	180	6.8			
L8.25 to L8.24					47	24" RCP	50'	(0.0085) -0.0002	14	4.5			

(CONTINUED)

TABLE 54

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
SOUTHGATE (CONTINUED)													
L8.31 to L8.28	2.1	0.45	0.95	14	5	24" RCP	265'	(0.0064) -0.0023	16	5.0		Adequate	
L8.28 to L8.23	3.0	0.45	2.30	16	12	3' F.B. Channel	60'	(0.0061) 0.0097	38	4.2		Adequate	
L8.23 to L8.19					12	24" RCP	225'	(0.0061) 0.0059	45	6.4		Adequate	
L8.24 to L8.18	1.3	0.45	12.77	21	60	3' F.B. Channel	350'	(0.0061) 0.0083	170	6.0		Adequate	
L8.18 to L8.15					60	36" RCP	250'	(0.0061) 0.0126	45	6.4	250' - 30" RCP	29,600	Parallel system
L8.15 to L8.7	3.1	0.45	14.17	24	63	36" RCP	350'	(0.0061) 0.0123	45	6.4	350' - 30" RCP	38,850	Parallel system
L8.7 to L8.4	1.0	0.45	14.62	26	63	36" RCP	70'	(0.0041) 0.0066	37	5.2	70' - 36" RCP	11,300	Parallel system
L8.6 to L8.5	5.3	0.45	2.39	17	12	24" RCP	50'	(0.0041) 0.0202	13	4.0		Adequate	
L8.37 to L8.38	3.0 47.6	0.9 0.45	24.12	22	111	30" RCP	60'	(0.0035) 0.0175	21	4.9	60' - 54" RCP	13,000	Parallel system
L8.38 to L8.8	2.3 16.2	0.9 0.45	50.49	27	215	5' F.B. Channel	610'	(0.0035) 0.0013	220	5.2		Adequate	
L8.8 to L8.10					215	Dual 48" RCP	50'	(0.0041) -0.0074	150	6.0	50' - 48" RCP	14,250	Parallel system
												262,500	SUBTOTAL
												52,500	UPSTREAM IMPROVEMENTS
												315,000	TOTAL

Southgate

The Southgate watershed drains 104.5 acres of the Northbridge Terrace and Charles Towne Estates I subdivisions. The existing drainage facilities are inadequate and are divided into two branches. The first branch is a tributary of Orange Grove Creek which extends northward from Dumbarton Drive to Summerset Circle. The existing 5 foot flat bottom channel is adequate, however, the culvert at Northbridge Road needs to be improved by the placement of a parallel 54" RCP. Improvements to the channel will involve excavation in the marsh and will require a South Carolina Coastal Council permit. The second branch consist of a series of pipe conduits, roadside ditches, and culverts which extend from the Orange Grove Creek outfall to Highway 171. Replacing the system with a 30" RCP and 36" RCP is recommended.

TABLE 55

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
DOWDEN (K-9, L-9)													
K9.44 to K9.43	0.83	0.45	0.37	4	3	24" RCP	115'	(0.0019) 0.003	14	4.5		Adequate	
K9.43 to L9.30	41.1	0.45	18.87	22	87	3.5' F.B. Channel	730'	(0.0019)	64	3.0		5,650	Clean channel and regrade sideslope to 2 horizontal to 1 vertical.
L9.30 to L9.29	15.3	0.45	25.76	27	109	24" RCP 27" x 43" CMP	90'	(0.0019) 0.0039	44	4.5	90' - Dual 42" RCP	31,700	Replace existng pipes
L9.29 to L9.34	11.8	0.45	31.07	33	121	4.5' F.B. Channel	375'	(0.0019) 0.0024	129	3.6		Adequate	
L9.34 to L9.33					121	24" RCP 27" x 43" CMP	70'	(0.0019) 0.0114	44	4.5	70' - Dual 48" RCP	16,950	Replace existing pipes
L9.33 to A	10.0	0.45	35.57	38	128	5' F.B. Channel	610'	(0.0019)	184	3.9		Adequate	
A to C	7.5 21.0	0.7 0.45	50.27	43	171	5' F.B. Channel	570'	(0.0019)	184	3.9	Revise Channel 2:1 sideslope	2,550	Clean channel and regrade sideslope to 2 horizontal to 1 vertical
L9.58 to L9.57	8.7	0.45	3.92	13	22	24" RCP	80'	(0.0046) 0.0054	13	4.2	80' - 24" RCP	8,050	Parallel pipe
L9.54 to L9.56	9.4	0.45	4.23	13	23	24" RCP	150'	(0.0122) 0.0065	22	6.9		Adequate	
L9.57 to C	2.3 9.5	0.9 0.45	14.50	20	69	2.5' F.B. Channel	1040'	(0.0046)	153	5.2		Adequate	
L9.47 to L9.49	13.8	0.9	12.42	12	70	36" RCP	65'	(0.0065) 0.0052	47	6.6	65' - 30" RCP	10,200	Parallel pipe
L9.49 to L9.50	5.5	0.45	14.90	14	79	3' F.B. Channel	250'	(0.0065) 0.007	187	6.3		Adequate	
L9.50 to L9.52					79	22"x36" CMP 27"x43" CMP	60'	(0.0065) 0.0207	49	4.3	60' - Dual 36" RCP	19,000	Replace pipes
L9.52 to L9.53	3.1	0.45	16.30	15	85	48" CMP	70'	(0.0056) -0.0007	61	4.8	70' - 30" RCP	6,850	Parallel pipe
L9.53 to C	1.8	0.45	17.11	17	86	5' F.B. Channel	280'	(0.0056)	980	9.1		Adequate	
C to L9.27			81.88	53	237	8.5' F.B. Channel	380'	(0.0056)	1230	9.2		Adequate	
L9.39 to L9.27	26.5 3.0	0.9 0.45	25.20	18	123	36" RCP	1030'	(0.0093)	56	7.9	1030' - 42" RCP	156,850	Parallel pipe
L9.27 to L9.21	2.2 7.4	0.7 0.45	111.95	54	325	2-42" RCP; 2-30" RCP; 48" RCP	130'	(0.0056) 0.0165	277	7.4		Adequate 257,800 51,600 309,400	Available head SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Dowden

The Dowden drainage basin lies within the triangle formed by Highway 7, Highway 171 and Marvin Avenue and drains portions of the Charlestowne Estates II and Lenevar subdivisions. This includes residential areas and a large regional shopping mall, Ashley Plaza Mall.

The existing drainage facilities consist of drainage ditches with culverts at roadway crossings. Approximately 50 percent of the existing drainage facilities are adequate. The systems which require improvement are the roadway culverts at Joshua Drive, Raymond Way, Dunnes Lane, Charlestowne Drive and Dowden Street plus a parallel system of 42" RCP along Highway 171 from Ashley Plaza Mall to the culverts crossing under Highway 171 at Old Towne Plantation Road.

TABLE 56

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
RIVERFRONT DRIVE (L-9)													
L9.81 to L9.80	28.3	0.45	12.74	16	65	18"x29" CMP	75'	(0.0013) 0.0037	11	3.5	75' - Dual 36" RCP	23,900	Replace 18"x29" CMP
L9.80 to L9.73	29.0	0.45	25.79	17	129	3' F.B. Channel	435'	(0.0013) 0.0023	43	2.4	3' F.B. Channel	11,800	Additional easement required
L9.73 to L9.77					129	24" RCP & 18" RCP	90'	(0.0213) 0.0012	42	9.1	90' - Dual 48" RCP	34,600	Replace existing 24" RCP & 18" RCP
L9.77 to L9.98	14.9	0.45	32.50	20	154	2.5' F.B. Channel	330'	(0.0213) 0.0232	126	8.8	3' F.B. Channel	10,950	Additional easement required
L9.98 to L9.97					154	Dual 24" RCP	70'	(0.0043) 0.0006	28	4.5	70' - Dual 48" RCP	28,200	Replace existing dual 24" RCP
L9.97 to L9.91	13.6	0.45	38.62	23	174	2.5' F.B. Channel	370'	(0.0043) 0.005	59	4.1	3' F.B. Channel	11,050	Additional easement required
L9.91 to L9.92	1.2 1.7	0.6 0.45	40.11	25	176	36" CMP	90'	(0.0053) 0.0014	27	3.9	90' - Dual 48" RCP	31,950	Replace 36" CMP
L9.92 to L9.95	2.7	0.45	41.33	26	178	36" RCP	330'	(0.0053)	42	6.0	330' - Dual 48" RCP	111,250	Relief system
L9.95 to L9.96					178	42" RCP	100'	(0.0053)	63	6.6	100' - Dual 42" RCP	31,200	Parallel system
												294,900	SUBTOTAL
												59,000	UPSTREAM IMPROVEMENTS
												353,900	TOTAL
MULMAR NORTH (L-9, L-10)													
L10.1 to L10.7	7.1	0.6	4.26	15	22	24" RCP	150'	(0.0131) 0.0089	22	7.1		Adequate	
L10.7 to L10.8					22	2' F.B. Channel	30'	(0.0131) 0.02	40	5.7		Adequate	
L10.8 to L10.9					22	24" RCP	85'	(0.0131) 0.0065	14	4.5	85' - 24" RCP	5,650	Parallel pipe
												5,650	SUBTOTAL
												1,150	UPSTREAM IMPROVEMENTS
												6,800	TOTAL
MULMAR SOUTH (L-9, L-10)													
L10.2 to L10.3	3.5	0.45	1.58	12	9	24" RCP	50'	(0.019) 0.0052	14	4.5		Adequate	
L10.3 to L10.4	0.2	0.45	1.67	13	9	2' F.B. Channel	20'	(0.019) 0.0535	56	7.0		Adequate	
L10.4 to L10.5					9	24" RCP	50'	0.0058	14	4.5		Adequate	

Riverfront Drive

The Riverfront Drive drainage basin is bounded on the south by Highway 7, on the east by Amberly Road, on the west by Downing Street and on the north by Cecilia Drive. The watershed drains a total of 91.4 acres, of which, 57.3 acres are in the City of Charleston boundaries.

The existing drainage facilities consist of a ditch and culvert system which extends from Highway 7 to the outfall into a small lake. The lake functions as a detention pond storing the runoff prior to discharge into the Ashley River. The existing systems are inadequate, providing less than 40 percent of the required capacity.

Replacement of the existing system with a new system consisting of a 3 foot flat bottom channel with dual culverts at roadway crossings is recommended. The lake at the end of the drainage system provides adequate storage capacity for runoff generated from the area.

Mulmar North

The Mulmar North drainage basin is located north of Orange Grove Road and drains the area along the east side of Mulmar Street from Orange Grove Road to the Ashley River. Existing drainage facilities consist of a channel with culverts at driveway crossings. All of the existing systems are adequate with the exception of the last culvert prior to discharge into the Ashley River which should be improved by the installation of a parallel 24" RCP.

Mulmar South

The Mulmar South drainage basin drains the area along the south side of Mulmar Street from Orange Grove Road to the Ashley River. Existing drainage facilities consist of a roadside channel with culverts at driveway crossings and is adequate.

TABLE 57

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
GAMECOCK ROAD (L-9, M-8, M-9)													
M9.46 to M9.45	10.6	0.70	7.42	11	43	24" RCP	70'	(0.006) 0.0246	15	4.8	70' - 36" RCP	14,400	Replace 24" RCP
M9.45 to M9.44	3.6	0.9	10.66	14	56	30" RCP	100'	(0.006)	28	5.6	110' - 36" RCP	57,400	Parallel system
M9.44 to M9.40	29.9	0.7	31.59	32	125	30" RCP	195'	(0.006)	28	5.6	195' - 54" RCP	47,800	Parallel system
M9.59 to M9.56	4.3	0.70	3.01	2	22	24" RCP	295'	(0.0051) 0.0044	14	4.5	290' - 24" RCP	25,700	Parallel system
M9.56 to M9.53	2.3	0.70	4.62	4	34	24" RCP	140'	(0.0064) 0.0076	16	5.0	140' - 24" RCP	13,450	Parallel system
M9.53 to M9.52	2.7	0.70	6.51	5	48	24" RCP	150'	(0.006) 0.0079	15	4.8	150' - 36" RCP	20,900	Parallel system
M9.52 to M9.50	4.2	0.70	9.45	6	66	24" RCP	170'	(0.0106) 0.0155	20	6.4	170' - 36" RCP	29,650	Parallel system
M9.50 to M9.47	2.0	0.70	10.85	7	72	24" RCP	235'	(0.0065) 0.0033	16	5.0	235' - 42" RCP	31,100	Replace 24" RCP
M9.47 to M9.42	1.4	0.70	11.83	9	73	3' F.B. Channel	170'	(0.0065)	175	6.2		Adequate	Potential channel erosion
M9.42 to M9.40	1.2	0.45	12.37	10	74	24" RCP	165'	(0.0065)	16	5.0	165' - 42" RCP	21,850	Replace 24" RCP
M9.40 to M9.32	5.1	0.45	46.26	33	180	30" RCP	245'	(0.0107)	36	7.3	245' - Dual 48" RCP	87,750	Replace 30" RCP
M9.32 to M9.35	6.5	0.45	49.19	35	187	27"x43" CMP	310'	(0.0106)	39	5.5	310' - Dual 48" RCP	101,650	Replace 27"x43" CMP
M9.35 to M9.37	7.2	0.45	52.43	37	191	27"x43" CMP	370'	(0.005) 0.0057	27	3.8	370' - 4'x6' box	104,650	Replace 27"x43" CMP
												556,300	SUBTOTAL
												111,300	UPSTREAM IMPROVEMENTS
												667,600	TOTAL
NUFFIELD DRIVE (L-9, M-9)													
M9.18 to M9.16	30.8	0.45	13.86	23	62	24" RCP	110'	(0.0018) 0.0012	8	2.6	110' - 48" RCP	26,550	Replace 24" RCP
M9.16 to M9.14	8.7	0.45	17.78	24	78	24" CMP	240'	(0.0217) 0.0109	19	6.0	240' - 48" RCP	42,000	Replace 24" CMP
												68,550	SUBTOTAL
												13,700	UPSTREAM IMPROVEMENTS
												82,250	TOTAL
MERTON (M-9)													
M9.26 to M9.24	10.4	0.45	4.68	11	27	24" RCP	135'	(0.0133) 0.0114	23	7.2		Adequate	Available head
WINCHESTER (M-9)													
M9.23 to M9.21	5.7	0.45	2.57	12	14	24" RCP	150'	(0.0113) 0.0091	21	6.6		Adequate	
M9.21 to M9.20	2.8	0.45	3.83	13	21	24" RCP	140'	(0.0179) -0.0001	26	8.3		Adequate	

Gamecock Road

The Gamecock Road watershed drains 81 acres of commercial development along Highway 7 and a portion of the Sandhurst subdivision. Approximately 75 percent of the area is zoned for commercial development. This area experiences surface flooding during periods of moderate to heavy rainfall with the downstream portion of the drainage area experiencing the majority of the problems.

Existing drainage facilities consist of a pipe conduit which extends southward from the outfall into the Ashley River marsh to the intersection of Winchester Drive and Westminster Road. Near this point the system splits into two branches, one running east and crossing Highway 7 and one running south to Gamecock Road.

Recommended improvements include replacing the existing outfall from the intersection of Winchester Drive and Westminister Road with dual 48" RCP's and 370' of 4'x6' box culvert. Other improvements include parallel pipes along each branch of the system to provide design capacity. The installation of the recommended improvements requires excavation in the marsh and a South Carolina Coastal Council permit will be required.

Nuffield Drive

The Nuffield Drive watershed drains a total of 39.5 acres in the Sandhurst subdivision and is located along Orange Grove Road between Winchester Drive and Manchester Road. Existing drainage facilities consist of a series of 24" CMP and 24" RCP which transport runoff from Nuffield Drive into the lake between Merton Road and Keble Road. The system provides less than 25 percent of the design capacity and replacing the system with a 48" RCP is recommended.

Merton

The Merton watershed drains a total of 10.4 acres of the Sandhurst subdivision, and is located between Merton Road on the north, Keble Road on the south and Rugby Road on the east. The existing 24" RCP outfall into a lake located between Winchester Drive and Sussex Road is adequate.

Winchester

The Winchester drainage basin is located along both sides of Winchester Drive and extends northwest from Orange Grove Road to the lake in the Merton watershed. The existing outfall consist of a 24" RCP which conveys runoff from Winchester Drive to the lake and is adequate.

TABLE 58

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
COVENTRY CIRCLE (M-9)													
M9.7 to M9.5	3.7	0.45	1.67	8	22	24" RCP	250'	(0.0206) 0.003	28	8.9		Adequate	
SOUTH HAMPTON DRIVE (M-9)													
M9.3 to M9.1	7.3	0.45	3.29	10	20	24" RCP	170'	(0.0402) 0.0258	39	12.5		Adequate	
PARKSHORE DRIVE (M-9)													
M9.9	4.8	0.45	2.16	8	14	24" CMP	200'	(0.0255)	20	6.5		Adequate	

Coventry Circle

The Coventry Circle watershed is located along the northern end of South Hampton Drive and drains 3.7 acres of the Huntington Woods East subdivision. The existing 24" RCP outfall conveys water from South Hampton Drive to the Ashley River marsh and is adequate.

South Hampton Drive

The South Hampton Drive watershed drains the area located between South Hampton Drive and Orange Grove Elementary School through a 24" RCP from South Hampton Drive to the Ashley River marsh. The system is adequate and no improvements are required.

Parkshore Drive

The Parkshore Drive drainage basin drains 4.8 acres along the northern end of Parkshore Drive. An existing 24" CMP conveys runoff from Parkshore Drive to the Ashley River marsh and is adequate.

TABLE 59

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ORANGE GROVE CREEK (M-8)													
M8.16 to M8.13	12.7	0.45	5.72	14	30	24" RCP	70'	(0.0068)	16	5.1	70' - 24" RCP	11,650	Parallel system
M8.13 to M8.12	3.76	0.45	7.41	15	39	30" VCP	230'	(0.0068) 0.0045	29	6.0	230' - 24" RCP	14,050	Parallel system
												25,700	SUBTOTAL
												5,150	UPSTREAM IMPROVEMENTS
												30,850	TOTAL
NORTHBRIDGE VILLAGE (M-8)													
M8.17	7.2	0.45	3.24	7	21	18" RCP	330'	(0.008)	8	4.6	330' - 36" RCP	42,250	Replace 18" RCP
												42,250	SUBTOTAL
												8,450	UPSTREAM IMPROVEMENTS
												50,700	TOTAL
NORVIEW (L-8, M-8)													
L8.43 to L8.42	10.6	0.45	4.77	11	28	24" RCP	135'	(0.0104) 0.0170	20	6.4	135' - 24" RCP	12,750	Parallel system
L8.42 to L8.41	3.1	0.45	6.17	12	35	24" RCP	50'	(0.0079) -0.0022	17	5.5	190' - 24" RCP	18,600	Parallel system
L8.41 to L8.40	4.6	0.45	8.24	13	45	30" RCP	140'	(0.0079) 0.0119	32	6.4			
L8.40 to L8.39					45	36" RCP	85'	(0.0064) 0.0109	46	6.5		Adequate	
												31,350	SUBTOTAL
												6,300	UPSTREAM IMPROVEMENTS
												37,650	TOTAL

Orange Grove Creek

The Orange Grove Creek watershed is located south of Orange Grove Road in the Parkshore I subdivision and is bounded on the west by Orange Grove Creek and on the south and east by the Ashley River. The existing drainage facilities are inadequate and consist of a 24" RCP which conveys runoff southwestward from Broadman Road to Orange Grove Creek. Installing a parallel 24" RCP is recommended to provide the design capacity.

Northbridge Village

The Northbridge Village drainage basin joins the Orange Grove Creek watershed on the east and drains 7.2 acres of the Parkshore I subdivision. The existing 18" RCP outfall is inadequate and a parallel 18" RCP is recommended.

Norview

The Norview watershed is located south of Orange Grove Road and drains portions of the Norview and Northbridge Terrace subdivisions. Existing drainage facilities consists of a pipe conduit system which runs from Norview Drive northeastward to the discharge point in Orange Grove Creek. The existing system provides less than 75 percent of the design capacity and a parallel 24" RCP is recommended.

TABLE 60

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ORANGE GROVE ROAD (M-8, M-9)													
M8.40 to M8.38	3.9	0.7	2.73	12	15	30" CMP	85'	(0.0074) 0.0015	20	4.1		Adequate	
M8.38 to M8.37	2.4	0.7	4.41	13	24	5' F.B. Channel	70'	(0.0074) 0.0174	107	5.7		Adequate	
M8.37 to M8.35					24	30" CMP	90'	(0.0074) 0.0073	20	4.2	90' - 18" RCP	Private	Parallel system
M8.35 to M8.33	1.5	0.7	5.46	14	29	5' F.B. Channel	80'	(0.0088) 0.0138	219	7.4		Adequate	
M8.33 to M8.31					29	30" CMP	115'	(0.0088) 0.0026	22	4.4	115' - 18" RCP	Private	Parallel system
M8.31 to M8.30	2.1	0.45	6.41	16	33	6' F.B. Channel	190'	(0.0116) 0.0056	512	10.0		Adequate	
M8.30 to M8.24					33	36" CMP	440'	(0.0116) 0.0094	41	5.7		Adequate	
M8.28 to M8.27	0.9	0.45	0.41	4	3	18"x29" CMP	60'	(0.0103) 0.0045	13	4.1		Adequate	
M8.27 to M8.24	2.0	0.45	1.31	5	10	18"x29" CMP	190'	(0.0103) 0.0041	13	4.1		Adequate	
M8.24 to M8.22	4.7	0.45	9.84	19	47	31"x50" CMP	190'	(0.0103) 0.0053	58	6.0		Adequate	
M8.22 to M8.11	0.9	0.45	10.25	20	49	31"x50" CMP	100'	(0.0103)	58	6.0		Adequate	
MUELLER DRIVE (L-9, M-8, M-9)													
M8.1 to M8.2	10.3	0.45	4.64	19	22	24" RCP	80'	(0.0144) 0.0036	14	4.5	80' - 30" RCP	8,200	Replace 24" RCP
M8.2 to M8.3	0.6	0.45	4.91	20	23	2' F.B. Channel	35'	(0.0144) 0.0103	49	6.1		Adequate	
M8.3 to M8.4					23	24" RCP	60'	(0.0144) 0.0012	14	4.5	60' - 30" RCP	5,900	Replace 24" RCP
M8.8 to M8.7	2.5	0.45	1.13	7	7	24" RCP	50'	(0.0424) 0.0220	14	4.5		Adequate	
M8.4 to M8.5	0.7	0.45	6.36	22	29	2' F.B. Channel	25'	(0.0144) 0.0464	49	6.1		Adequate	
M8.5 to M8.9	1.2	0.45	6.90	24	31	24" RCP	400'	(0.0144) 0.0084	24	7.5	400' - 30" RCP	33,600	Replace 24" RCP
												28,800	Downstream channel improvements
												76,500	SUBTOTAL
												15,300	UPSTREAM IMPROVEMENTS
												91,800	TOTAL
BUCKINGHAM DRIVE (M-8)													
M8.21	4.4	0.45	1.98	7	13	16"x25" CMP	130'	(0.0213)	9	4.9	130' - 18" RCP	8,350	Parallel system
												8,350	SUBTOTAL
												1,700	UPSTREAM IMPROVEMENTS
												10,050	TOTAL

Orange Grove Road

The Orange Grove Road watershed drains an area along the north side of Orange Grove Road and extends from Highway 7 to Brisbane Drive. The existing drainage facilities consist of a pipe conduit system from the outfall into the Ashley River to an open channel located west of Beardsley Road which continues westward toward Highway 7 with culverts at several roadway crossings. This existing system is adequate.

Mueller Drive

The Mueller Drive watershed drains a total of 15.3 acres and is located along the south side of Orange Grove Road extending eastward from Highway 7 to Charlyn Drive. The existing drainage facilities consist of a roadside ditch along the south side of Orange Grove Road, driveway culverts, and a 24" RCP which crosses Orange Grove Road east of Brisbane Drive conveying the runoff to the Ashley River. The existing system provides 60 to 75 percent of the design capacity. Replacing the 24" RCP outfall with a 30" RCP outfall is recommended. Also included in the project cost for this area is improvement of the existing outfall channel which will require excavation within marsh areas and will necessitate obtaining a South Carolina Coastal Council permit.

Buckingham Drive

The Buckingham Drive watershed is located on either side of Buckingham Drive in the Parkshore II subdivision. The existing 16"x25" CMP outfall to the Ashley River is inadequate and should be improved with a parallel 18" RCP.

TABLE 61

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORM WATER CONDUIT	COST (DOLLARS)	
TUDOR PLACE (M-8)													
M8.62 to M8.61	1.9	0.45	0.86	3	6	24" RCP	250'	(0.0142) 0.0034	23	7.4		Adequate	
LEICESTER (M-8)													
M8.60 to M8.58	2.8	0.45	1.26	7	8	24" RCP	175'	0.0042	19	6.0		Adequate	
CHARING CROSS NORTH (M-8)													
M8.72 to M8.70	2.3	0.45	1.04	5	8	24" RCP	235'	(0.0074) 0.0034	17	5.4		Adequate	
WINDSOR EAST (M-8)													
M8.68 to M8.66	3.9	0.45	1.76	5	13	24" RCP	230'	(0.008) 0.0038	18	5.6		Adequate	

Tudor Place

The Tudor Place watershed joins the Windsor East watershed on the east and drains the area around the intersection of Windsor Drive and Leicester Avenue. The existing 24" RCP outfall is adequate.

Leicester

The Leicester watershed drains a 2.8 acre area along Leicester Avenue in the Parkshore III subdivision. The existing 24" RCP outfall to the Ashley River is adequate.

Charing Cross North

The Charing Cross North watershed drains the area along the northern end of Charing Cross Road in the Parkshore III subdivision. The existing 24" RCP outfall is adequate.

Windsor East

The Windsor East watershed drains a 3.9 acre area around the intersection of Windsor Drive and Charing Cross Road. The existing 24" RCP outfall is adequate.

TABLE 62

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
POSTON (M-8, M-9)													
M8.74 to M8.73	7.8	0.45	3.51	15	18	36" RCP	110'	(0.0166) 0.0048	37	5.2		Adequate	
M8.73 to M8.75	2.0 1.9	0.9 0.25	5.79	16	30	3' F.B. Channel	190'	(0.0166) 0.0082	155	8.6		Adequate	
M8.75 to M8.77					30	30" RCP	200'	(0.0166)	24	4.5	200' - 24" RCP	62,200	Parallel system
												62,200	SUBTOTAL
												12,450	UPSTREAM IMPROVEMENTS
												74,650	TOTAL
WINDSOR (M-8)													
M8.53 to M8.56	8.7	0.45	3.92	9	24	24" RCP	300'	(0.003) 0.0057	11	3.4	300' - 24" RCP	24,750	Parallel system
M8.56 50 M8.57	6.7	0.45	6.94	11	40	24" RCP	230'	(0.0145) 0.0019	24	7.5	230' - 30" RCP	17,900	Parallel system
												42,650	SUBTOTAL
												8,550	UPSTREAM IMPROVEMENTS
												51,200	TOTAL
BLACKBURN (M-8)													
M8.47 to M8.45	3.0	0.45	1.35	4	10	18"x29" CMP	200'	(0.0082) 0.0062	12	3.7		Adequate	
BRIGHTON (M-8)													
M8.51 to M8.48	5.8	0.45	2.61	6	18	24" RCP	300'	(0.0115) 0.0056	21	6.7		Adequate	
BRISBANE (M-8)													
M8.43 to M8.41	5.4	0.45	2.43	5	18	27"x43" CMP	180	(0.023) 0.0057	57	8.1		Adequate	

Poston

The Poston watershed is located parallel to Highway 7 and drains 11.7 acres of the Parkshore III subdivision. The existing drainage facilities consist of a roadside ditch running parallel to the Frontage Road along Highway 7, a 36" RCP culvert under Poston Road, and a 30" RCP crossing Highway 7. The existing culvert under Highway 7 is inadequate and a parallel 24" RCP is recommended.

Windsor

The Windsor watershed drains an area located on either side of Poston Road. Existing drainage facilities consist of a 24" RCP which conveys runoff from Windsor Drive southeastward to the Ashley River marsh. The existing system provides less than 60 percent of the design capacity and a parallel system of 24" RCP and 30" RCP is recommended.

Blackburn

The Blackburn watershed drains a portion of the Parkshore II subdivision. A 18"x29" CMP serves as the outfall to the Ashley River and is adequate.

Brighton

The Brighton watershed is located in the Parkshore II subdivision adjacent to Brisbane Drive. The existing 24" RCP outfall to the Ashley River is adequate.

Brisbane

The Brisbane watershed joins the Brighton watershed on the east and drains a total of 5.4 acres located along Brisbane Drive. The existing 27"x43" CMP outfall is adequate.

TABLE 63

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ASHLEY HALL ROAD (K-9, K-10, L-9, L-10, L-11)													
L9.67 to L9.70	12.4	0.7	8.68	9	54	24" RCP	300'	(0.0017) -0.0001	8	2.6	300' - 48" RCP	54,850	Replace 24" RCP
L9.70 to L9.63	9.8	0.45	13.09	11	76	3' F.B. Channel	110'	(0.0017) 0.0198	45	2.7	3' F.B. Channel	600	Revise side slope
L9.63 to L10.28					76	36" RCP	470'	(0.0029)	31	4.4	470' - 42" RCP	85,300	Parallel system
L10.28 to L10.27	7.8	0.7	18.55	14	98	36" RCP	100'	(0.002)	26	3.7	100' - Dual 42" RCP	22,200	Replace 36" RCP
L10.27 to L10.101	5.8	0.7	22.61	15	118	42" RCP	580'	(0.0089)	82	8.5	580' - 42" RCP	114,400	Parallel system
L10.101 to L10.23	9.3 38.5	0.7 0.45	46.45	19	223	48" RCP	300'	(0.0089)	117	9.3	300' - 60" RCP	100,500	Parallel system
L10.23 to L10.22					223	5' F.B. Channel	210'	(0.0089) 0.0124	760	10.2		Adequate	
L10.22 to L10.21					223	48" RCP	70'	(0.0089) -0.002	117	9.3	145' - 60" RCP	56,100	Parallel system
L10.21 to L10.20	8.9	0.9	54.46	23	245	48" RCP	75'	(0.0089) -0.0015	117	9.3			
L10.20 to L10.18					245	5' F.B. Channel	320'	(0.0089) 0.0091	443	8.9		Adequate	Parallel system
L10.18 to L10.17					245	48" RCP	70'	(0.0089)	117	9.3	70' - 60" RCP	27,900	Parallel pipe
L10.11 to L10.17	48.7	0.45	21.92	33	85	30" RCP	250'	(0.0007)	9	1.9	250' - Dual 42" RCP	75,000	Replace 30" RCP
L10.17 to L10.49	18.9 4.0	0.9 0.7	96.19	35	366	54" RCP	570'	(0.006)	132	8.3	1510' - 6'x6' Box	600,000	Relief system L10.17 to L10.17A
L10.49 to L10.52	5.1 10.8	0.7 0.45	104.62	39	377	60" RCP	570'	(0.0027)	117	6.0			Adequate with relief
L10.52 to L10.55	10.6	0.7	112.04	43	381	60" RCP	330'	(0.01) 0.0054	226	11.5			
L10.55 to L10.56	1.5	0.7	113.09	45	381	10' F.B. Channel	30'	(0.0043) -0.0097	650	7.4			
L10.56 to L10.57					381	60" RCP	80'	(0.0043) 0.0044	148	7.5			
L10.57 to L10.58					381	10' F.B. Channel	40'	(0.0043) 0.0175	650	7.4			
L11.52 to L11.50	19.4 50.1	0.7 0.45	36.13	35	137	30" RCP	515'	(0.0057) 0.0032	27	5.5	515' - 60" RCP	162,150	Replace 30" RCP
L11.50 to L11.47	100.3	0.45	81.27	54	236	60" RCP	380'	(0.0057) 0.0107	170	8.7	960' - 42" RCP	205,350	Parallel system
L11.47 to L10.78	5.8	0.7	85.33	57	239	60" RCP	490'	(0.0062) 0.0031	178	9.0			
L10.78 to L10.79	6.2	0.7	89.67	60	242	60" RCP	90'	(0.0062) 0.0062	178	9.0			

(CONTINUED)

TABLE 63

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ASHLEY HALL ROAD (CONTINUED)													
L10.86 to L10.83	3.4	0.45	1.53	11	9	24" RCP	285'	(0.0021) 0.0036	9	2.9		Adequate	
L10.83 to L10.80	6.4	0.45	4.41	13	24	24" x 36" CMP	240'	(0.0221) 0.0093	34	7.0		Adequate	
L10.90 to L10.88	8.3	0.45	3.74	16	19	24" x 36" CMP	180'	(0.0217) 0.0078	34	7.0		Adequate	
L10.93 to L10.92	5.3	0.45	2.39	5	18	18" x 30" CMP	130'	(0.0185) 0.0042	17	5.5		Adequate	
L10.40 to L10.43	10.5	0.7	7.35	11	43	32" x 50" CMP	320'	(0.0025) 0.0036	28	3.0	320' - 42" RCP	50,900	Replace 32"x50" CMP
L10.46 to L10.43	5.0 22.7	0.9 0.7	20.39	33	80	42" x 64" CMP	165'	(0.0067) 0.0092	91	5.7		Adequate	
L10.43 to L10.45	2.5	0.7	29.49	34	114	42" x 64" CMP	40'	(0.0112) 0.0218	118	7.4		Adequate	Available head
L10.45 to L10.58					114	6' F.B. Channel	220'	(0.0112)	677	10.4		Adequate	
L10.58 to L10.61	18.9 41.4	0.9 0.45	306.08	116	490	36" RCP	70'	(0.0043) 0.0073	84	4.0	70' - dual 4½'x8' Box	46,050	Parallel system
												1,601,300	SUBTOTAL
												320,300	UPSTREAM IMPROVEMENTS
												1,921,600	TOTAL
MILLBROOK (L-10)													
L10.69 to L10.68	5.3	0.45	2.39	15	12	24" RCP	170'	(0.0005) 0.0079	14	4.4		Adequate	
L10.68 to L10.67	2.5	0.6	3.89	17	19	3' F.B. Channel	100'	(0.0003) 0.0019	30	1.3		Adequate	
L10.67 to L10.66					19	30" RCP	90'	(0.0056) 0.0019	20	4.1		Adequate	
L10.66 to L10.64	37.1	0.45	20.59	22	95	3' F.B. Channel	720'	(0.0023) 0.0046	84	3.5	3' F.B. Channel	2,300	Alter side slopes
L10.64 to L10.65					95	36" RCP	90'	(0.0056)	30	4.2	90' - Dual 42" RCP	42,900	Parallel pipe
												45,200	SUBTOTAL
												9,050	UPSTREAM IMPROVEMENTS
												54,250	TOTAL

Ashley Hall Road

The Ashley Hall Road watershed drains a total of 498.3 acres of which approximately 70 percent is outside the City of Charleston. This is a rapidly developing area and in recent years the area along Ashley Hall Road has seen the development of several apartment complexes with more under construction or in the planning stage. This development combined with work associated with the Highway 61 Expressway, which should result in commercial development along Highway 61, has caused a major drainage problem in this area. The area around the Village Apartments has experienced severe drainage problems in recent years. The existing system of pipe conduits, roadside ditches, roadway culverts and channels is inadequate. One of the major problem areas is the existing pipe conduit system which runs along the west side of Ashley Hall Road. This system provides less than 40 percent of the design capacity and should be improved by installing a parallel 6'x6' box culvert along Ashley Hall Road to the outfall.

The runoff from the area around Highway 61, Millbrook Boulevard and Ivyhall Road discharges into a lake prior to discharge into the Ashley River marsh. The lake provides some storage capacity but was considered insignificant and was not taken into account in sizing of the new system shown in the associated table for this area.

The first priority for this area is improvement of the existing system which crosses Ashley Hall Road. A dual 4½'x8' box culvert is recommended. This will require excavation in the marsh and will require a South Carolina Coastal Council permit.

Millbrook

The Millbrook watershed drains the area along either side of Millbrook Boulevard from Manigault Place to Ashley Hall Road. Of the 44.9 acres drained by the system, approximately 60 percent is outside the City of Charleston.

The existing system consist of a roadside channel along the south side of Millbrook Boulevard with culverts at driveway crossings which is inadequate at the Ashley Hall Road crossing. Recommended improvements for the system consist of enlarging the ditch section along Millbrook Avenue and installing parallel 42" RCP culverts across Ashley Hall Road. This installation will require excavation in marsh areas and will require a South Carolina Coastal Council permit.

TABLE 64

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ASHLEY HALL PLANTATION WEST (L-10, L-11, M-10, M-11)													
L10.75 to L10.74	0.1	0.9	0.09	1	1	24" RCP	60'	(0.0003) 0.0085	3	1.1		Adequate	
L10.74 to L10.73	0.6 0.6	0.9 0.35	0.84	10	5	5' F.B. Channel	30'	(0.0003) -0.0133	17	1.0		Adequate	
L10.73 to L10.72					5	24" RCP	80'	(0.0003) 0.0023	12	3.8		Adequate	
L10.97 to L10.98	5.3 12.2	0.6 0.35	7.45	10	45	27" x 36" CMP	140'	(0.0005)	5	1.1	140' - 42" RCP	21,400	Replace existing system. Outfalls into marsh.
L11.44 to L11.43	6.0 6.4	0.35 0.6	5.94	21	28	36" RCP	40'	(0.0025) -0.0068	29	4.1		Adequate	
L10.72 to L11.42	2.7 8.0 16.1	0.15 0.35 0.6	27.10	25	119	6' F.B. Channel	550'	(0.0003) 0.0025	28	1.2	7' F.B. Channel	9,900	
L11.42 to L11.41					119	36" RCP	100'	(0.0003) -0.0012	29	4.1	100' - Dual 48" RCP	35,050	Parallel system
L11.41 to L11.20	17.3 7.4	0.6 0.7	42.66	32	169	7' F.B. Channel	875'	(0.0003) 0.0015	38	1.3	7' F.B. Channel	18,400	
L11.20 to L11.19					169	36" RCP	90'	(0.0003) -0.0032	29	4.1	90' - Triple 48" RCP	49,100	Replace 36" RCP
L11.22 to L11.23	1.7	0.25	0.43	1	3	36" RCP	100'	(0.0051) 0.0078	41	5.8		Adequate	
L11.12 to L11.10	2.2	0.35	0.77	7	5	24" RCP	320'	(0.0027) 0.0044	10	3.2		Adequate	
L11.10 to L11.9	2.7	0.35	1.72	9	11	30" RCP	70'	(0.0027) 0.0061	18	3.8		Adequate	
L11.9 to L11.6	3.2	0.35	2.84	10	17	9' F.B. Channel	75'	(0.0027) 0.0020	250	4.8		Adequate	
L11.6 to L11.8					17	36" RCP	230'	(0.0027) 0.0016	30	4.2		Adequate	
L11.19 to L11.5	25.2 15.2	0.7 0.35	68.89	45	227	3' F.B. Channel	1880'	(0.0003) -0.0001	28	1.3	8' F.B. Channel	37,800	
L11.5 to L11.3					227	48" CMP	110'	(0.0003) -0.0024	65	5.2	110' - Dual 54" RCP	51,700	Parallel system
L11.3 to L11.1	8.4	0.6	73.93	47	237	13' F.B. Channel	235'	(0.0003) 0.0049	135	1.8	13' F.B. Channel	4,900	
L11.1 to L11.2					237	42" RCP	90'	(0.0003) 0.0052	38	3.9	90' - Dual 4'x6' Box	52,450	Remove 42" RCP
M10.13 to M10.14	1.9	0.35	0.67	2	5	24" CMP	145'	(0.0015) 0.0036	5	1.6		Adequate	
M10.14 to M10.15	0.9	0.35	0.99	3	7	24" CMP	65'	(0.0015)	5	1.6		Adequate	
L11.37 to L11.38	4.3	0.35	1.51	8	10	24" CMP	90'	(0.0018) 0.0053	5	1.7		Adequate	Available head
L11.38 to L11.40	1.1	0.35	1.90	9	12	27" x 43" CMP	150'	(0.0018) 0.0023	16	2.3		Adequate	

(CONTINUED)

80.7 acres

TABLE 64

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
ASHLEY HALL PLANTATION WEST (CONTINUED)													
L11.24 to L11.25	1.3	0.35	0.46	3	3	22" x 36" CMP	175'	(0.0006) 0.0014	6	1.2		Adequate	
L11.25 to L11.27	1.5	0.35	0.99	4	7	22" x 36" CMP	305'	(0.0006) 0.0024	6	1.2		Adequate	
L11.27 to L11.28	1.4	0.35	1.48	6	10	24" RCP	120'	(0.0006) -0.0065	5	1.5	120' - 24" RCP	9,600	Parallel system
L11.29 to L11.30	1.9	0.35	0.67	3	5	24" CMP	250'	(0.0074) 0.0017	11	3.5		Adequate	
L11.36 to L11.34	8.2	0.35	2.87	8	18	24" CMP	200'	(0.0071) 0.0044	11	3.4	290' - 30" RCP	30,800	Replace 24" CMP
L11.34 to L11.33	1.4	0.35	3.36	9	21	24" CMP	90'	(0.0071) 0.0092	11	3.4			
L11.33 to M11.4	33.7 50.6	0.15 0.35	32.05	10	192	Marsh	320'	(0.0006)				Adequate	Available storage
M11.4					192	25' Bridge	30'	(0.0006)	429	3.0		Adequate	
M11.7 to M11.6	3.2	0.35	1.12	6	8	24" RCP	180'	(0.0081)	18	5.6		Adequate	
M11.6 to M11.5	0.6	0.20	1.24	7	8	24" RCP	130'	(0.0081) -0.0042	18	5.6		Adequate	
M11.5 to M11.3	0.2	0.2	1.28	8	8	24" RCP	50'	(0.0081) 0.0072	18	5.6		Adequate	
M11.4 to M11.8	15.2 22.7	0.35 0.15	115.99	56	331	Marsh	1375'						Available storage
M11.8 to M11.9					331	4' x 6' Box	250'	(0.0003) -0.0003	90	3.8			Available storage
												321,100	SUBTOTAL
												64,250	UPSTREAM IMPROVEMENTS
												385,350	TOTAL
ASHLEY HALL PLANTATION EAST (M-10)													
M10.12 to M10.11	1.8	0.35	0.63	5	5	30" RCP	120'	0.0023	4	0.7			Pipe System Adequate With Improvement to M10.6-M10.7 Due to Increased Hydraulic Slope
M10.11 to M10.10	1.0	0.35	0.98	6	7	30" RCP	230'	0.0023	4	0.7			
M10.10 to M10.1	1.9	0.35	1.65	8	11	30" RCP	325'	0.0003	4	0.7			
M10.1 to M10.2	5.2	0.35	3.47	10	21	36" RCP	130'	0.0033	6	0.8			
M10.2 to M10.3	5.3	0.35	5.33	11	31	36" RCP	180'	0.0027	6	0.8			
M10.3 to M10.4	4.1	0.35	6.77	12	38	48" RCP	80'	0.0079	12	1.0			
M10.4 to M10.6	6.2	0.35	8.94	13	49	6' F.B. Channel	120'	-0.0304	48	1.9			
M10.6 to M10.7					49	42" CMP	65'		52	4.9	65' - 48" RCP	11,400	Replace 42" CMP
												11,400	SUBTOTAL
												2,300	UPSTREAM IMPROVEMENTS
												13,700	TOTAL

Ashley Hall Plantation West

The Ashley Hall Plantation West drainage basin is located along the east side of Highway 61 and is bounded on the south by Millbrook Boulevard and on the north by the Mark Clark Expressway. Of the 291 acres drained approximately 60 percent falls within the City of Charleston.

The existing drainage facilities are divided into two sections. The first being a channel section with roadway culverts which runs southeast from Ashley Hall Plantation Road to Millbrook Boulevard. The second branch is an area of marsh which extends southeastward from the existing bridge on Ashley Hall Plantation Road. Several existing drainage systems discharge into this marsh area from the Ashley Hall Plantation subdivision.

The majority of the existing systems are adequate with the exception of the western branch. The western branch requires new culverts at all of the roadway crossings and a new channel section from William Kennerty Boulevard to Ashley Hall Plantation Road.

Ashley Hall Plantation East

The Ashley Hall Plantation East watershed drains a portion of the Ashley Hall Plantation subdivision. The area lies to the east of Hobonny Lane and extends to the Ashley River marsh. The existing drainage system consist of a pipe system which conveys water from Hobonny Lane to the Ashley River marsh and is inadequate due to the restriction created by an existing 42" CMP. By replacing the 42" CMP with a 48" RCP, the upstream portion of the system will be adequate.

TABLE 65

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
FOREST LAKES (L-12, M-12)													
M12.1 to M12.2	8.3	0.45	3.74	8	24	24" CMP	480'	(0.0026) 0.0022	7	2.1	480' - 30" RCP	40,500	Remove 24" CMP
M12.2 to M12.3	8.8	0.45	7.70	11	45	27"x43" CMP	500'	(0.0026) 0.0051	19	2.7	870' - 42" RCP	119,850	Remove 27"x43" CMP
M12.3 to L12.1	6.4	0.45	10.58	14	56	27"x43" CMP	370'	(0.0026) 0.0069	19	2.7			
L12.1 to L12.4	9.0	0.45	14.63	16	75	27"x43" CMP	210'	(0.0026) 0.0041	19	2.7	210' - 48" RCP	40,500	Remove 27"x43" CMP
												200,850	SUBTOTAL
												40,200	UPSTREAM IMPROVEMENTS
												241,050	TOTAL
MAGWOOD (L-11, L-12, M-11, M-12)													
M12.6 to M12.5	164.1	0.35	57.44	42	198	36" & 42" RCP	50	(0.010)	72	4.2	3-48" RCP	25,700	Parallel system
M11.13 to M11.12	36.7	0.35	12.85	22	59	24" RCP	50	(0.010)	12	3.8	2-36" RCP	12,600	Parallel system
M12.5 to M11.11	70 129	0.6 0.4	163.89	85	344	5' F.B. Channel	5200	(0.0005)	64	1.8	32' F.B. Channel	266,400	Divert flow to L11.53A
M11.11 to M11.10					344	30" RCP	50	(0.010)	21	4.3		Adequate	Flow diverted from this location
M11.10 to L11.53	150.8 100.6	0.4 0.6	284.57	100	512	5' F.B. Channel	1850	(0.0005)	47	1.6	50 Ac-Ft Detention	1,032,600	
L11.53 to L11.54					512	42" RCP & 4'x4' Box	50	(0.010)	112	4.4	Dual 4'x8' Box Culvert		Parallel system
												1,337,300	SUBTOTAL
												267,500	UPSTREAM IMPROVEMENTS
												1,604,800	TOTAL

Forest Lakes

The Forest Lakes watershed drains 32.5 acres of the Forest Lakes subdivision through a system of 24" CMP and 27"x43" CMP which commences at Overrun Street and runs southwest down Forest Lakes Boulevard to the outlet into Church Creek. The existing system is inadequate and replacement with a line of 30" RCP, 42" RCP, and 48" RCP is recommended.

Magwood

The Magwood watershed is located along the western side of Highway 61 and extends from Able Street on the south to Woodland Road on the north. Of the 751 acres drained by the watershed, approximately 80 percent is located outside the City of Charleston. The majority of the area which lies within the City boundary is presently undeveloped. With the opening of the Mark Clark Expressway, this area should see rapid development.

The existing 4'x4' box culvert and 48" RCP under Highway 61 are inadequate. To provide design capacity a 78 acre-foot detention basin should be provided west of Highway 61 as well as improvement to the existing highway crossing by placing dual 4'x8' box culverts parallel to the existing system.

TABLE 66

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
ASHLEY TOWNE VILLAGE (N-12)													
N12.1 to N12.3	7.9	0.45	3.56	19	17	24" RCP	210'	(0.0024) 0.0058	10	3.1	210' - 24" RCP	13,450	Parallel system
N12.3 to N12.8	18.3	0.45	11.80	23	53	10' F.B. Channel	380'	(0.0005) 0.0028	170	2.3		Adequate	
N12.5 to N12.6	2.1	0.45	0.95	4	7	30" RCP	290'	(0.0005) 0.0021	8	1.6		Adequate	
N12.6 to N12.8	3.5	0.45	2.53	6	18	36" RCP	180'	(0.0005) 0.0026	13	1.8		Adequate	With available head
N12.8 to N12.9	16.8	0.45	21.89	26	94	10' F.B. Channel	370'	(0.0005) -0.0071	233	2.5		Adequate	
N12.14 to N12.11	3.6	0.45	1.62	4	12	24" RCP	160'	(0.0069) 0.0069	16	5.2		Adequate	
N12.9 to N12.12			23.51	26	101	Dual 36" RCP	140'	(0.0236) 0.0236	76	5.4		Adequate	With available head
												13,450	SUBTOTAL
												2,700	UPSTREAM IMPROVEMENTS
												16,150	TOTAL

Ashley Towne Village

The Ashley Towne Village watershed drains the Ashley Towne Landing subdivision and is located along the east side of Highway 61 between the Seaboard Systems Railroad on the north and Church Creek on the south. Existing drainage facilities consist of an open channel with culverts at roadway crossings, and is adequate for the projected flow conditions.

TABLE 67

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
LONGVIEW (N-14)													
N14.46 to N14.45	5.4	0.45	2.43	9	15	24" RCP	160'	(0.002) -0.0002	9	2.8	685' - 24" RCP	55,750	Parallel system
N14.45 to N14.40	3.0	0.45	3.78	10	23	30" RCP	525'	(0.002) 0.0037	16	3.2			
N14.40 to N14.38	5.8	0.45	6.39	14	34	36" RCP	290'	(0.0041) 0.0025	37	5.2		Adequate	
N14.38 to N14.39	4.2	0.45	8.28	16	42	42" RCP	150'	(0.0218) 0.0043	129	13.4		Adequate	
												55,750	SUBTOTAL
												11,150	UPSTREAM IMPROVEMENTS
												66,900	TOTAL
HICKORY HILL (N-13, N-14)													
N14.28	48.8 97.7	0.35 0.25	170.05	123	268	8' F.B. Channel	4200	0.0005	144	2.2	18' F.B. Channel	78,500	Total CA includes 132.54 from Shadowmoss Watershed.
												78,500	SUBTOTAL
												15,700	UPSTREAM IMPROVEMENTS
												94,200	TOTAL
SHADOWMOSS WEST (N-14, O-14)													
N14.54	35.2 105.6	0.35 0.25	38.72	36	142	16' F.B. Channel	3100	(0.0005)	198	2.2		Adequate	

Longview

The Longview watershed is located north of Bees Ferry Road and drains a portion of the Hickory Hill Plantation subdivision. A line of pipe extending from Foxhill Road to Church Creek serves as the outfall and is adequate with the exception of the first two sections of the pipe line. A parallel system of 24" RCP is recommended to upgrade this system to provide the required capacity.

Hickory Hill

The Hickory Hill watershed drains a total of 146.5 acres which includes a portion of the Shadowmoss Golf Course and the Hickory Hill Subdivision. Of the total area drained, approximately two-thirds is presently undeveloped. Those areas which have been developed consist of a portion of the Hickory Hill Subdivision and is predominately low to medium density residential.

The existing drainage facilities consist of a 8 foot flat bottom channel which conveys the runoff from this area, and the Shadowmoss watershed, to Church Creek. The existing channel requires enlargement to a 18 foot flat bottom width. In addition, elimination of the existing constriction on Church Creek is required for the system to function properly.

Shadowmoss West

The Shadowmoss West watershed drains a total of 140 acres surrounding and including the Shadowmoss Golf Course. At the present time, approximately 75 percent of the area is undeveloped. Future development of the area will most likely consist of medium to high density residential type units.

The existing drainage facilities consist of a series of open channels and roadway culverts which provide drainage for the golf course. This existing system discharges into Church Creek, and its capacity is affected by the present constriction of Church Creek at the Seaboard System Railroad (refer to discussion of Church Creek drainage basin).

No recommended improvements have been made for this watershed because all development will be the responsibility of the property owner. However, prior to development, the proposed drainage plan should be reviewed by the City of Charleston. Proposed improvements should adhere to the recommended floodplain management plan within this report.

TABLE 68

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
SHADOWMOSS (N-13, N-14, O-13, O-14)													
O14.2 to O14.5	5.9	0.45	2.66	11	15	24" CMP	330'	(0.0039) 0.0054	8	2.5		Adequate	Available head
O14.5 to N14.3	4.6	0.45	4.73	13	26	36" CMP	320'	(0.0039) 0.0074	24	3.3		Adequate	Available head
N14.3 to N14.4	5.7	0.45	7.30	15	38	36" CMP	280'	(0.0039) 0.0037	24	3.3	280' - 30" RCP	25,150	Parallel system
N14.7 to N14.4	7.1	0.45	3.20	13	18	42" CMP	140'	(0.0036) 0.0038	34	3.5		Adequate	
N14.4 to N14.6	2.8	0.45	11.76	17	59	54" CMP	190'	(0.0039) 0.0052	69	4.4		Adequate	
N14.11 to N14.6	6.4	0.45	2.88	14	15	24" CMP	140'	(0.0036) 0.0049	8	2.4	140' - 30" RCP	15,550	Parallel system
N14.6 to N13.62	1.9	0.45	15.50	18	76	60" CMP	200'	(0.0039) 0.0038	92	4.7		Adequate	
N13.62 to N13.57	2.8	0.45	16.76	19	80	60" CMP	120'	(0.0039) 0.0023	92	4.7		Adequate	
N13.56 to N13.55	20.0	0.45	9.00	18	44	42" CMP	125'	(0.0058) 0.002	43	4.5		Adequate	Available head
N13.57 to N13.51	52.8	0.45	49.52	33	193	20' F.B. Channel	850'	(0.0002)	194	1.6		Adequate	
N13.51 to N13.54					193	60" CMP	160'	(0.0031)	280	14.3		Adequate	
O13.49 to O13.48	8.5	0.45	3.83	10	23	36" CMP	290'	(0.0025) 0.0035	19	2.7		Adequate	Existing ponding problem behind houses Available head

(CONTINUED)

TABLE 68

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
SHADOWMOSS (CONTINUED)													
O13.48 to O13.46	3.5	0.45	5.41	12	30	36" CMP	65'	(0.0025)	19	2.7	55' - 30" RCP	11,000	Parallel system
N13.36 to N13.40	7.1	0.45	3.20	8	20	42" CMP	155'	(0.0054) 0.0032	42	4.3		Adequate	
N13.40 to N13.41	2.3	0.45	4.24	9	26	42" CMP	145'	(0.0054) 0.0013	42	4.3		Adequate	
N13.41 to N13.46	11.1	0.45	9.24	10	55	7' F.B. Channel	840'	(0.0054)	331	6.6		Adequate	
O13.46 to N13.43			14.65	15	76	Dual 40"x65" CMP	230'	(0.0025) 0.007	112	3.5		Adequate	
N13.29 to N13.30	9.7	0.45	4.37	13	24	30" CMP	130'	(0.0148) 0.0072	28	5.7		Adequate	
N13.54 to N13.66	100.0 37.6	0.25 0.45	110.46	73	265	20' F.B. Channel	2450'	(0.0002) 0.0001	162	1.4		Adequate	Available storage
N13.66 to N13.64					265	Dual 48" RCP	100'	(0.005) 0.0022	100	4.0	2200' - 16' F.B. Channel 120' - Dual 60" RCP	153,700	Relief N13.17 to N13.1A
N13.64 to N13.21	79.9	0.25	130.44	98	265	20' F.B. Channel	1550'	(0.0002) -0.0001	162	1.4			Adequate with relief
N13.21 to N13.19					265	Dual 48" RCP	85'	(0.0187) -0.0002	100	4.0			
N13.19 to N13.13	7.8	0.25	132.39	99	265	20' F.B. Channel	200'	(0.0002) 0.0095	162	1.4			
N13.13 to N13.11					265	Dual 48" RCP	75'	-0.0043	100	4.0			
N13.11 to N13.7	0.6	0.25	132.54	100	265	20' F.B. Channel	50'	(0.0002) -0.0014	162	1.4			
N13.7 to N13.9					265	Dual 36" RCP	75'	(0.0067) 0.002	56	4.0			
												205,400 41,100 246,500	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Shadowmoss

The Shadowmoss watershed drains the area around the Shadowmoss Golf Course including the residential area which joins the golf course on the east. The existing drainage facilities consist of a series of open channels, roadway culverts, pipe conduit systems and lakes. The majority of these systems are adequate, provided the channels are cleaned.

The major improvement that should be made is the improvement of an existing channel which presently bisects the golf course from the Number 5 fairway to the Number 3 fairway and connects to a ditch which leads to Church Creek. This project would divert flow from the existing culverts under Bees Ferry Road which will make them adequate to handle the expected flow. The cost associated with this work would conceivably be the responsibility of the Shadowmoss Golf Course since the entire project is on private property and serves only the golf course and associated subdivision.

TABLE 69

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SHADOWMOSS NORTH (N-14,O-14)													
O14.12 to O14.11	50.6	0.25	12.65	32	50	24" CMP	60	(0.0023) 0.0042	9	2.9		Private	
O14.11 to O14.10	4.3	0.25	13.73	36	51	4' F.B. Channel	490	(0.0023) 0.0021	39	1.8		Private	
O14.10 to O14.9					51	24" CMP	260	(0.0024 0.0024	5	1.6		Private	
O14.9 to N14.61A	12.6	0.25	16.88	45	56	4' F.B. Channel	1100	(0.0020) 0.0024	36	2.6		Private	
N14.60 to N14.61	21.0	0.25	5.25	24	23	24" CMP	180	(0.0003) -0.0025	6	1.9		Private	
N14.61 to N14.61A					23	4' F.B. Channel	160	(0.0003) 0.0037	14	1		Private	
N14.61A to Outfall			22.13	45	73	4' F.B. Channel	460	0.0003	14	1		Private	
HIGHWAY 61 NORTH (O-13,O-14)													
O14.8 to O14.7	139.1	0.35	48.69	48	156	4'x4' Box	120	-0.0004	80	5.0	120' - 48" RCP	26,100	Parallel system
												26,100	SUBTOTAL
												5,250	UPSTREAM IMPROVEMENTS
												31,350	TOTAL
LIVE OAK (O-13)													
O13.5 to O13.6	16.7 20.4	0.35 0.25	10.95	38	39	24" RCP	110	0.0042	14	4.5	110' - 36" RCP	19,600	Parallel system
												19,600	SUBTOTAL
												3,950	UPSTREAM IMPROVEMENTS
												23,550	TOTAL

Shadowmoss North

The Shadowmoss North watershed drains 88.5 acres surrounding the Shadowmoss Golf Course and is presently undeveloped, with the exception of the golf course. Those areas which are undeveloped are expected to be developed for medium density residential in the near future.

The existing drainage facilities consist of a series of open channels and roadway culverts which convey the runoff from the golf course to Church Creek. No recommended improvements have been made for this area, since all development will be the responsibility of the property owner.

Highway 61 North

The Highway 61 North watershed drains a presently undeveloped area north of the Live Oak watershed along the west side of Highway 61. It outlets through an existing 4'x4' box culvert into a lake along the east side of Highway 61 prior to discharge into the Ashley River. A parallel 48" RCP under Highway 61 or a detention pond prior to the crossing will be required once the land is developed.

Live Oak

The Live Oak watershed drains the Live Oak Memorial Gardens Cemetery and a portion of the Shadowmoss subdivision located adjacent to Highway 61. The existing drainage facilities consist of a 24" RCP culvert under Highway 61 which outlets into Keivling Creek. A parallel 36" RCP is recommended to provide recommended capacity.

SECTION C

JAMES ISLAND AREA

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JAMES ISLAND AREA WATERSHEDS

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EXPLANATION OF HYDRAULIC DATA TABLES

The Hydraulic Data Tables contain information, by watershed areas, for each of the drainage facilities within the respective area. The data listed in each column is as follows:

Column 1: Location of the system to be analyzed, listing upstream manhole number and downstream manhole number.

Column 2: Drainage Area to system to be analyzed in acres.

Column 3: Runoff coefficient for the area listed in Column 2. (See Table 1)

Column 4: Total CA is the sum of Column 2 times Column 3 plus CA for areas upstream of the point of analysis.

Column 5: Travel time is the time required for runoff to reach the point of analysis from the most remote point within in the watershed.

Column 6: Discharge (Q) equals CIA where CA is the total found in Column 4 times the rainfall intensity (I) in inches per hour from Figure No. 3 using the travel time in Column 5.

Column 7: Existing system description.

Column 8: Length of existing system.

Column 9: Slope of existing system. Both the physical slope (actual slope of system) and the hydraulic slope (water surface profile) are listed for each system. The hydraulic slope is placed in parenthesis and is used to compute the capacity of the existing system.

Column 10: Capacity of existing system in cubic feet per second computed from Manning's equation.

Column 11: Velocity of existing system in feet per second. Discharge divided by flow area.

Column 12 & 13: Recommended Improvements. List improvements required (Column 12) and associated cost (Column 13).

Column 14: Comments

The James Island area is dominated by residential development with commercial development confined primarily to Folly Road and Maybank Highway. The area is drained by numerous drainage basins, the majority of which provide service to both City and County residents. Any major projects to improve drainage facilities on James Island should be approached as a cooperative effort between the City of Charleston and Charleston County.

The existing drainage facilities consist mainly of open channels with culverts crossing driveways and streets. There are some pipe conduit systems along Folly Road and Maybank Highway. The major portion of the existing systems are inadequate and will require improvement for protection of flooding at design limits. A discussion of the drainage facilities within each watershed along with recommended improvements and associated costs is contained hereafter.

TABLE 70

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
STILLS BEE (E-6)													
E6.41 to E6.40	9.2	.45	4.14	10	25	30" CMP	375'	(.0032) .0028	13	2.7	375 L.F. 36" RCP	46,950	Replace existing pipe
E6.40 to E6.39	5.7	.45	6.71	13	37	27" x 43" CMP	40'	(.0116) .0018	41	5.7		Adequate	
E6.39 to E6.38	1.4	.45	7.34	14	39	36" CMP	140'	(.0116) .0029	41	5.7		Adequate	
E6.38 to E6.37	1.1	.45	7.84	15	41	36" CMP	40'	(.0116) .0045	41	5.7		Adequate	
												46,950	SUBTOTAL
												9,400	UPSTREAM IMPROVEMENTS
												56,350	TOTAL
BATTERY BROWN (E-6)													
E6.35 to E6.36	3.5	.45	1.58	9	10	18" x 29" CMP	130'	(.015) .0041	16	5.0		Adequate	
VARDELL STREET (E-6)													
E6.1 to E6.2	18.70	0.35	6.55	17	32	24" RCP	65'	-0.0046	14	4.5	65' - 36" RCP	8,800	Parallel system
												8,800	SUBTOTAL
												1,800	UPSTREAM IMPROVEMENTS
												10,600	TOTAL
PEREGRINE (E-6, F-6)													
E6.6B to E6.6A	9.7	0.45	4.37	5	32	36" CMP	230'	(0.0093)	36	5.1		Adequate	

Stills Bee

The Stills Bee watershed drains 17.4 acres of residential development located between Putnam Drive on the east and Stills Bee Avenue on the west. Existing drainage facilities consist of a pipe conduit system which extends from Stills Bee Avenue eastward across Putnam Drive and discharges into the Clark Sound marsh. The existing facilities are adequate with the exception of the segment between Stills Bee Avenue and Putnam Drive which provides approximately 50 percent of the recommended capacity. A 36" RCP to replace the existing 30" CMP is recommended.

Battery Brown

The Battery Brown watershed drains 3.5 acres of residential development along Battery Brown Court located in the James Island portion of the study area. The existing drainage facilities consist of a 18"x29" CMP with conveys the runoff to the Clark Sound marsh and is adequate.

Vardell Street

The Vardell Street watershed is located along the western side of Sessionville Road and drains approximately 19 acres of residential development. The existing drainage facility consist of a 24" RCP which crosses under Sessionville Road and outlets into Clark Sound. The existing system is inadequate and a parallel 36" RCP culvert is recommended.

Peregrine

The Peregrine watershed drains approximately 10 acres of residential development located along both sides of Peregrine Drive. The existing drainage facility is a 36" CMP which discharges into Clark Sound and is adequate.

TABLE 71

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
PEASHILL (E-6,E-7)													
E7.28 to E7.29	4.6	.45	2.07	8	13	36" RCP	30'	(0.0009) -0.02	32	4.5		Adequate	
E7.29 to E7.17	18.9	.45	10.58	9	66	6' F.B. Channel	650'	(0.0009) 0.0024	70	2.4		Adequate	
E7.17 to E7.16					66	40"x65" CMP	50'	(0.0026) 0.002	48	3.4	50' - 30" RCP	5,350	Parallel pipe
E7.16 to E7.14	.95	.45	11.01	15	66	7' F.B. Channel	150'	(0.0026) -0.0011	106	3.7		Adequate	
E7.20 to E7.18	17.9	.45	8.06	14	43	Dual 18"x 29" CMP	40'	(0.0012) 0.0088	17	3.0	40' - Dual 30" RCP	7,700	Replace existing
E7.18 to E7.15	3.5	.45	9.64	15	50	5' F.B. Channel	590'	(0.0012) 0.0011	25	2.0	590' - 6' F.B. Channel	1,800	
E7.15 to E7.14					50	36" RCP	30'	(0.0012) 0.034	32	4.5	30' - 30" RCP	3,200	Parallel pipe
E7.14 to E7.12	1.0	.45	21.09	20	100	7' F.B. Channel	120'	(0.0026) 0.0074	116	3.7		Adequate	
E7.12 to E7.13					100	40"x65" CMP	40'	(0.0008) -0.01	48	3.4	40' - 42" RCP	6,350	Parallel pipe
E7.13 to B	2.1	.45	22.04	22	101	6' F.B. Channel	310'	(0.0008) --	60	2.1	310' - 11' F.B. Channel	1,450	
E6.24 to E6.26	8.4	.45	3.78	19	18	22"x36" CMP	440'	(0.0004) 0.0006	5	1.0	980' - 36" RCP	125,050	Replace existing system
E6.26 to E7.45	1.5	.45	4.46	22	21	22"x36" CMP	400'	(0.0004) 0.0004	5	1.0			Replace existing system
E7.45 to E7.46	2.2	.45	5.45	25	24	22"x36" CMP	140'	(0.0004) --	5	1.0			Replace existing system
E7.46 to E7.47	4.4	.45	7.43	26	32	30" RCP	45'	(0.0004) --	7	1.4	295' - 42" RCP	44,600	Replace existing system
E7.47 to E7.48	3.7	.45	9.1	27	39	30" RCP	250'	(0.0004) 0.0015	7	1.4			Replace existing system
E7.48 to B	.9	.45	9.52	29	40	4' F.B. Channel	340'	(0.0004) --	44	1.5		Adequate	
B to E6.15	8.8	.45	35.52	31	142	5' F.B. Channel	540'	(0.0008) --	65	2.1	540' - 7' F.B. Channel	3,600	
E6.15 to E6.16					142	36"x54" CMP	40'	(0.0043) 0.0025	36	3.2	40' - 4'x8' Box	15,450	Replace existing pipe

(CONTINUED)

TABLE 71

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
PEASHILL (CONTINUED)													
E6.16 to E6.13	4.0	.45	37.32	36	142	5' F.B. Channel	335'	(0.0043) 0.004	43	3.4	335' - 7' F.B. Channel	2,700	
E7.40 to E7.43	27.7	.45	12.47	25	55	30" RCP	140'	(0.0015) -0.0051	20	4.2	140' - 42" RCP	21,950	Parallel system
E7.43 to E7.11	38.6	.45	29.84	26	131	3' F.B. Channel	1020'	(0.0015) 0.0018	24	2.1	10' F.B. Channel	13,000	
E7.11 to E7.10					131	24" RCP	40'	(0.003) 0.003	14	4.5	40' - 4'x8' Box	15,250	Replace existing
E7.10 to E7.9	24.4	.45	40.82	33	159	4' F.B. Channel	535'	(0.0024) 0.0033	39	3.0	13' F.B. Channel	9,000	
E7.9 to E7.49					159	31"x50" CMP	275'	(0.002) 0.0036	25	2.6	1085' - 4'x8' Box	394,550	Replace existing system
E7.49 to E6.18	8.1	.45	44.47	35	169	31"x50" CMP	475'	(0.002) -0.0036	25	2.6			Replace existing system
E6.18 to E6.14	2.2	.45	45.46	38	169	31"x50" CMP	185'	(0.002) 0.0031	25	2.6			Replace existing system
E6.14 to E6.13	12.2	.45	50.95	39	181	31"x50" CMP	150'	(0.002) 0.0031	25	2.6			Replace existing system
E6.13 to E6.12	2.9	.45	89.58	40	314	5' F.B. Channel	290'	(0.0043) 0.005	105	4.7	290' - 18' F.B. Channel	8,650	
F6.12 to E6.11					314	36" RCP	60'	(0.001) 0.0067	32	4.5	60' - Dual 6'x6' Box	61,450	Replace existing pipe
E6.11 to E6.51	.3	.45	89.72	43	314	11' F.B. Channel	100'	(0.001) -0.0167	89	2.3	100' - 18' F.B. Channel	2,550	
E6.47 to E6.51	7.5	.45	3.38	10	20	30" RCP	150'	(0.0033) 0.0033	20	4.2		Adequate	
E6.51 to A	1.8	.45	93.91	44	315	11' F.B. Channel	390'	(0.0010) --	89	23	390' - 18' F.B. Channel	3,250	
E6.44 to E6.43	2.0	.45	.9	5	7	24" RCP	180'	(0.0007) 0.0025	5	1.7		Adequate	
E6.43 to A	4.5	.45	2.93	6	21	9' F.B. Channel	540'	(0.0007) --	40	1.7		Adequate	
A to E6.7	5.0	.45	99.99	47	320	13' F.B. Channel	420'	(0.001) --	148	2.9	420' 19' F.B. Channel	6,500	
E6.7 to E6.3					320	Dual 42" RCP - Dual 27"x43" CMP	80'	(0.001) -0.0021	250	7.8	80' - Dual 36" RCP	23,250	Parallel pipes
												776,650	SUBTOTAL
												155,350	UPSTREAM IMPROVEMENTS
												932,000	TOTAL

Peashill

The Peashill watershed is a predominately residential area of approximately 220 acres which includes the Westchester Subdivision. Existing drainage facilities consist of an open channel which extends westward from the discharge point into Clark Sound to Folly Road, with pipe culverts located at roadway crossings. In addition to the major drainage channel there are two pipe conduit systems which serve portions of the Westchester Subdivision and discharge into the main drainage channel. The majority of the existing drainage facilities are inadequate, providing less than 50 percent of the required capacity. Recommended improvements include additional culverts at Peashill Road, Secessionville Road, Woodview Lane and Westwood Drive and widening the existing channel to a 18 foot flat bottom width. Other improvements include replacing the existing 22"x36" CMP from E6.24 to E7.46 with a 36" RCP, replacing the existing 30" RCP from E7.46 to E7.48 with a 42" RCP, and replacing the existing 31"x50" CMP from E7.9 to E6.13 with a 4'x8' box section. This work will require additional easement acquisition, and will probably require a South Carolina Coastal Council permit to provide a free outfall into Clark Sound.

TABLE 72

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
DILLS BLUFF (E-6, E-7, F-5, F-6, F-7)													
F6.15 to F6.14	5.9	0.35	2.07	11	12	24" RCP	135'	(0.0009) 0.0034	6	1.9	135' - 24" RCP	10,350	Parallel system
F6.14 to F6.13						Lake							
F6.13 to F6.10	49.9	0.35	19.54	33	76	18"x29" CMP	140'	(0.0007) -0.0016	3	1.1	140' - 30" RCP	12,450	Parallel system. Available storage in lake
F6.10 to F6.6	77.2	0.35	46.56	35	177	6.5' F.B. Channel	980'	(0.0007) (0.0016)	54	1.2	15' F.B. Channel	31,700	
F6.6 to F6.3					177	24" RCP & 30" RCP	350'	(0.0005) 0.0025	12	1.6	350' - Triple 48" RCP	177,600	Replace 24" & 30" RCP
F6.3 to F6.1	34.3	0.35	58.57	43	205	42" RCP	70'	(0.0005) 0.0071	19	2.0	70' - Dual 48" RCP & 54" RCP	39,550	Replace 42" RCP
F6.1 to F6.2	21.1	0.35	65.96	44	221	7' F.B. Channel	300'	(0.0002) -0.0031	115	1.5	13' F.B. Channel	20,550	
F6.17 to F6.2	9.7	0.45	4.37	11	25	30" CMP	140'	(0.0003)	4	0.8	140' - 42" RCP	22,000	Parallel system
F6.2 to F6.29	66.5	0.35	93.61	46	304	9.5' F.B. Channel	1920'	(0.0002) 0.0002	137	1.6	13' F.B. Channel	74,550	
F6.29 to F6.28					304	36" RCP	80'	(0.0063) 0.0024	53	7.5	80' - Dual 5'x8' Box	72,000	Parallel system
F6.28 to F6.31	22.6	0.35	101.52	57	304	9.5' F.B. Channel	360'	(0.0002) 0.0061	42	1.1	20' F.B. Channel	24,150	
F6.31 to F6.30					304	48" RCP	60'	(0.0083) 0.0015	55	4.4	60' - Triple 60" RCP	45,400	Parallel system
F6.30 to F6.32	58.6	0.35	122.03	59	336	7' F.B. Channel	2150'	(0.0002) 0.0012	156	1.6	30' F.B. Channel	163,800	Excavation in marsh required
F6.32 to F6.34	102.1	0.35	155.77	71	387	36" CMP & 36" RCP	110'	(0.0045) 0.0004	42	3.5	110' - Triple 5'x8' Box	147,900	Replace 36" CMP & 36 "RCP
												842,000	SUBTOTAL
												168,400	UPSTREAM IMPROVEMENTS
												1,010,400	TOTAL
RIVERLAND SOUTH (E-7, E-8, F-7, F-8)													
E7.1 to E7.3	110.6	0.35	38.71	37	139	30" RCP	135'	-0.0027	24	4.9	135' - Dual 48" RCP	44,350	Parallel system
E7.3 to E8.1	388.1	0.35	174.55	71	419	12' F.B. Channel	5150'	(0.0002) 0.0009	131	1.54	36' F.B. Channel	312,500	
E8.1 to E8.3					419	48" RCP	50'	0.0038	55	4.4	50' - Dual 6'x8' Box	41,550	Parallel system
												398,400	SUBTOTAL
												79,700	UPSTREAM IMPROVEMENTS
												478,100	TOTAL

Dills Bluff

The Dills Bluff watershed drains approximately 448 acres of residential development and lies between Dills Bluff Road on the east and Pauline Drive on the west. Of the 448 acres, approximately 50 percent lies outside the City of Charleston.

The existing drainage facilities consist of a channel and culvert system which commences east of Pauline Drive and outlets under Dills Bluff Road into a tributary of James Island Creek. All of the existing drainage systems are inadequate and require improvement. Recommended improvements include the replacement of the existing outlet structures under Dills Bluff Road (36" RCP and 36" CMP) with three 5'x8' box culverts, widening the existing 7' flat bottom channel between Dills Bluff Road and Camp Road to a twenty (20) foot width, placing three 60" RCP culverts parallel to the 48" RCP culvert under Camp Road and various other improvements to the upstream drainage facilities.

Riverland South

The Riverland South watershed contains approximately 500 acres of farm land which lies between Riverland Road on the west and Folly Road on the east. Existing drainage facilities consist of a channel and culvert system which commences east of Folly Road and outlets to the Stono River. If this area develops to a residential community as anticipated the existing facilities will require improvement as noted on the hydraulic analysis table. Recommended improvements include the placement of dual 6'x8' box culverts under Riverland Drive and a 36' flat bottom channel between Riverland Drive and Folly Road.

TABLE 73

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
TURKEY PEN (E-8, F-8)													
F8.1 to F8.2	50.5	0.35	17.68	35	67	36" RCP	50'	(0.0050)	30	4.2	50' - 42" RCP	8,050	Parallel system
												8,050	SUBTOTAL
												1,650	UPSTREAM IMPROVEMENTS
												9,700	TOTAL
RIVERLAND NORTH (F-7, F-8)													
F8.3 to F8.4	115.1	0.35	40.29	37	147	24" RCP	60'	-0.0117	15	4.8	60' - Dual 48" RCP	20,600	Parallel system
												20,600	SUBTOTAL
												4,150	UPSTREAM IMPROVEMENTS
												24,750	TOTAL
RIVERLAND WEST (F-8, G-8)													
F8.7 to F8.8	55.6 18.5	0.45 0.15	27.80	31	111	36" RCP	60'	(0.0167) -0.0023	40	5.7	60' - 48" RCP	10,600	Parallel system
												10,600	SUBTOTAL
												2,150	UPSTREAM IMPROVEMENTS
												12,750	TOTAL
CAMP ROAD WEST (F-8)													
F8.9 to F8.10	23.9	0.35	8.37	17	42	36" RCP	60'	(0.0083) -0.0023	68	9.6		Adequate	
BRADHAM (G-8, G-9)													
G8.27 to G8.28	78.2	0.45	35.19	51	106	18"x29" CMP	100'	(0.005) 0.0001	16	9.1	100' - Dual 48" RCP	38,900	Parallel system
												38,900	SUBTOTAL
												7,800	UPSTREAM IMPROVEMENTS
												46,700	TOTAL

Turkey Pen

The Turkey Pen watershed is located on the east side of Riverland Drive and north of Turkey Pen Road. The watershed drains 50.5 acres of farmland which can be expected to be developed for residential use in the future. The existing drainage system consists of a 36" RCP across Riverland Drive which outlets into the Stono River. The system is inadequate and a parallel 42" RCP culvert will be required upon development of this area.

Riverland North

The Riverland North watershed drains approximately 115 acres of which approximately 30 percent has been developed for residential use. The remaining 70 percent is farm land which can be expected to be developed for residential use in the future. An existing 24" RCP under Riverland Drive provides the drainage for the area along with a series of ditches which extend up into the watershed. The outlet for the 24 inch culvert is through a series of ditches to the Stono River. The culvert and the existing outfall are inadequate and should be improved by placing two parallel 48" RCP culverts under Riverland Drive with improvements to the outfall channel. The recommended improvements to the outfall channel will require acquisition of additional easements, and a South Carolina Coastal Council permit.

Riverland West

The Riverland West drainage basin is located on the west side of Riverland Drive and north of James Island Creek. The basin drains 74.1 acres of presently undeveloped land, of which, 75 percent is expected to be developed for residential use. The existing 36" RCP culvert under Riverland Drive is inadequate and should be improved by the placement of a 48" RCP culvert parallel to the existing culvert.

Camp Road West

The Camp Road West watershed drains 23.9 acres which is presently undeveloped, but can be expected to be developed for residential use in the future. The existing drainage facility is a 36" RCP culvert under Camp Road with outlets into James Island Creek. The 36 inch culvert is adequate if future development is limited to residential.

Bradham

The Bradham watershed drains 78.2 acres of farm land which can be expected to be developed for residential use in the future. The existing 18"x29" CMP outfall under Riverland Drive into James Island Creek is inadequate and should be improved by the placement of dual 48" RCP culverts parallel to the existing culvert upon development of the area.

TABLE 74

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
FORT JOHNSON (F-5)													
F5.1 to F5.4	1.0 0.9	0.25 0.9	1.06	5	8	24" RCP	290'	(0.0032)	11	3.5		Adequate	
F5.4 to F5.5	1.0 0.6	0.9 0.25	2.11	7	14	24" RCP	130'	(0.0032) 0.0018	11	3.5		Adequate	Available head
F5.5 to F5.8	0.8	0.9	2.83	8	18	30" RCP	485'	(0.0032) 0.0033	20	4.1		Adequate	
F5.8 to F5.9	2.0 2.1	0.9 0.5	5.16	11	30	30" RCP	295'	(0.0032) 0.0035	20	4.1	295'-24" RCP	21,300	Parallel system
F5.13 to F5.12	1.8 1.0	0.9 0.25	1.87	9	12	24" RCP	325'	(0.0048) 0.0038	14	4.3		Adequate	
F5.12 to F5.9	2.5 7.6	0.9 0.25	6.02	11	35	24" RCP	150'	(0.0048) 0.0076	14	4.3		Adequate	
F5.9 to F5.10	1.8	0.9	12.80	13	70	31"x50" CMP	235'	(0.0058) 0.0047	43	4.5	235'-36" RCP	28,700	Parallel system
F5.10 to F5.11	3.5	0.25	13.68	14	73	31"x50" CMP	400'	(0.0058) 0.0018	43	4.5	400'-36" RCP	44,350	Parallel system
												94,350 18,900 113,250	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
HARBOR TOWNE (F-5, F-6, G-5, G-6)													
F5.11 to G6.12	281.4	0.45	140.31	42	484	10' F.B. Channel	2900'	(0.0002) -	57	1.2	34' F.B. Channel	249,850	Total CA includes area from Fort Johnson Watershed
G6.12 to G6.11					484	30" RCP	80'	-	55	11.2	80' - Dual 4½'x10' Box	96,000	Parallel system
												345,850 69,200 415,050	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
WINBORN (G-6)													
G6.13	6.7	0.45	3.02	16	15	18" RCP	60'	(0.044)	19	10.8		Adequate	

Fort Johnson

The Fort Johnson watershed drains 26.6 acres around Fort Johnson High School located on Fort Johnson Road. The existing drainage facilities consist of a series of pipe conduits which outlet into the major channel of the Harbor Towne watershed (see Harbor Towne discussion for recommended channel improvements). Three segments of the existing Fort Johnson drainage facilities require improvement. Recommended improvements include placing a 24" RCP parallel to the existing 30" RCP from F5.8 to F5.9, and placing a 36" RCP parallel to the existing 31"x50" CMP from F5.9 to F5.11.

Harbor Towne

The Harbor Towne watershed drains a total of 281.4 acres of residential and undeveloped land, of which approximately 80 percent lies outside the City of Charleston. The existing drainage facilities consist of a 30" RCP culvert under Dills Bluff Road and a 10' flat bottom channel which runs southeast from this point to Three Trees Road. All of the existing systems are undersized and require improvement. Recommended improvements include a parallel dual 4½'x10' box culvert at Dills Bluff Road and increasing the existing channel to a 50' flat bottom width from Dills Bluff Road to the point where the Fort Johnson watershed discharges into the channel.

Winborn

The Winborn watershed drains 6.7 acres which lies outside the City of Charleston. The existing 18" RCP outfall to James Island Creek is adequate.

TABLE 75

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
HARRILL COURT (F-6)													
F6.20 to F6.21	6.7	0.35	2.35	7	16	30" CMP	460'	(0.0052) 0.0012	17	3.4		Adequate	
HELD CIRCLE NORTH (G-6)													
G6.2 to G6.1	7.1	0.45	3.20	9	20	18"x29" CMP	170'	(0.0118) 0.0064	14	4.4		Adequate	Available head
HELD CIRCLE SOUTH (F-6,G-6)													
G6.7 to G6.5	3.1	0.45	1.40	8	9	18"x29" CMP	240'	(0.0164) 0.0099	16	5.2		Adequate	
G6.5 to G6.4	3.1	0.45	2.80	9	17	18"x29" CMP	160'	(0.0164) 0.0099	16	5.2		Adequate	Available head
RIVER POINT (G-7)													
G7.9 to G7.8	8.0 33.4	1.0 0.35	19.69	19	95	36" CMP	145'	(0.0069) 0.0027	45	6.4		Adequate	Available storage in pond

Harrill Court

The Harrill Court watershed drains 6.7 acres of the Creek Point subdivision. Existing drainage facilities consist of a 30" CMP which outlets to a tributary of James Island Creek and is adequate.

Held Circle North

The Held Circle North watershed also serves a portion of the Creek Point subdivision, draining a total of 7.1 acres. The existing drainage facility is a 18"x29" CMP which discharges into James Island Creek and is adequate.

Held Circle South

The Held Circle South watershed drains 6.2 acres of the Creek Point subdivision and is located along the east and west sides of Held Circle, north of Anderson Avenue. The existing 18"x29" CMP outfall into James Island Creek is adequate.

River Point

The River Point watershed drains 41.4 acres of the River Point subdivision. The major drainage facility of the watershed is a lake which functions as a detention facility prior to discharge into James Island Creek. Upstream drainage facilities are dependent upon the water surface elevation in the lake to operate properly. The existing lake outfall is a 36" CMP which is adequate due to the available storage volume in the lake.

TABLE 76

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
OYSTER POINT (F-6, F-7, G-6, G-7)													
G7.23 to F7.29	2.6	0.6	1.56	3	12	24" RCP	180'	(0.0020) 0.0244	9	2.8	180' - 18" RCP	12,500	Parallel system
G7.21 to G7.22	1.3	0.6	0.78	3	6	24" RCP	190'	(0.0015) 0.0011	8	2.4		Adequate	
G7.22 to F7.29	1.2	0.6	1.50	4	11	24" RCP	150'	(0.0015) 0.0019	8	2.4	150' - 18" RCP	9,200	Parallel system
F7.29 to F7.31	1.3	0.6	3.84	5	28	30" RCP	180'	(0.0115) 0.0009	38	7.8		Adequate	
G7.20 to G7.18	1.2	0.6	0.72	3	5	24" RCP	160'	(0.005) 0.0054	14	4.4		Adequate	
G7.18 to G7.17						Lake							
G7.17 to G7.16	2.5 2.7	0.45 0.6	3.47	4	26	24" RCP	140'	(0.005) -0.0001	14	4.4		Adequate	Available storage in lake
G7.16 to G7.15					26	30" RCP	50'	(0.005) -0.0001	25	5.1		Adequate	
G7.15 to F7.31					26	9' F.B. Channel	120'	(0.005)	107	1.9		Adequate	
F7.31 to F7.32	4.2	0.45	9.20	6	64	9' F.B. Channel	80'	(0.0001)	48	0.9	80' - Dual 36" RCP	23,550	Fill in channel
F7.32 to F7.27					64	24" RCP	200'	(0.0097) 0.0045	19	6.1	200' - 42" RCP	35,200	Parallel system
F7.27 to F7.28	1.6	0.6	10.16	7	67	24" RCP	30'	(0.0097) 0.0045	19	6.1	30' - 42" RCP	4,450	Parallel system
F7.28 to F7.21	9.8 15.0	0.6 0.45	22.79	12	128	5.5' F.B. Channel	670'	(0.0002) 0.0042	27	1.0	12' F.B. Channel	20,900	
F7.21 to F7.22					128	36" RCP	110'	(0.0004) 0.0022	28	4.0	110' - Dual 48" RCP	44,550	Parallel system

(CONTINUED)

TABLE 76

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
OYSTER POINT (CONTINUED)													
F7.14 to F7.13	34.2	0.35	11.97	18	59	54" RCP	100'	(0.0018) -0.0009	100	6.3		Adequate	
F7.13 to F7.16	2.2 4.1	0.9 0.25	14.98	20	71	11' F.B. Channel	260'	(0.0002) -0.0026	134	1.6		Adequate	
F7.16 to F7.18	7.4 17.4	0.6 0.35	25.51	21	120	48" RCP	60'	(0.0043) -0.0030	82	6.5	60' - 42" RCP	14,600	Parallel system
F7.18 to F7.22	3.0	0.6	27.31	22	126	11' F.B. Channel	50'	(0.0002) -0.0028	75	1.3	11' F.B. Channel	1,200	Increase sideslope to 2 horizontal to 1 vertical
F7.22 to F7.24	4.8 7.8	0.6 0.35	55.71	25	245	11' F.B. Channel	460'	(0.0002) -0.0028	75	1.3	20' F.B. Channel	30,250	
F7.23 to F7.24	5.3	0.6	3.18	4	24	24" RCP	475'	(0.0035)	12	3.7	475' - 24" RCP	30,800	Parallel system
F7.24 to F7.6	6.0 14.1	0.6 0.35	67.43	29	280	11' F.B.	580'	(0.0002) 0.0048	75	1.3	24" F.B. Channel	23,800	
F7.6 to F7.1					280	Dual 60" RCP	170'	(0.0049)	316	8.0		Adequate	
F7.11 to F7.10	7.4 66.1 1.5	0.25 0.35 0.6	25.89	16	132	42" RCP	575'	(0.0052)	63	6.5	575' - 48" RCP	98,400	Parallel system
												349,400	SUBTOTAL
												69,900	UPSTREAM IMPROVEMENTS
												419,300	TOTAL

Oyster Point

The Oyster Point watershed drains portions of the Rivers Point and Creek Point subdivisions. Of the total 230 acres drained by the watershed, approximately 30 percent lies in the City of Charleston.

The existing drainage facilities consist of stormwater drainage conduits and culverts within the Rivers Point and Creek Point subdivisions. These systems outlet into a tidal channel and culvert system which then crosses Anderson Avenue into James Island Creek.

The majority of the existing systems within the Rivers Point subdivision are adequate. However, approximately 80 percent of the system between Rivers Point subdivision and Anderson Avenue requires improvements. The majority of improvements consist of widening the existing channel and will require the acquisition of additional easements. The channel improvements will also require excavation within the marsh and will require a South Carolina Coastal Council permit prior to construction.

TABLE 77

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
CASTLE PINCKNEY DRIVE (H-5)													
H5.14 to H5.13	5.2	0.45	2.34	11	14	24" RCP	180'		24	7.6		Adequate	
WHITE POINT (H-5)													
H5.8 to H5.7	9.0	0.35	3.15	14	17	30" RCP	195'	(0.0084)	33	6.6		Adequate	
SUMTER DRIVE (H-5)													
H5.4 to H5.3	5.4	0.45	2.43	12	14	24" RCP	175'	(0.0094)	19	6.0		Adequate	

Castle Pinckney Drive

The Castle Pinckney Drive watershed is located in the East James Island section of the City of Charleston at the intersection of Castle Pinckney Drive and Paul Revere Drive. The existing 24" RCP outlets into a lake prior to discharge into the Ashley River and is adequate.

White Point

The White Point drainage basin drains 9.0 acres of the Lawton Bluff residential section of James Island. The existing 30" RCP culvert under White Point Boulevard discharges to the Ashley River and is adequate.

Sumter Drive

The Sumter Drive drainage basin is located in the Lawton Bluff section of James Island and drains a total of 5.4 acres of residential development. The existing 24" RCP outfall located at the intersection of Sumter Drive and Carmel Drive discharges to the Ashley River and is adequate.

TABLE 78

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
EAST JAMES ISLAND (G-5,G-6, H-5)													
G5.21 to G5.20	50.0	0.35	17.50	17	88	Dual 42" CMP	200'	(0.0012) -0.0029	40	2.0	200' - 42" RCP	31,800	Parallel system
G5.20 to G5.17	3.5	0.60	19.60	18	96	Dual 42" CMP	200'	(0.0012) 0.0067	40	2.0	200' - 48" RCP	35,050	Parallel system
G5.16 to G5.15	2.9 11.7	0.9 0.35	6.71	18	33	24" RCP	200'	(0.0045) -0.0004	13	4.2	200' - 36" RCP	29,800	Parallel system
G5.17 to G5.14	2.3	0.9	28.38	19	136	4' F.B. Channel	230'	(0.0002) 0.0020	13	0.8	260' - Dual 48" RCP	85,800	Fill in existing channel
G5.14 to G5.13					136	30" RCP	90'	(0.0045) 0.0079	18	3.7	90' - 48" RCP	29,250	Parallel system
G5.12 to G5.9	74.9 10.4	0.35 0.90	35.58	38	125	Dual 30" RCP	110'	(0.0045) -0.0004	36	3.7		Adequate	Available storage
G5.7 to G5.5	1.3 25.9	0.9 0.35	10.24	20	49	24" RCP & 30" RCP	120'	(0.0042) 0.0053	29	3.7		Adequate	
G5.9 to G5.1	33.8 128.8	1.0 0.35	153.08	66	398	Lake							
G5.1 to G5.3					398	18" RCP & 36" RCP	90'	(0.0159) 0.0088	67	8.5		Adequate	Available storage in pond
												211,700	SUBTOTAL
												42,350	UPSTREAM IMPROVEMENTS
												254,050	TOTAL

East James Island

The East James Island watershed is located along both sides of Harbor View Road and west of Castle Pinckney Drive. The watershed contains portions of the residential subdivisions of East James Island and Lawton Bluff. The predominant drainage features of this watershed are three large lakes which provide a storage area for runoff from the area prior to discharge into the Charleston Harbor. Due to the presence of the lake system and the amount of detention volume provided by each, the existing drainage facilities within the basin are adequate with the exception of the existing systems along the east and north sides of the Harbor View Shopping Center. Improvements include placing a 42" RCP adjacent to the existing dual 42" CMP from G5.21 to G5.20, a 48" RCP parallel to the existing dual 42" CMP from G5.20 to G5.17, a 36" RCP parallel to the existing 24" CMP from G5.16 to G5.15, dual 48" RCP's parallel to the existing 30" RCP and filling in 230' of channel from G5.17 to G5.13

TABLE 79

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
WAMBAW (G-7, G-8, H-7, H-8)													
H8.14 to H8.15	5.9	0.45	2.66	12	15	24" RCP	120'	(0.0025) -0.0011	10	3.1	120' - 24" RCP	10,700	Parallel system
H8.16 to H8.19	2.3	0.45	1.04	6	7	16"x25" CMP	200'	(0.0025) -0.0008	4	1.7	200' - 18" RCP	12,900	Parallel system
H8.15 to H8.13	14.7	0.45	10.32	18	51	4' F.B. Channel	1000'	(0.0002) 0.0026	37	1.1	5' F.B. Channel	5,600	
H8.13 to H8.13A					51	18" RCP	120'	0.0026	10	5.7	120' - Dual 36" RCP	29,700	Remove 18" RCP
H8.13A to H8.4	28.4	0.45	23.10	24	102	2' F.B. Channel	1100'	(0.0002) 0.0026	10	0.8	280' - Dual 48" RCP & 820' - 12' F.B. Channel	121,100	Fill 280' of channel
H8.10 to H8.7	6.0	0.45	2.70	10	16	24" RCP	340'	(0.0021) 0.0052	9	2.9	340' - 24" RCP	22,200	Parallel system
H8.7 to H8.3	2.7	0.45	3.92	12	22	24" RCP	300'	(0.0021) 0.0052	9	2.9	300' - 30" RCP	26,650	Parallel system
H8.12 to H8.8	12.5	0.45	5.63	8	36	24" RCP	260'	(0.0012) -	7	2.2	260' - 36" RCP	31,450	Parallel system
H8.8 to H8.3	2.8	0.45	6.89	9	43	30" RCP	250'	(0.0012) 0.0052	12	2.5	250' - 36" RCP	37,300	Parallel system
H8.3 to H8.4	3.7	0.45	12.48	13	69	36" RCP	120'	(0.0012) 0.0079	20	2.8	120' - 42" RCP	19,700	Parallel system
H8.4 to H8.2	8.2	0.45	39.27	28	161	11' F.B. Channel	800'	(0.0002) -0.0006	216	1.8	12' F.B. Channel	13,350	
H8.1 to H8.2	20.6	0.45	9.27	18	45	30" RCP	150'	(0.0025) 0.0043	18	3.6	150' - 36" RCP	20,000	Parallel system
G8.29 to G8.30	7.1	0.45	3.20	12	18	24" RCP	100'	0.0018	15	4.8		Adequate	

(CONTINUED)

TABLE 79

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
WAMBAW (CONTINUED)													
H8.2 to G8.1	64.1	0.45	80.59	33	314	11' F.B. Channel	900'	(0.0002) 0.0018	216	1.8	22' F.B. Channel	38,050	
G8.1 to G8.5					314	42" RCP & 36" RCP	220'	0.0013	32	2.0	220' - Dual 4.5'x8' Box	175,000	Replace 42" RCP and 36" RCP
G8.5 to G8.7	3.5	0.45	82.17	34	314	12' F.B. Channel	60'	(0.0002) 0.0060	270	1.8	22' F.B. Channel	1,800	
G8.7 to G8.9					314	Dual 42" RCP	80'	0.0048	80	4.2	80' - Dual 4.5'x8' Box	75,850	Replace dual 42" RCP
G8.9 to G8.11	1.1	0.45	82.67	35	314	12' F.B. Channel	40'	(0.0003) 0.0030	261	2.1	22' F.B. Channel	1,450	
G8.11 to G8.13					314	Dual 42" RCP	60'	(0.0005) 0.0063	39	2.0	110' - Dual 4.5'x8' Box	97,100	Relief system
G8.13 to G8.15	14.0 14.9	0.45 0.6	97.91	36	352	42" RCP & 48" RCP	120'	(0.0005) -0.0007	47	2.2			Relief system
G8.19 to G8.22	9.6	0.45	4.32	14	23	30" RCP & 48" RCP	100'	0.0049	120	6.2		Adequate	
G8.15 to G8.25	10.1	0.45	106.78	40	374	15.5' F.B. Channel	800'	(0.0002) 0.0020	228	1.7	34' F.B. Channel	50,400	
G8.25 to G8.23					374	Dual 48" RCP	100'	-0.0036	105	4.1	100' - Dual 4.5'x8' Box	73,750	Parallel system
												864,050	SUBTOTAL
												172,800	UPSTREAM IMPROVEMENTS
												1,036,850	TOTAL

Wambaw

The Wambaw watershed is located between Folly Road on the east and Fleming Road on the west and drains a total of 232.2 acres including the Marlborough subdivision and a portion of the Cross Creek subdivision. The existing drainage system consist of a channel which runs from Houghton Drive south to the discharge into James Island Creek at Riley Road, plus several pipe systems which tie into the channel. The channel provides approximately 60 percent of the recommended capacity with the culverts at roadways providing significantly less capacity.

Recommended improvements include placing dual 4½'x8' box culverts parallel to the existing dual 48" RCP culverts under Riley Road and increasing the width of the existing channel from G8.25 to G8.15 to a 34 foot flat bottom width. These improvements will require a South Carolina Coastal Council permit since they will involve excavation in the marsh and the acquistion of additional easements. Other improvements to the existing system are described on the hydraulic analysis table for Wambaw.

TABLE 80

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
FOLLY ROAD (G-7, H-7)													
H7.15 to H7.17	7.3	0.45	3.29	8	21	24" RCP	350'	(0.0016) 0.0019	8	2.5	350' - 30" RCP	46,150	Parallel system
H7.17 to H7.19	4.6	0.45	5.36	10	32	24" RCP	750'	(0.0016) 0.0011	8	2.5	750' - 42" RCP	147,000	Parallel system
H7.19 to G7.27	1.3 3.9	0.9 0.45	8.29	15	43	30" RCP	1350'	(0.0016) 0.0015	14	2.9	1350' - 42" RCP	271,200	Parallel system
G7.30 to G7.27	6.8	0.70	4.76	12	27	24" RCP	150'	(0.0072) 0.0055	17	5.3	150' - 24" RCP	75,600	Parallel system
G7.27 to G7.28	7.4	0.70	18.23	24	81	36" RCP	70'	(0.0072) 0.0016	49	6.9	70' - 42" RCP	9,700	Parallel system
												549,650	SUBTOTAL
												109,950	UPSTREAM IMPROVEMENTS
												659,600	TOTAL
MARTELLO (H-7)													
H7.28 to H7.27	17.0	0.35	5.95	19	29	24" RCP	190'	(0.0046) 0.0094	13	4.2	100' - 36" RCP	22,400	Relief system H7.28 to H7.29
H7.27 to H7.29	14.5	0.35	11.03	20	52	36" RCP	220'	(0.0046) 0.0008	39	5.5			Adequate with relief
H7.29 to H7.30	3.5	0.35	12.26	21	58	2' F.B. Channel	410'	(0.0002) 0.0024	13	0.9	6' F.B. Channel	6,150	
H7.30 to H7.31					58	36" RCP	85'	0.0007	37	5.2	85' - 36" RCP	10,400	Parallel system
												38,950	SUBTOTAL
												7,800	UPSTREAM IMPROVEMENTS
												46,750	TOTAL

Folly Road

The Folly Road watershed consist of the area drained by the existing stormwater drainage facilities located along the western edge of Folly Road, and extending from Houghton Road southward toward James Island Creek. The existing system is inadequate and provides only approximately 35 percent of the recommended capacity. A parallel system of 30" RCP and 42" RCP is recommended to provide the design capacity. The outlet into Wappoo Creek should be cleaned and will require a South Carolina Coastal Council permit.

Martello

The Martello watershed drains the area along the east side of Folly Road. Of the 35 acres drained by the watershed, approximately 10 percent is in the City of Charleston.

The existing drainage facilities provide approximately 50 percent of the design capacity. A 36" RCP relief system is proposed for the system at Folly Road and Harbor View Road. The system will be constructed along the back property line of the parcel on the southeast corner of Folly Road and Harbor View Road and will require a drainage easement.

TABLE 81

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
BELVEDERE (H-7, I-7)													
I7.2A to H7.59	55.2	0.25	13.80	37	50	24" VCP	390'	(0.0029)	11	3.4	390' - Dual 36" RCP	86,200	Replace 24" VCP
H7.59 to H7.47	9.1	0.25	16.08	38	58	3' F.B. Channel	90'	(0.0002) 0.0097	49	1.2	6' F.B. Channel	1,200	
H7.47 to H7.48					58	24" RCP	100'	(0.005) 0.0019	14	4.5	100' - Dual 36" RCP	22,800	Replace 24" RCP
												110,200	SUBTOTAL
												22,050	UPSTREAM IMPROVEMENTS
												132,250	TOTAL
COUNTRY CLUB (H-7, I-7)													
H7.52 to H7.51	98.4	0.25	24.60	40	86	30" CMP	130'	0.0216	11	2.2	130' - Dual 36" RCP	30,900	Available storage Replace 30" CMP
H7.51 to H7.49	23.1	0.25	30.38	2	103	5' F.B. Channel	230'	(0.0002) 0.0021	43	1.2	5' F.B. Channel	1,300	Adjust side slope
H7.49 to H7.50					103	24" CMP	150'	0.0006	6	1.9	150' - Triple - 36" RCP	53,500	Available storage. Replace 24" CMP
												85,700	SUBTOTAL
												17,150	UPSTREAM IMPROVEMENTS
												102,850	TOTAL
INVERNESS (H-7)													
H7.38 to H7.37	19.3	0.45	8.69	21	41	24" RCP	80'	(0.0113) 0.0021	12	3.9	80' - 36" RCP	14,550	Remove 24" RCP
H7.32 to H7.37	19.2	0.45	8.64	21	41	24" RCP	210'	(0.0043) 0.0008	13	4.1	210' - 36" RCP	29,400	Parallel system
H7.37 to H7.40			17.33	22	80	24" RCP, Dual 18" RCP	80'	(0.0043) 0.0025	25	4.1	80' - Triple - 36" RCP	29,200	Replace 24" RCP and Dual 18" RCP
H7.34 to H7.40	14.7	0.45	6.62	14	35	24" RCP	200'	(0.0033) -0.0011	11	3.6	200' - Dual 30" RCP	44,200	Replace 24" RCP
H7.40 to H7.41			23.95	23	108	Dual 24" RCP	100'	(0.0033) 0.0006	22	3.6	100' - Triple - 36" RCP	33,450	Replace dual 24" RCP
H7.41 to H7.43	2.7	0.45	25.17	26	108	4' F.B. Channel	940'	(0.0002) 0.0019	7	0.8	9' F.B. Channel	28,800	
H7.43 to H7.44					108	42" RCP	90'	0.0001	55	5.7	90' - 42" RCP	12,300	Parallel system
												191,900	SUBTOTAL
												38,400	UPSTREAM IMPROVEMENTS
												230,300	TOTAL

Belvedere

The Belvedere watershed drains 64 acres including the residential areas around Belvedere Road and a portion of the Country Club of Charleston golf course. Existing drainage facilities consist of a culvert and ditch system which discharges into the marshes of Dill Creek. The existing system provides approximately 22 percent of the design capacity. Recommended improvements consist of replacing the existing system with dual 36" culverts and channel improvements.

Country Club

The Country Club drainage basin serves the major portion of the Country Club of Charleston golf course and the northern section of the Country Club II residential area. Existing drainage facilities consist of a series of culverts and ditches which traverse across the golf course and discharge into Dill Creek. This system provides approximately 30 percent of the design capacity and improvements to the existing culverts and ditches are recommended. Improvements include replacing the existing 24" CMP from H7.49 to H7.50 with triple 36" RCP culverts.

Inverness

The Inverness watershed drains the southern part of the Country Club II Subdivision. Existing drainage facilities consist of a series of culverts and ditches which discharge eastward along the north side of Harbor View Road into Dill Creek. The existing systems provide less than 20 percent of the design capacity.

New stormwater drainage facilities are required to ungrade the existing systems within the area. Recommended improvements include replacing the existing 18" RCP and 24" RCP culverts under Fairway Drive with three (3) 36" RCP culverts, increasing the channel along side Harbor View Road to a 9 foot flat bottom width and placing a 42" RCP culvert parallel to the existing 42" RCP culvert from H7.43 to H7.44. The improvements will require the acquisition of an additional easement and a South Carolina Coastal Council permit.

TABLE 82

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
CROSS CREEK (H-7, H-8)													
H8.28 to H8.27	12	0.45	5.4	17	27	18"x24" CMP	100'	(0.0009) 0.0044	4	1.2	100' - 36" RCP	16,950	Parallel system
H8.27 to H8.25	6	0.45	8.1	18	40	22"x36" CMP	215'	(0.0009) 0.0025	7	1.4	215' - Dual 36" RCP	50,000	Remove existing 22"x36" CMP
H8.25 to H8.24	0.85	0.45	8.5	20	40	27"x43" CMP	110'	(0.0009) -0.0015	11	1.6	110' - Dual 36" RCP	24,550	Remove existing 27"x43" CMP
H8.24 to H8.23	3.8	0.45	10.2	21	48	4.5' F.B. Channel	210'	(0.0009) 0.0026	102	2.5		Adequate	
H8.23 to H8.20					48	18"x29" CMP	135'	(0.0009) 0.0033	10	3.6	135' - 36" RCP	23,300	Parallel system
H8.35 to H8.33	8.6	0.45	3.9	10	23	22"x36" CMP	280'	(0.0017) 0.0025	10	1.9	280' - 30" RCP	28,750	Parallel system
H8.33 to H8.32	3.0	0.45	5.3	12	30	36" RCP	90'	(0.0017) 0.0031	24	3.4	90' - 30" RCP	9,400	Parallel system
H8.32 to H8.30	4.1	0.45	7.1	13	39	27"x43" CMP	170'	(0.0017) 0.0026	16	2.2	170' - 36" RCP	26,250	Parallel system
H8.30 to H8.29	0.95	0.45	7.5	14	39	31"x50" CMP	130'	(0.0017) 0.0012	23	2.4	130' - 36" RCP	14,700	Parallel system
H8.20 to H8.37	4.7	0.45	19.8	24	89	6.5' F.B. Channel	100'	(0.0007)	164	2.6		Adequate	
H8.48 to H8.47	1.4	0.9	1.26	2	10	24" CMP	190'	(0.0015) 0.0027	5	1.6	190' - 24" RCP	14,300	Parallel system
H8.47 to H8.46	1.4	0.9	1.26	2	10	3' F.B. Channel	90'	(0.0015) -0.0042	60	2.7		Adequate	
H8.46 to H8.45	5.5	0.6	4.56	8	29	22"x36" CMP	130'	(0.0015) 0.0035	9	1.8	130' - 36" RCP	18,000	Parallel system
H8.45 to H8.42	1.4	0.6	5.40	9	33	31"x50" CMP	370'	(0.0015) 0.0025	22	2.3	370' - 36" RCP	34,000	Parallel system
H8.42 to H8.41	3.0	0.6	7.20	11	42	3' F.B. Channel	30'	(0.0015) 0.0307	78	3.0	30' - Dual 36" RCP	12,600	Fill in channel
H8.41 to H8.40					42	36" RCP	95'	(0.0015) -0.0043	22	3.2	95' - 36" RCP	14,350	Parallel system
H8.40 to H8.38	2.5	0.6	8.70	12	49	31"x50" CMP	140'	(0.0015) 0.0140	22	2.3	140' - 36" RCP	20,200	Parallel system
H7.13 to H7.10	7.8	0.6	4.68	7	31	31"x50" CMP	165'	(0.0013) 0.0009	20	2.1	165' - 30" RCP	26,650	Parallel system

(CONTINUED)

TABLE 82

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
CROSS CREEK (CONTINUED)													
H7.10 to H7.8	3.9	0.9	8.19	9	51	7' F.B. Channel	165'	(0.0013) 0.0028	244	3.6		Adequate	
H7.8 to H7.4					51	Dual 27"x43" CMP	85'	(0.0013) -0.0079	28	1.9	85' - Dual 48" RCP	30,000	Replace dual system 27"x43" CMP
H7.4 to H8.50	2.7	0.9	10.62	11	62	10' F.B. Channel	320'	(0.0013) 0.0027	305	3.8		Adequate	
H8.50 to H8.54					62	Dual 31"x50" CMP	335'	(0.0013) 0.0020	41	2.1	335' - 36" RCP	52,800	Parallel system
H8.54 to H8.55	3.4	0.6	12.66	13	70	Dual 31"x50" CMP	110'	(0.0013) 0.0034	41	2.1	110' - 42" RCP	14,400	Parallel system
H8.38 to H8.59	39.4 21.5	0.45 0.6	71.7	45	237	Retention Pond	1600'	(0.0005)	630	3.3			Discharge is reduced to 76 CFS due to retention pond
H8.61 to H8.59	2.7	0.9	2.43	3	18	30" RCP	250'	(0.0046) 0.0054	24	4.9		Adequate	
H8.59 to H8.62	2.6	0.9	76.5	47	86	11' F.B. Channel	280'	0.0049	630	3.3		Adequate	
H8.62 to H8.63					86	48" RCP	110'	(0.0007) 0.0007	33	2.6	110' - 36" RCP	165,500	Parallel system
H7.3 to H8.63	9.4	0.9	8.46	12	47	24" RCP	660'	(0.0037) 0.0022	12	3.8	660' - 36" RCP	125,200	Parallel system
H8.63 to H8.69	3.8	0.9	88.4	48	109	48" RCP	510'	0.0048	86	6.9	510' - 36" RCP	95,350	Discharge reduced by available storage parallel system
H8.66 to H8.69	0.4	0.9	0.36	2	3	24" RCP	250'	0.0106	20	6.4		Adequate	
H8.69 to H8.72	6.0 6.1	0.45 0.9	97	51	124	54" RCP	230'	0.0048	118	7.4	230' - 36" RCP	79,900	Outfall ditch needs improvement; parallel system
												748,150	SUBTOTAL
												149,650	UPSTREAM IMPROVEMENTS
												897,800	TOTAL

Cross Creek

The Cross Creek watershed is located on James Island at the intersection of Folly Road and Maybank Highway and drains the Cross Creek and James Island subdivisions. The existing drainage facilities consist of a series of culverts, pipe conduits, and open channels in the Cross Creek subdivision, all of which discharge into a detention pond. The detention pond discharges to Wappoo Creek through a pipe conduit system which parallels Folly Road through the Wappoo Creek business park section. The existing systems provide less than 50 percent of the design capacity.

The existing systems which discharge into the detention pond should be improved by either replacement or parallel systems. The outfall of the detention pond also requires improvement through a parallel 36" RCP from the head of the system at the intersection of Folly Road and Tatum Street to the discharge point in Wappoo Creek. The discharge channel must also be cleaned if the system is to function properly. This will require a South Carolina Coastal Council permit for excavation in the marsh.

TABLE 83

HYDRAULIC ANALYSIS FOR JAMES ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
MUNICIPAL (G-9, H-8, H-9)													
H8.80 to H8.79	15.3	0.35	5.36	12	30	36" RCP	32'	(0.0092) -0.0044	30	4.2		Adequate	
H8.79 to H8.78	0.1	0.35	5.40	12	30	4' F.B. Channel	40'	(0.0092) 0.004	141	6.7		Adequate	
H8.78 to H8.77					30	36" RCP	32'	(0.0024) 0.0013	30	4.2		Adequate	
H8.77 to H9.8	20.1 40.3	0.25 0.35	24.54	27	104	4' F.B. Channel	390'	(0.0024) 0.0037	97	3.7	5' F.B. Channel	2,700	
H9.8 to H9.6					104	36" RCP & 42" RCP	50'	(0.0009) 0.006	72	4.2	42" RCP	6,550	Parallel system
H9.6 to H9.4	17.7	0.25	28.97	30	119	8' F.B. Channel	355'	(0.0009) 0.0002	103	2.6	9' F.B. Channel	2,550	
H9.4 to H9.2					119	36" RCP & 42" RCP	200'	(0.0005) 0.0011	72	4.2	48" RCP	30,000	Parallel system
H9.2 to H9.18	4.9	0.25	30.20	31	121	10' F.B. Channel	50'	(0.0005) 0.0007	98	2.0	11' F.B. Channel	7,200	
H9.18					121	26' W. Bridge	26'	(0.0005) 0.0007	216	2.2		Adequate	
H9.18 to H9.19	46.6	0.35	46.51	40	165	10' F.B. Channel	1390'	(0.0005) 0.0007	105	2.0	15' F.B. Channel	51,150	
H9.19					165	16.5' W. Bridge	30'	(0.0005) 0.0007	167	2.3		Adequate	
H9.19 to H9.20	4.5	0.35	48.09	41	168	12' F.B. Channel	140'	(0.0005) 0.0007	133	2.1	15' F.B. Channel	1,300	
H9.20					168	16.5' W. Bridge	35'	(0.0005) 0.0007	167	2.3		Adequate	
												101,450	SUBTOTAL
												20,300	UPSTREAM IMPROVEMENTS
												121,750	TOTAL
PAGELAND (H-8, H-9)													
H9.18 to H9.16	31.1	0.35	10.89	40	39	24" RCP	740'	(0.0015) --	8	2.4	740' - 42" RCP	112,000	Replace existing 24" RCP
H9.16 to H9.17	5.3	0.35	12.75	44	43	24" RCP	230'	(0.0015) 0.0026	8	2.4	230' - 42" RCP	38,050	Replace existing 24" RCP
H9.17 to H9.15	1.5 52.6	0.25 0.35	31.54	45	104	30" RCP	730'	(0.0015) 0.0026	14	2.8	730' - 54" RCP	163,400	Parallel system
H9.15 to H9.14	1.4	0.9	32.80	49	104	30" RCP	200'	(0.0015) 0.0086	14	2.8	200' - 54" RCP	48,750	Parallel system
H9.14 to H9.13	0.3	0.9	33.07	50	104	30" RCP	180'	(0.0015) 0.005	14	2.5	180' - 54" RCP	44,550	Parallel system
H9.13 to H9.10	0.6	0.9	33.61	51	104	36" RCP	260'	(0.0015) -0.0013	22	3.2	260' - 54" RCP	61,350	Parallel system
H9.10 to H9.12	0.2	0.9	33.79	52	104	36" RCP	170'	(0.0015)	22	3.2	170' - 54" RCP	57,650	Parallel system
												525,750	SUBTOTAL
												105,150	UPSTREAM IMPROVEMENTS
												630,900	TOTAL

Municipal

The Municipal watershed drains the area surrounding a portion of the Municipal Golf Course. The watershed is bounded by Woodland Shores Road on the east, Maybank Highway on the north and Riverland Drive on the west. Of the 149.5 acres drained by the watershed approximately 75 percent lies outside the City boundaries. Those areas which are within the City consist mainly of the Municipal Golf Course.

The existing drainage facilities consist of an open channel with pipe culverts and bridges at roadway crossings, and extends eastward from the discharge point into the Stono River at Canal Street to Pawpaw Drive. The existing bridges located along Canal Street and the bridge on Riverland Drive are adequate. The remainder of the system is inadequate and requires improvement. Recommended improvements consist of widening the existing channel to a 15 foot flat bottom width from the discharge point to Riverland Drive. Also required are improvements to the existing system upstream of Riverland Drive. The improvements recommended for the system upstream of the Riverland Drive bridge will provide the most benefit for those areas outside the City of Charleston.

Pageland

The Pageland watershed drains the area north of Maybank Highway and is bounded by Plymouth Avenue on the east, Medway Road on the north, and Riverland Drive on the west. The 93 acre watershed consist of medium density residential development. Approximately 90 percent of the area lies outside the present City boundaries.

The existing drainage facilities consist of a pipe conduit system which runs along the north side of Maybank Highway and extends westward from Plymouth Avenue to the discharge point into the Stono River located approximately 350 feet west of Riverland Drive. The existing system is inadequate and a parallel system of 54" RCP from Manhole Number H9.17 to H9.12 is recommended to provide the design capacity. Also recommended is the replacement of the existing 24" RCP from H9.18 to H9.17 with a 42" RCP.

SECTION D

JOHNS ISLAND AREA

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JOHNS ISLAND AREA WATERSHEDS

WATERSHED	PAGE
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EXPLANATION OF HYDRAULIC DATA TABLES

The Hydraulic Data Tables contain information, by watershed areas, for each of the drainage facilities within the respective area. The data listed in each column is as follows:

Column 1: Location of the system to be analyzed, listing upstream manhole number and downstream manhole number.

Column 2: Drainage Area to system to be analyzed in acres.

Column 3: Runoff coefficient for the area listed in Column 2. (See Table 1)

Column 4: Total CA is the sum of Column 2 times Column 3 plus CA for areas upstream of the point of analysis.

Column 5: Travel time is the time required for runoff to reach the point of analysis from the most remote point within in the watershed.

Column 6: Discharge (Q) equals CIA where CA is the total found in Column 4 times the rainfall intensity (I) in inches per hour from Figure No. 3 using the travel time in Column 5.

Column 7: Existing system description.

Column 8: Length of existing system.

Column 9: Slope of existing system. Both the physical slope (actual slope of system) and the hydraulic slope (water surface profile) are listed for each system. The hydraulic slope is placed in parenthesis and is used to compute the capacity of the existing system.

Column 10: Capacity of existing system in cubic feet per second computed from Manning's equation.

Column 11: Velocity of existing system in feet per second. Discharge divided by flow area.

Column 12 & 13: Recommended Improvements. List improvements required (Column 12) and associated cost (Column 13).

Column 14: Comments

The Johns Island portion of the study area is predominately undeveloped with some single family residences located within the City boundaries. The area is drained by three drainage basins; two which outlet to the Stono River and one which outlets to Church Creek and provide service to both City and County residents. Any major efforts to improve drainage facilities on Johns Island should be approached jointly between the City of Charleston and Charleston County.

The existing drainage facilities consist of open channels with culverts at roadway and driveway crossings. The major portion of the channels and culverts are inadequate and require improvement for protection of flooding at design limits prior to development of the area. A discussion of the drainage facilities within each watershed along with recommended improvements and associated costs is contained in the following paragraphs.

TABLE 84

HYDRAULIC ANALYSIS FOR JOHNS ISLAND AREA

LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
MAYBANK (A-3, A-4)													
A to A4.1	239.9 240.0	0.25 0.35	143.98	58	403	4' F.B. Channel	800'	(0.001)	99	2.7	3800' - 24' F.B. Channel	219,600	
A14.1					403	14' W. Bridge			423	9.2		Adequate	
												219,600	SUBTOTAL
												43,950	UPSTREAM IMPROVEMENTS
												263,550	TOTAL
MURRAY WOOD (A-4)													
A4.8 to A4.7	104.2	0.35	36.47	31	146	30" RCP	60'	(0.0083) 0.0065	20	4.1	Dual 48" RCP	20,050	Parallel culverts
A4.7 to A4.6	97.1 90.0	0.25 0.35	92.25	58	258	3' F.B. Channel	4000'	(0.001) 0.001	33	2.0	14' F.B. Channel	226,800	
A4.6 to A4.5					258	24" RCP	60'	(0.0083) -0.0022	12	3.8	Dual 4'x6' Box	58,600	Replace existing culvert
												305,450	SUBTOTAL
												61,100	UPSTREAM IMPROVEMENTS
												366,550	TOTAL
FENWICK (A-1, A-2, A-4)													
A1.4 to A1.3	320.1	0.35	112.04	49	353	18" CMP	50'	(0.0052) 0.0052	5	2.8	Dual 4'x9' Box	52,100	Replace existing pipe
A1.3 to A1.2	139.7	0.35	160.94	57	451	4' F.B. Channel	1100'	(0.0018) 0.0018	77	3.0	26' F.B. Channel	126,000	
A1.2 to A1.1					451	36" RCP	50'	0.0074	30	4.2	Dual 4.5'x8' Box	63,000	Parallel system
A1.1 to A2.2	479.3	0.35	328.70	103	592	5' F.B. Channel	6500'	(0.0016)	114	3.2	28' F.B. Channel	596,200	
A2.2					592	45' W. Bridge	27'	(0.0016)	1110	10.3		Adequate	
A2.2 to A2.1	93.9	0.35	361.57	114	592	10' F.B. Channel	1550'	(0.0016)	187	3.5	28' F.B. Channel	179,300	
A2.1					592	45' W. Bridge	28'	(0.0016)	1240	11.1		Adequate	
												1,016,600	SUBTOTAL
												203,350	UPSTREAM IMPROVEMENTS
												1,219,950	TOTAL

Maybank

The Maybank watershed is located in the Johns Island area and is bounded on the east by River Road and on the south by Maybank Highway. The 480 acre watershed is presently undeveloped with the exception of several single family residences along River Road. Future development is expected to consist of low to medium density residential within this area.

The existing drainage facilities consist of a 14 foot wide bridge on River Road and a channel extending from this point to the upper reaches of the watershed. The channel is undersized and has a very heavy growth of vegetation which restricts the capacity. Prior to development of this area the existing channel should be improved to a 24 foot flat bottom width.

Murray Wood

The Murray Wood watershed is located north of the Maybank watershed and drains a total of 291 acres. The watershed is presently undeveloped and approximately 80 percent lies outside the City of Charleston boundaries. Those areas which are within the City boundaries are expected to be developed for low to medium density residential use. Prior to development the existing drainage facilities should be improved. Recommended improvements consist of replacing the existing 24" RCP culvert under River Road with a dual 4'x6' box culvert, widening the channel between River Road and Murray Wood Road to a 14 foot flat bottom width, and placing dual 48" RCP culverts parallel to the existing 30" RCP culvert under Murray Wood Road.

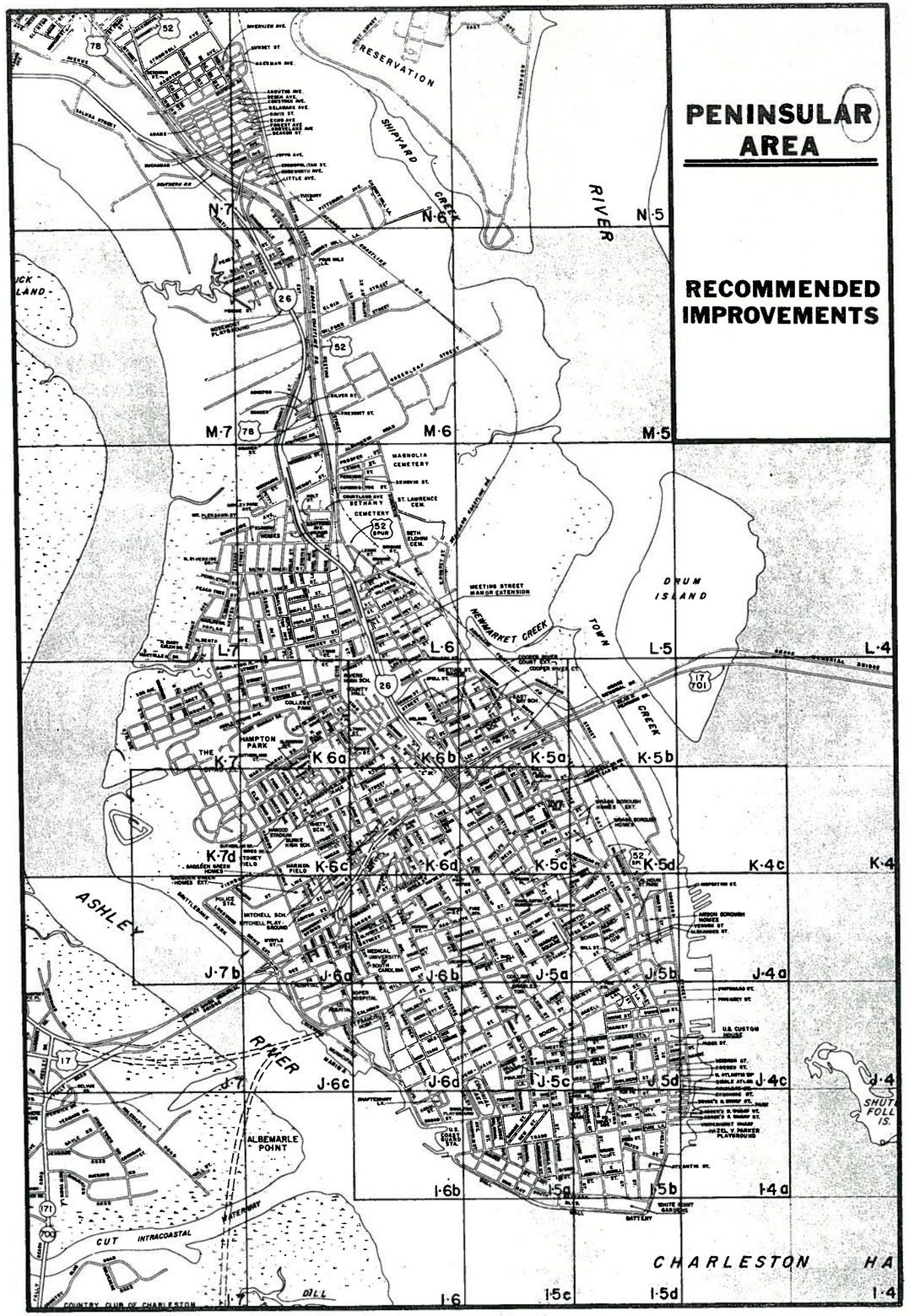
Fenwick

The Fenwick watershed is located in the Johns Island area and drains a total of 1,033 acres, of which approximately 75 percent lies outside the City boundaries. Those areas within the city boundaries are presently undeveloped. Development of the area is expected to consist of low to medium density residential.

Existing drainage facilities consist of a channel which runs eastward from Main Road to Castlewick Avenue with bridges at the Main Road and Brownswood Road crossings, and culverts at the Castlewick Avenue crossing. The culvert at the Castlewick Avenue crossing and the existing channel are inadequate and will require improvement prior to development. Recommended improvements consist of dual 4.5'x8' box culverts at Castlewick Avenue and a 28 foot flat bottom channel from Castlewick Avenue to the discharge point into Church Creek.

PENINSULAR AREA

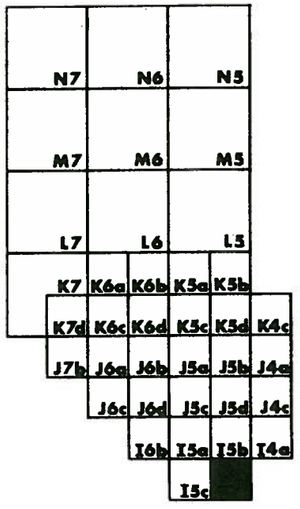
RECOMMENDED IMPROVEMENTS



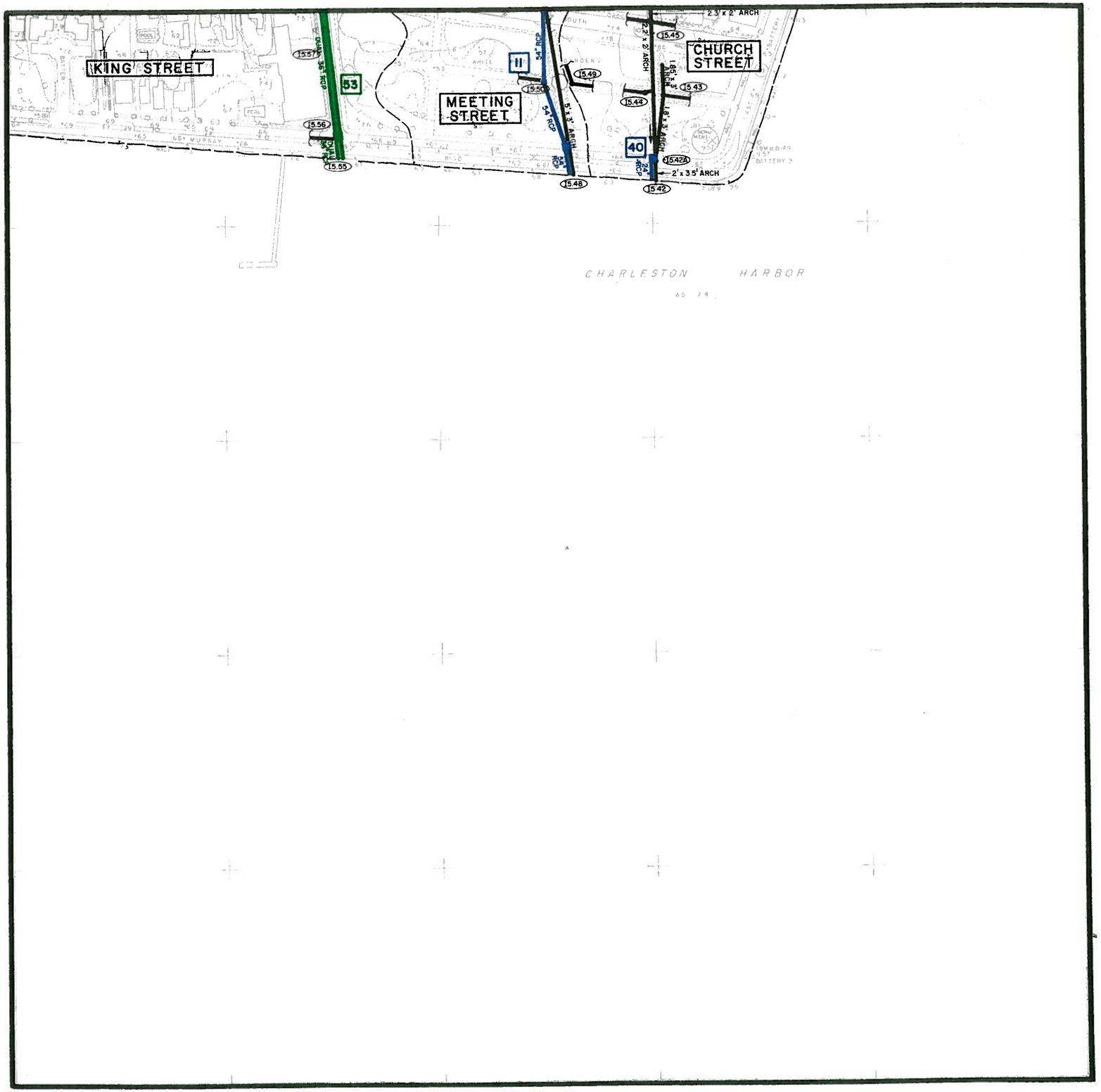
DRAINAGE SYSTEMS — MAP I5d

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N



PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

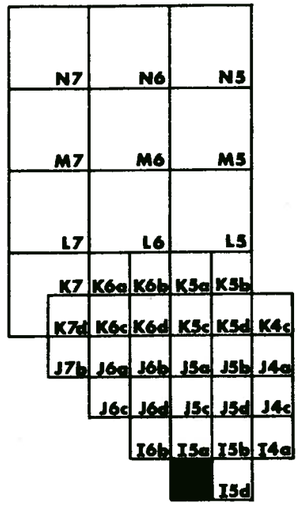
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE: 250 0 250 500 750 FEET

DRAINAGE SYSTEMS | MAP I5c

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

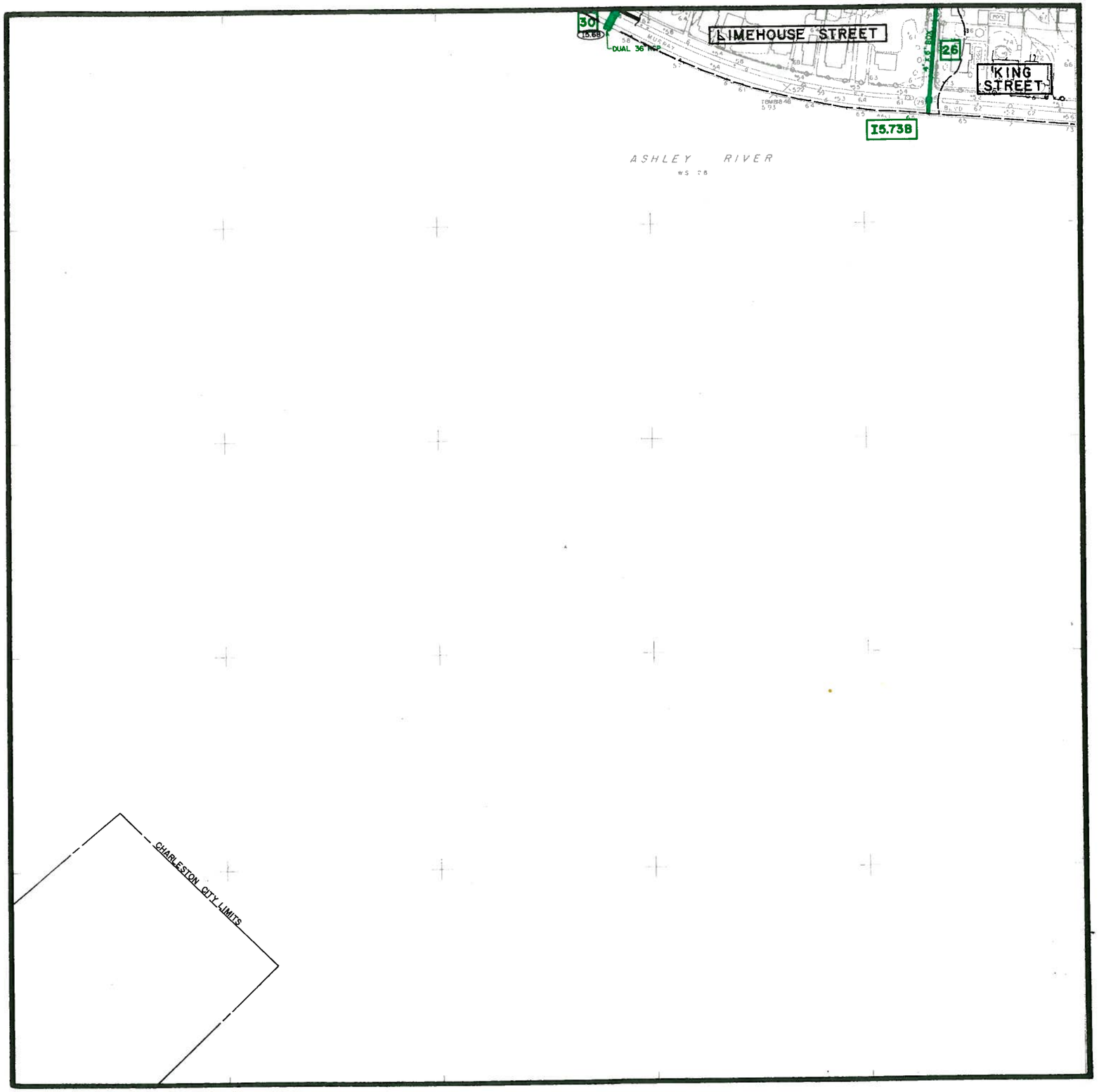
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

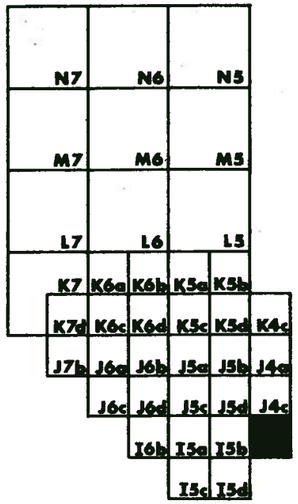
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DRAINAGE SYSTEMS — MAP I4a

recommended improvements
CITY OF CHARLESTON

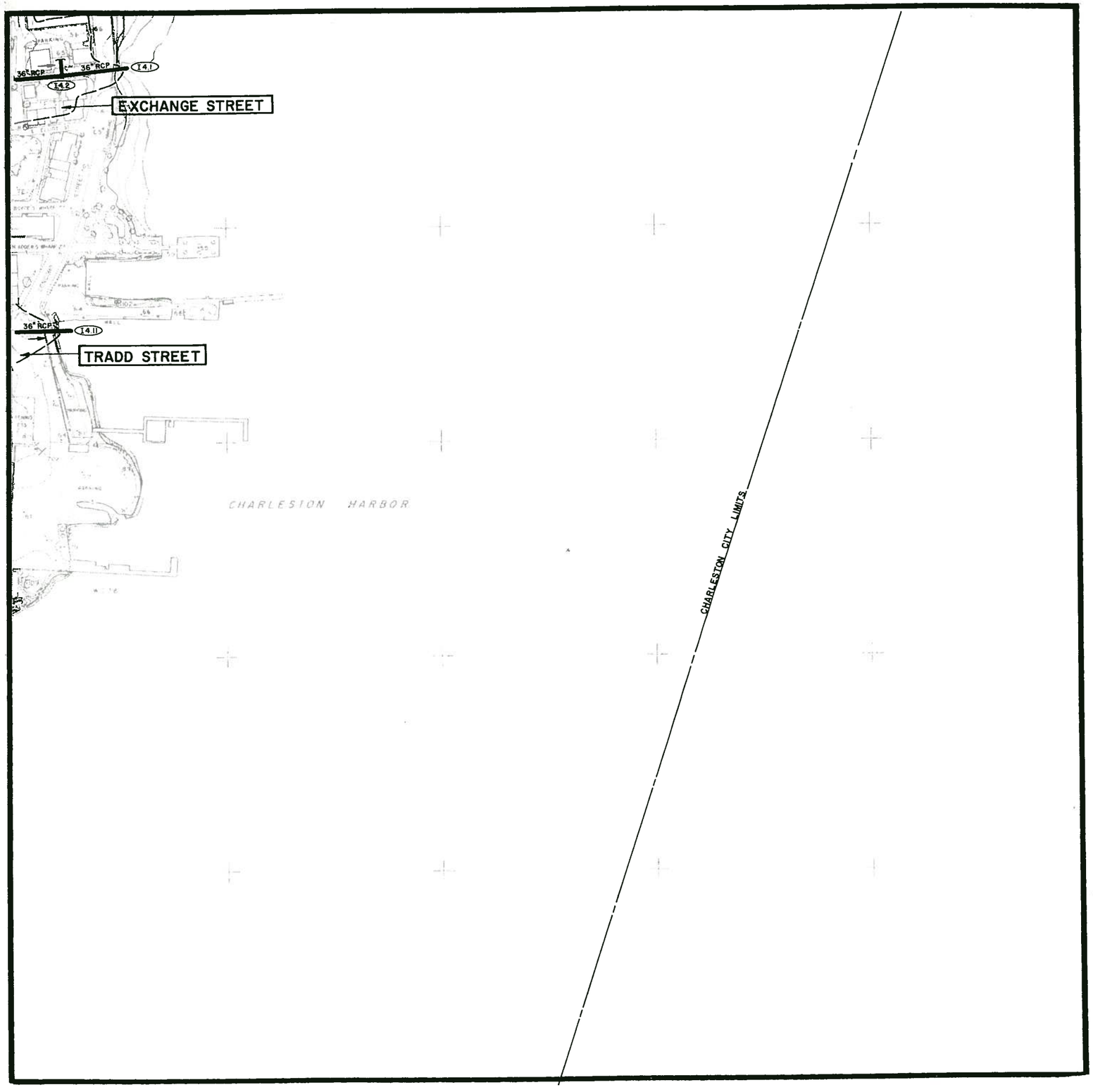
PENINSULAR AREA



N

PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY



LEGEND

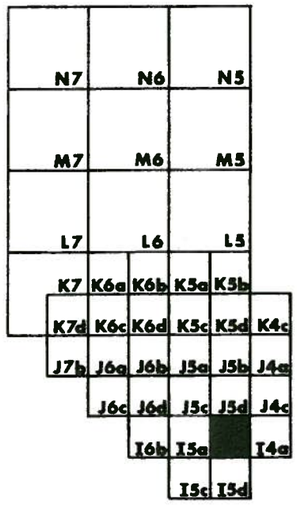
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- RETENTION POND
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

DRAINAGE SYSTEMS | MAP I5b

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

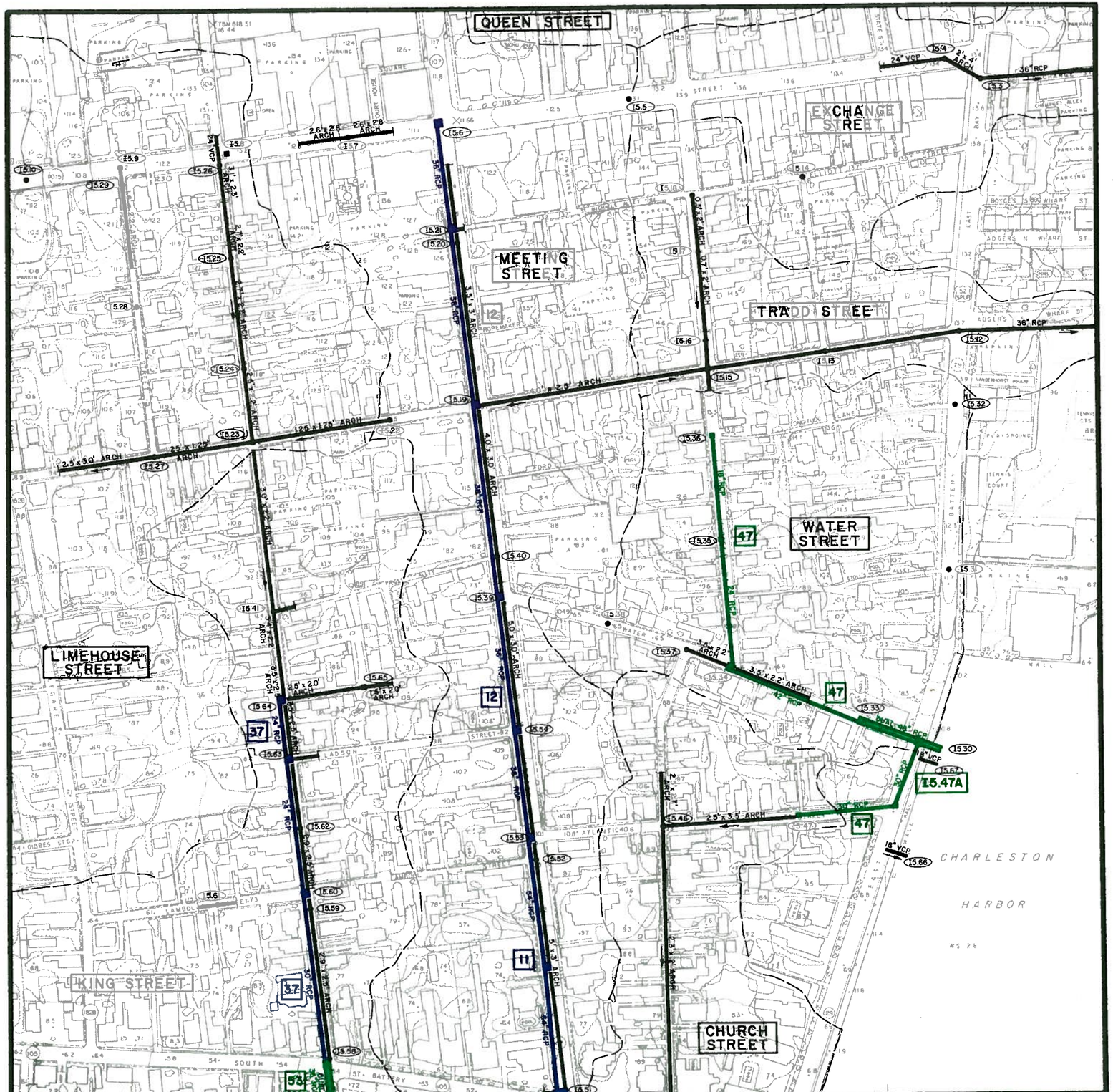
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

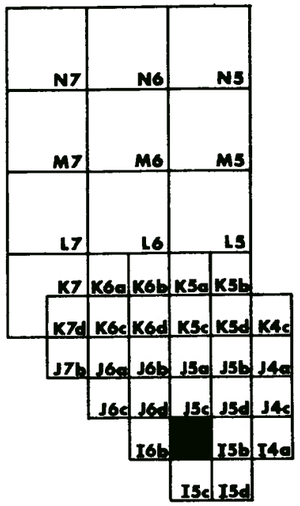
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DRAINAGE SYSTEMS — MAP I5a

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

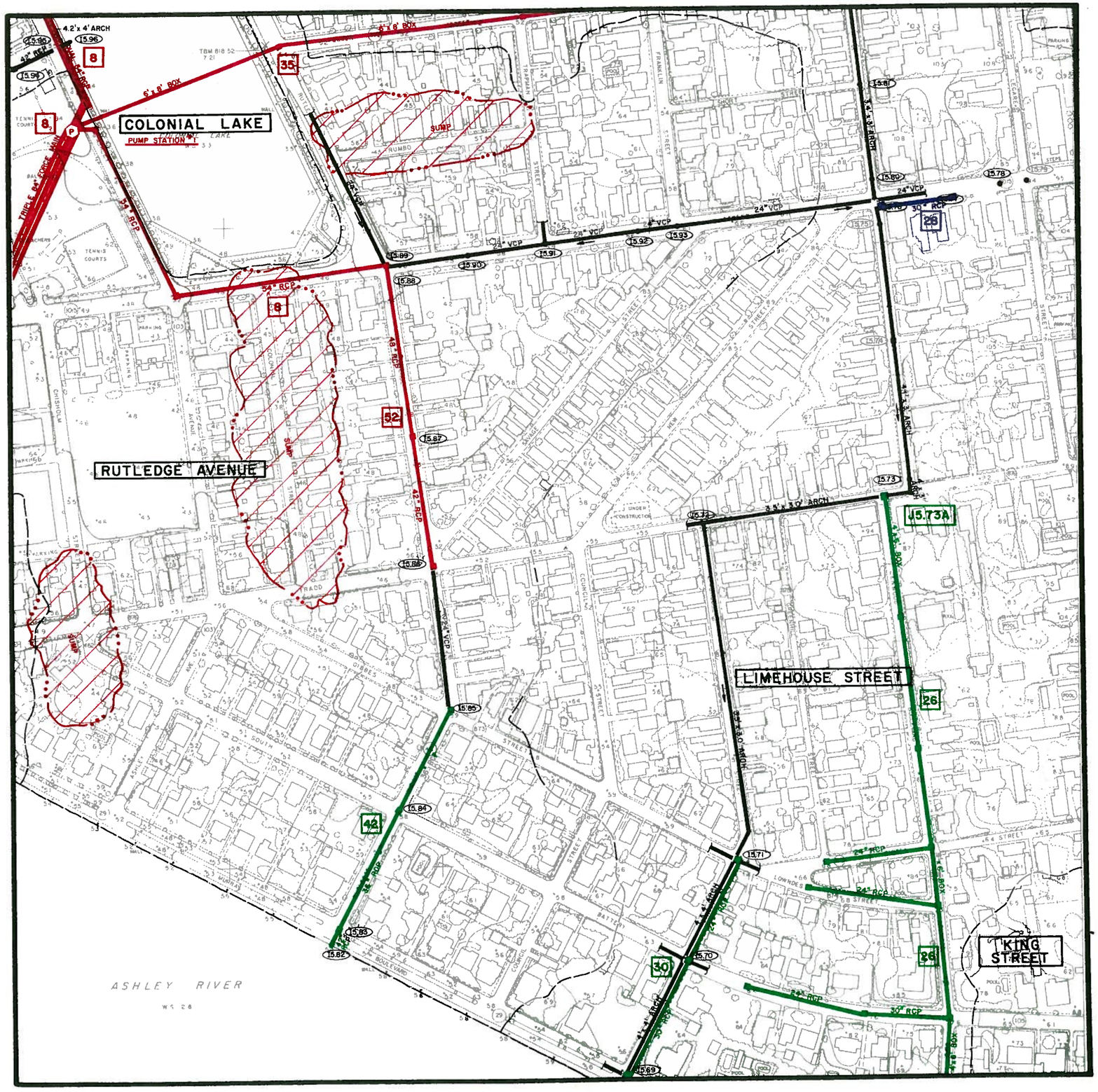
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

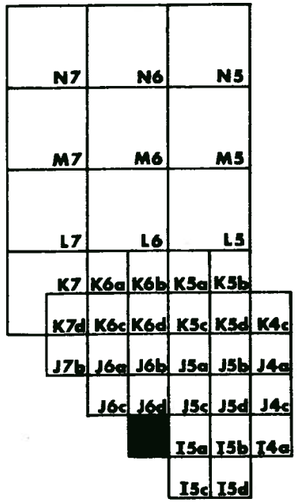
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DRAINAGE SYSTEMS — MAP I6b

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

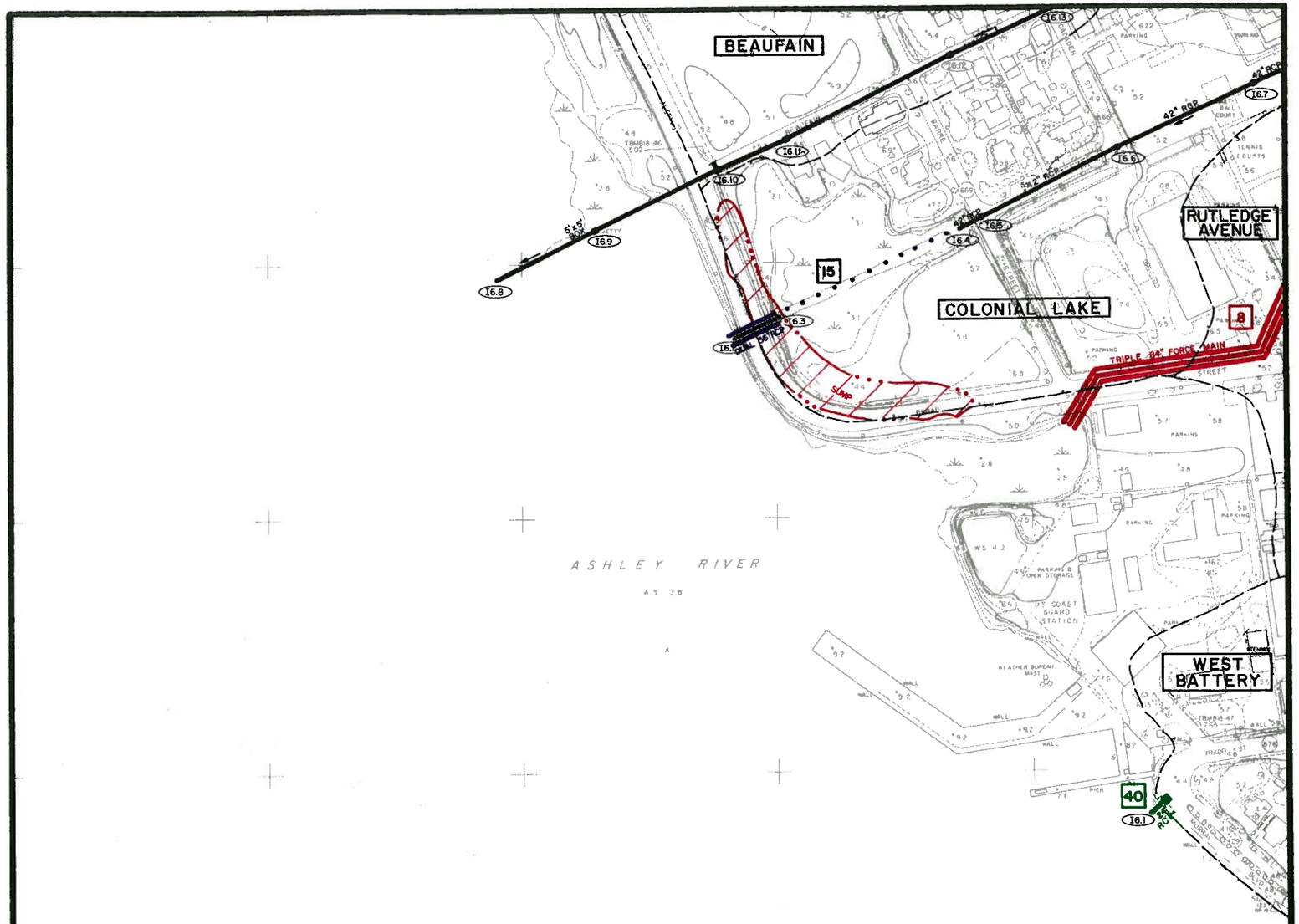
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

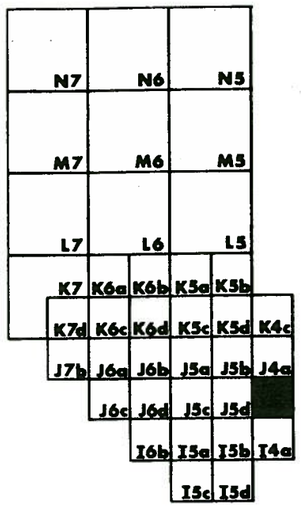


DRAINAGE SYSTEMS

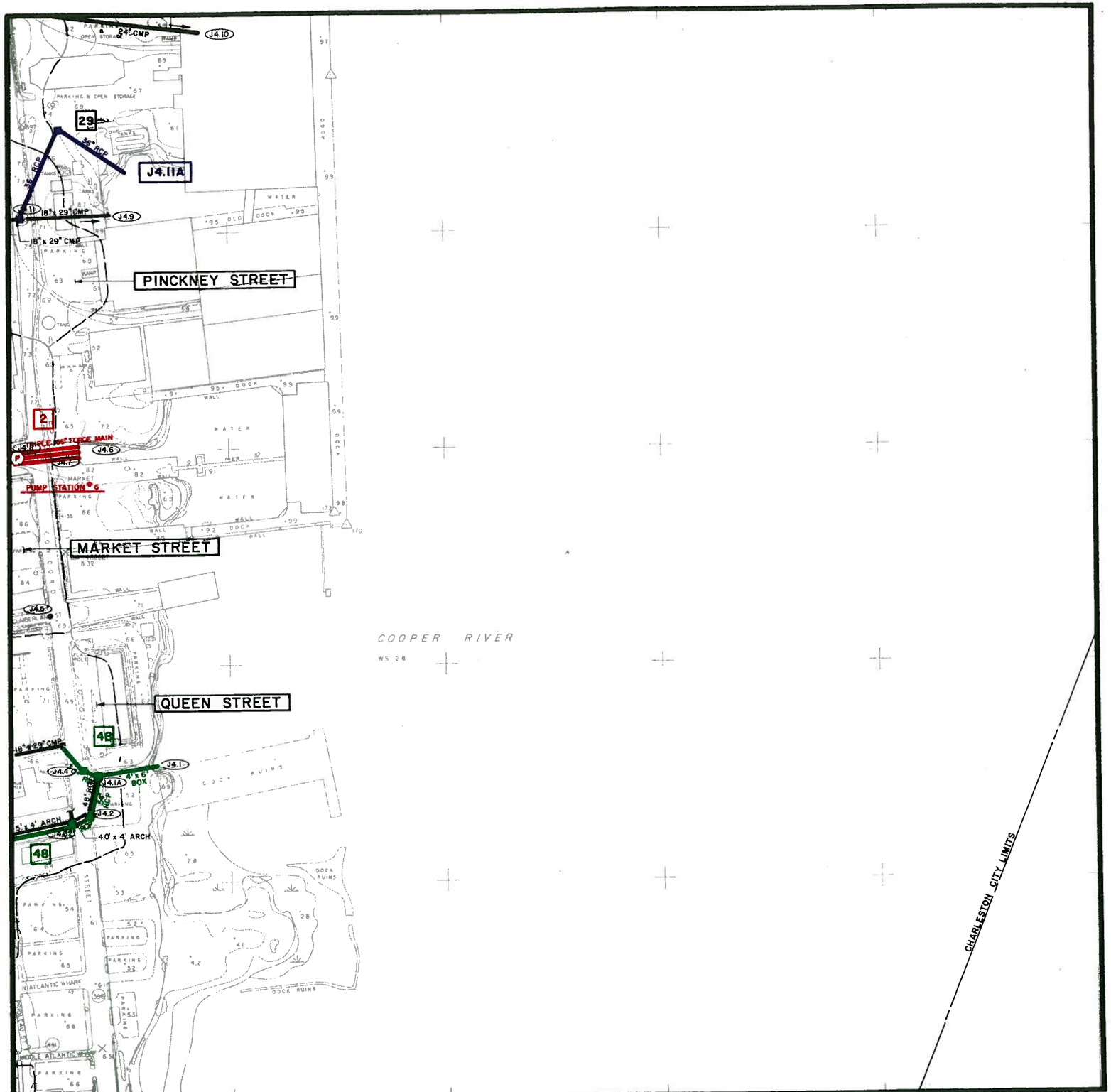
MAP J4c

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N



PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

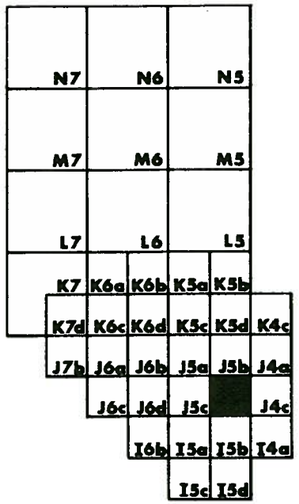
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DRAINAGE SYSTEMS

MAP J5d

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

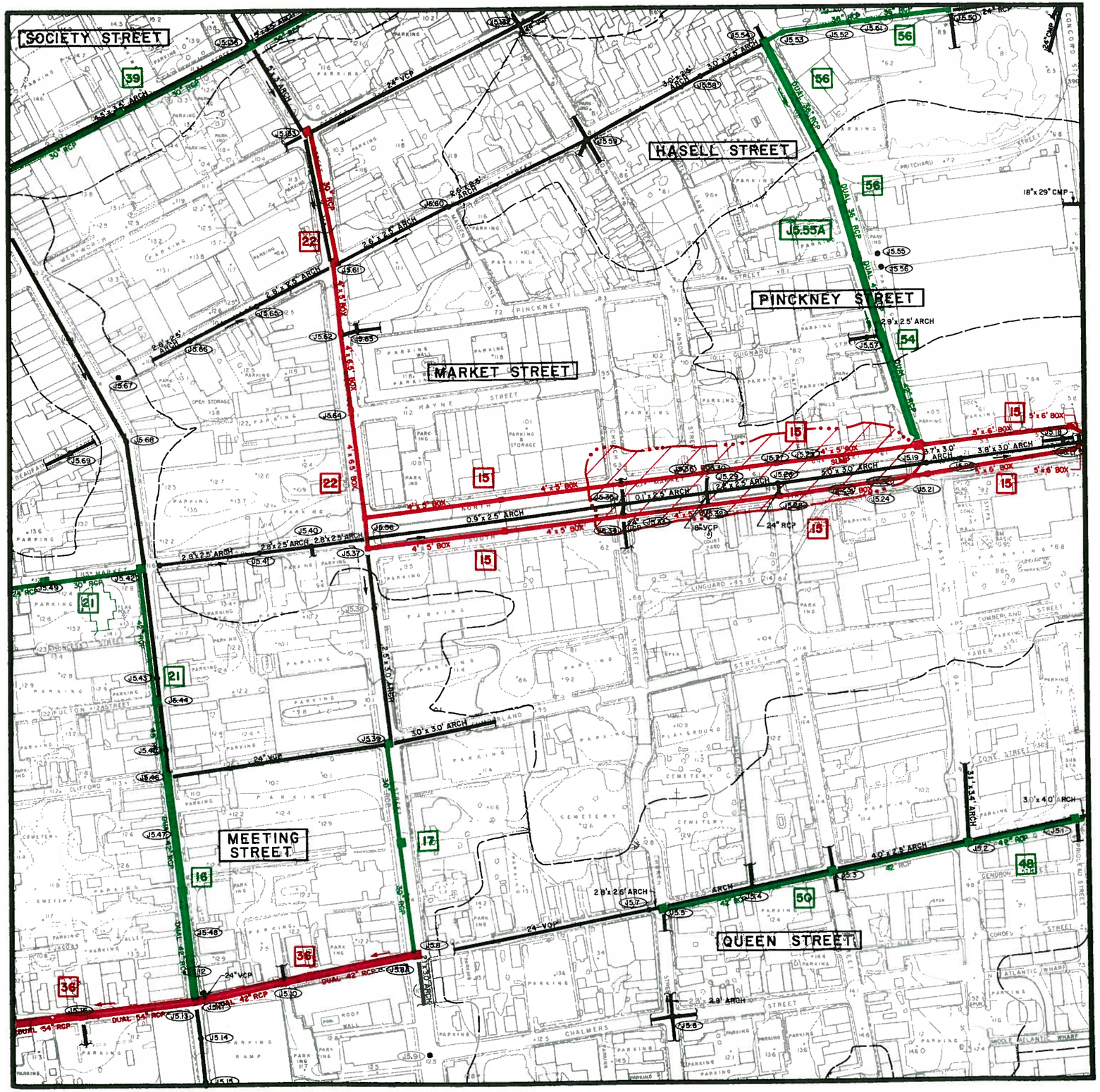
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
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- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

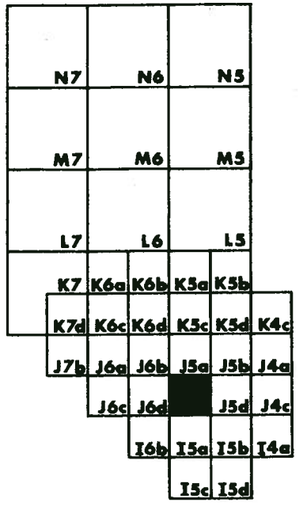
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DRAINAGE SYSTEMS — MAP J5c

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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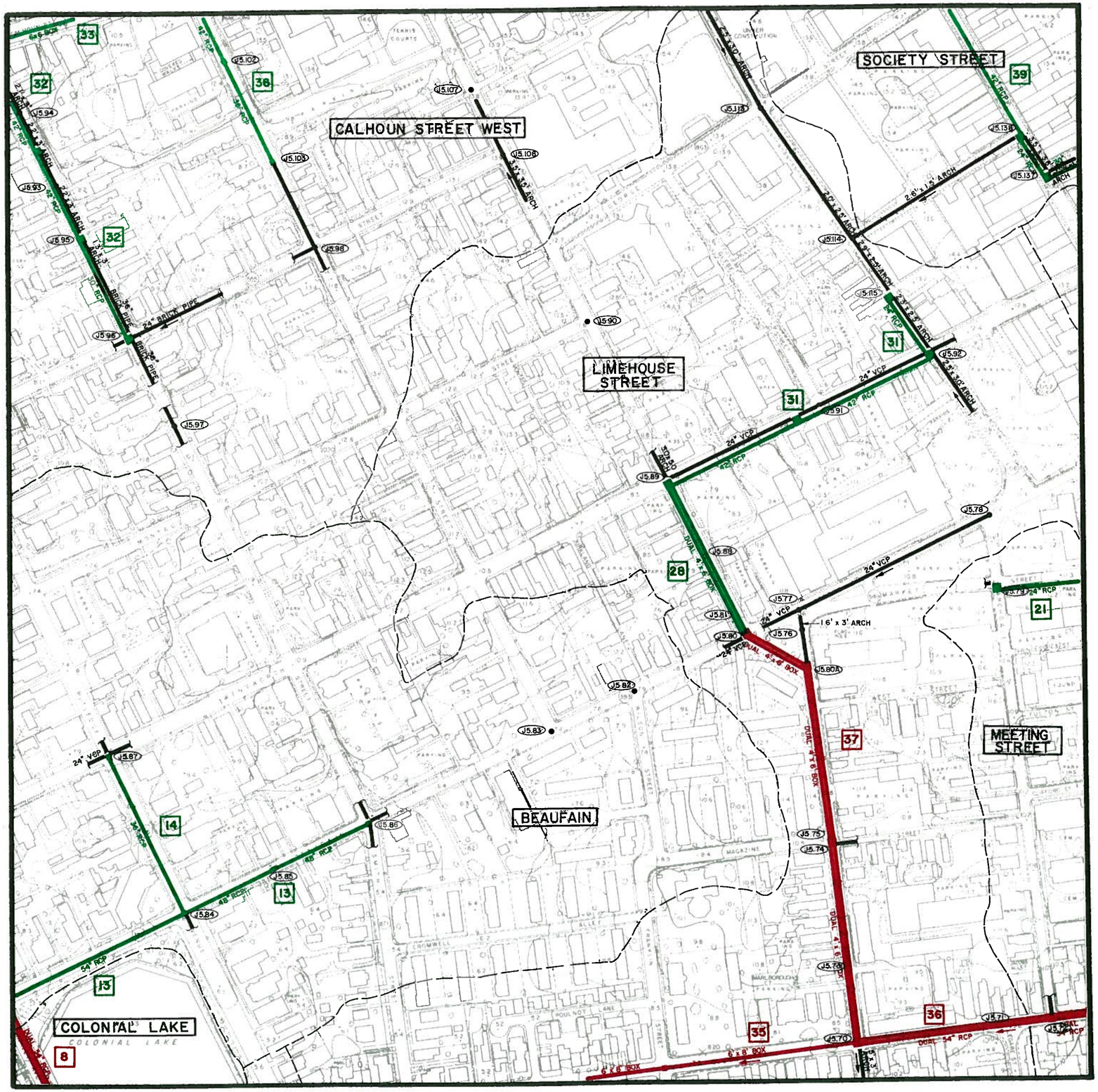
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
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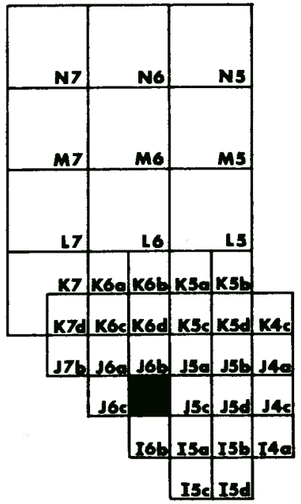
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DRAINAGE SYSTEMS — MAP J6d

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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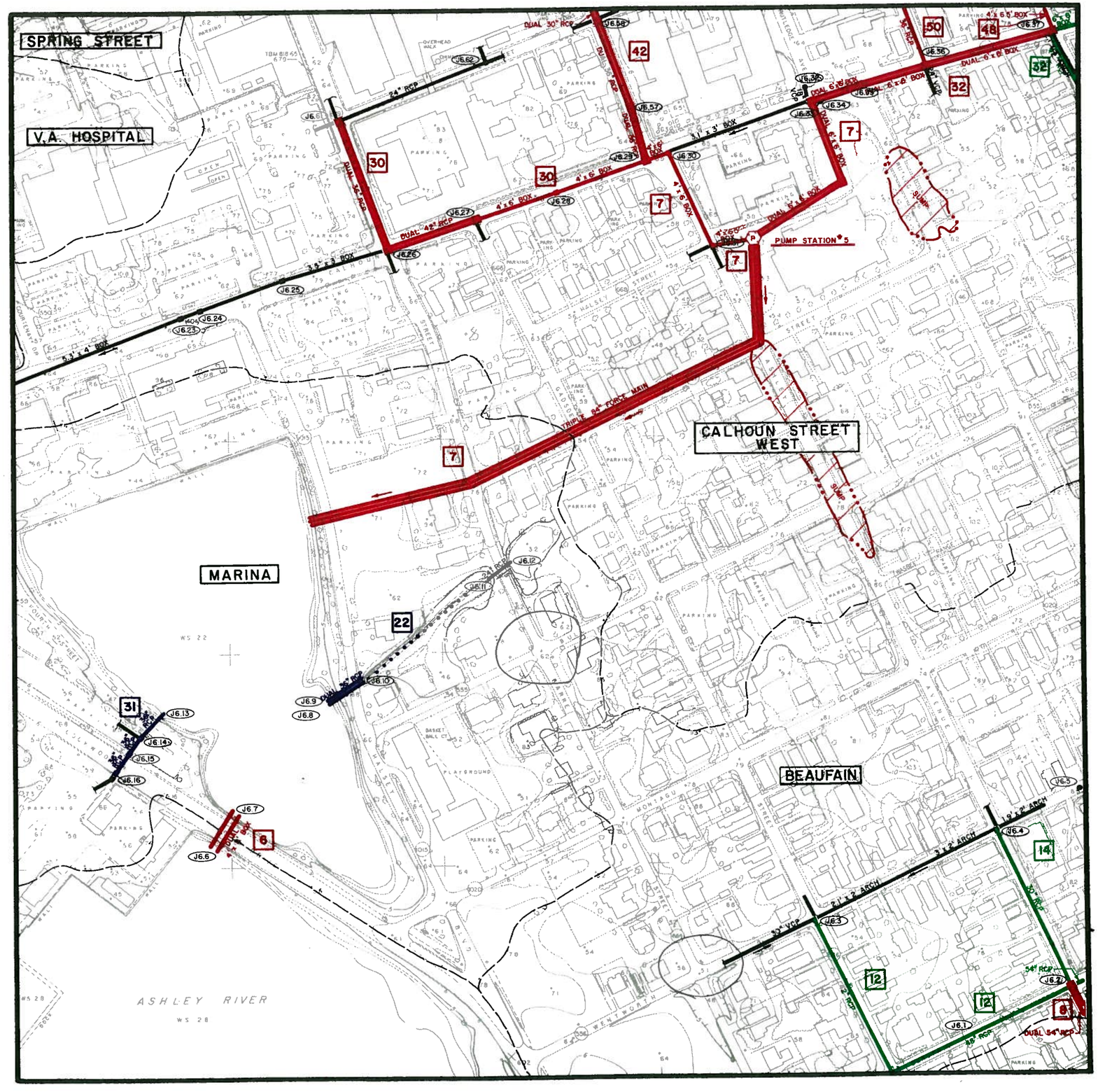
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
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- WATERSHED BOUNDARY
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- DETENTION BASIN
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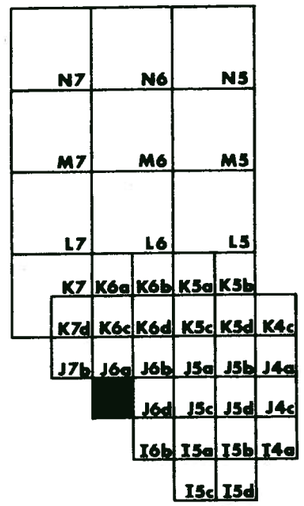
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DRAINAGE SYSTEMS — MAP J6c

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

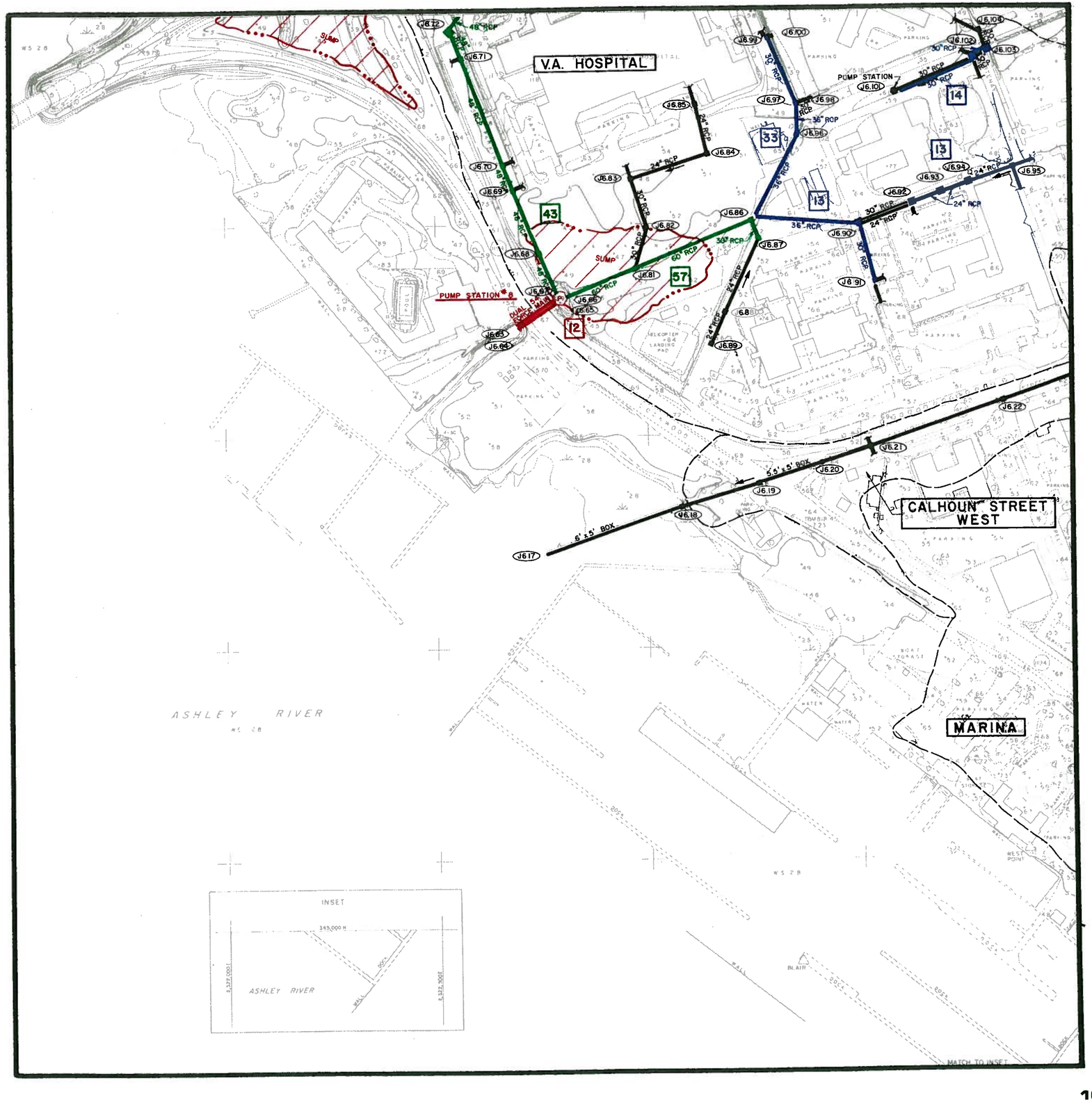
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

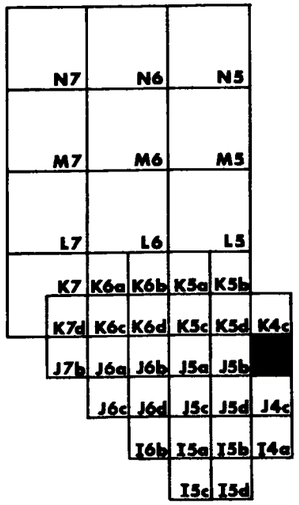
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DRAINAGE SYSTEMS — MAP J4a

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

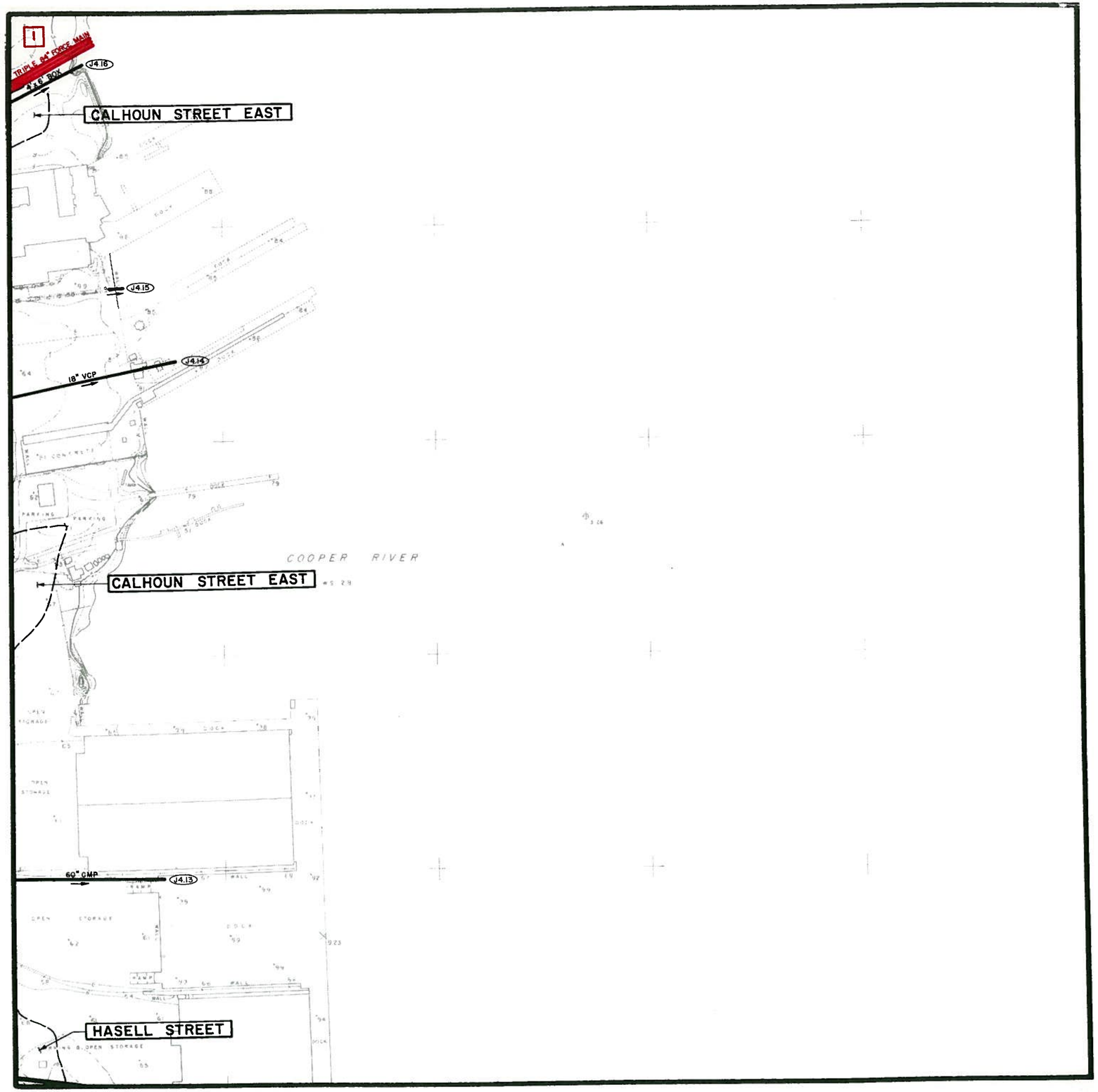
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

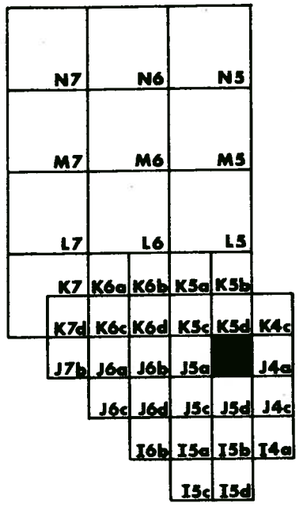
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DRAINAGE SYSTEMS — MAP J5b

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

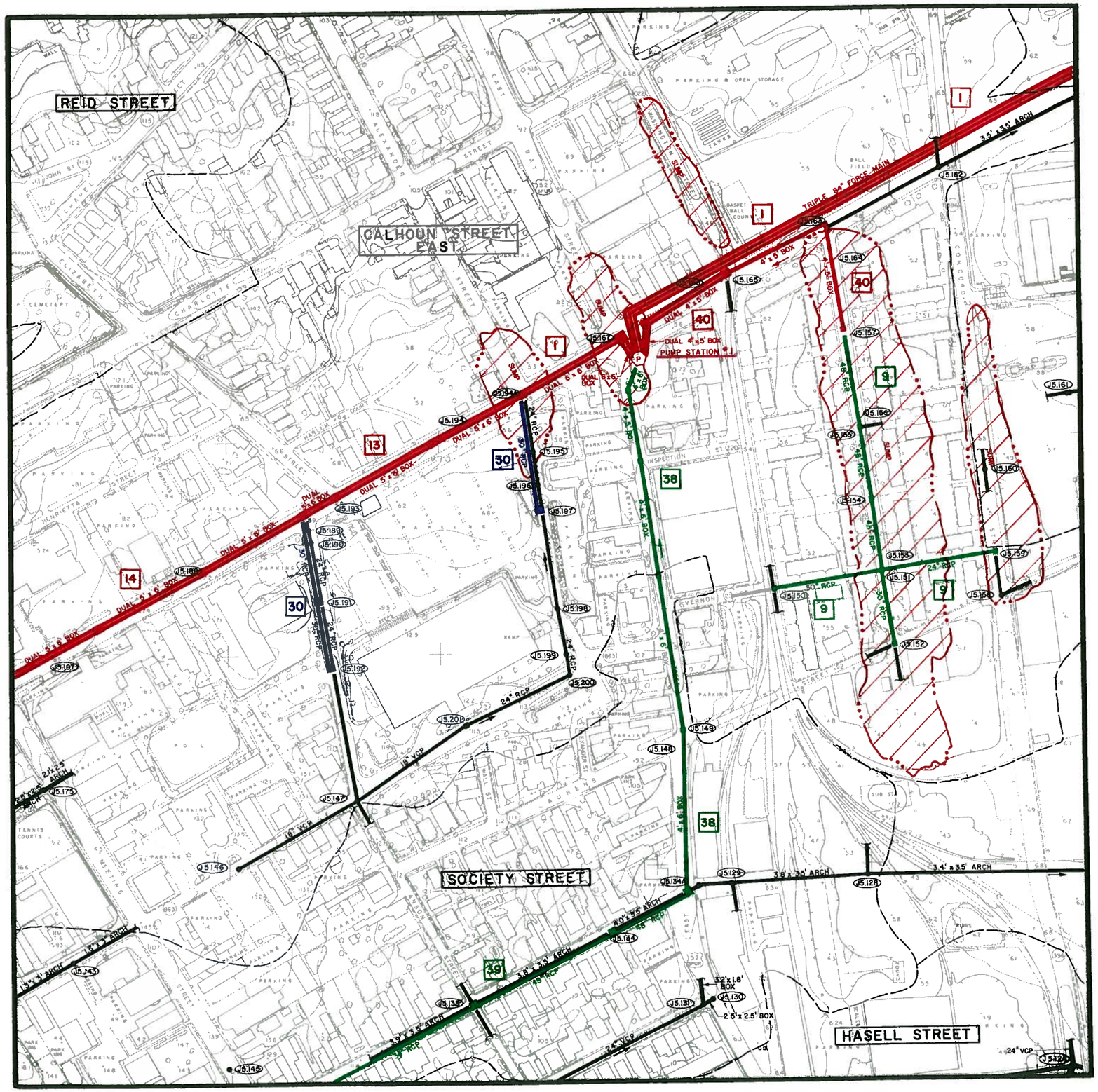
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

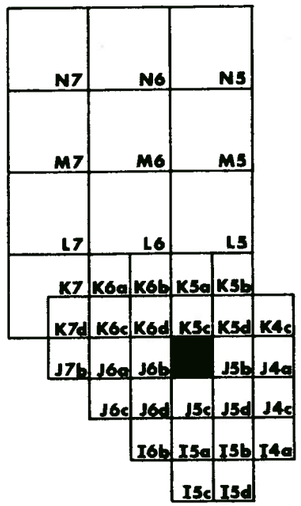


DRAINAGE SYSTEMS

MAP J5a

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

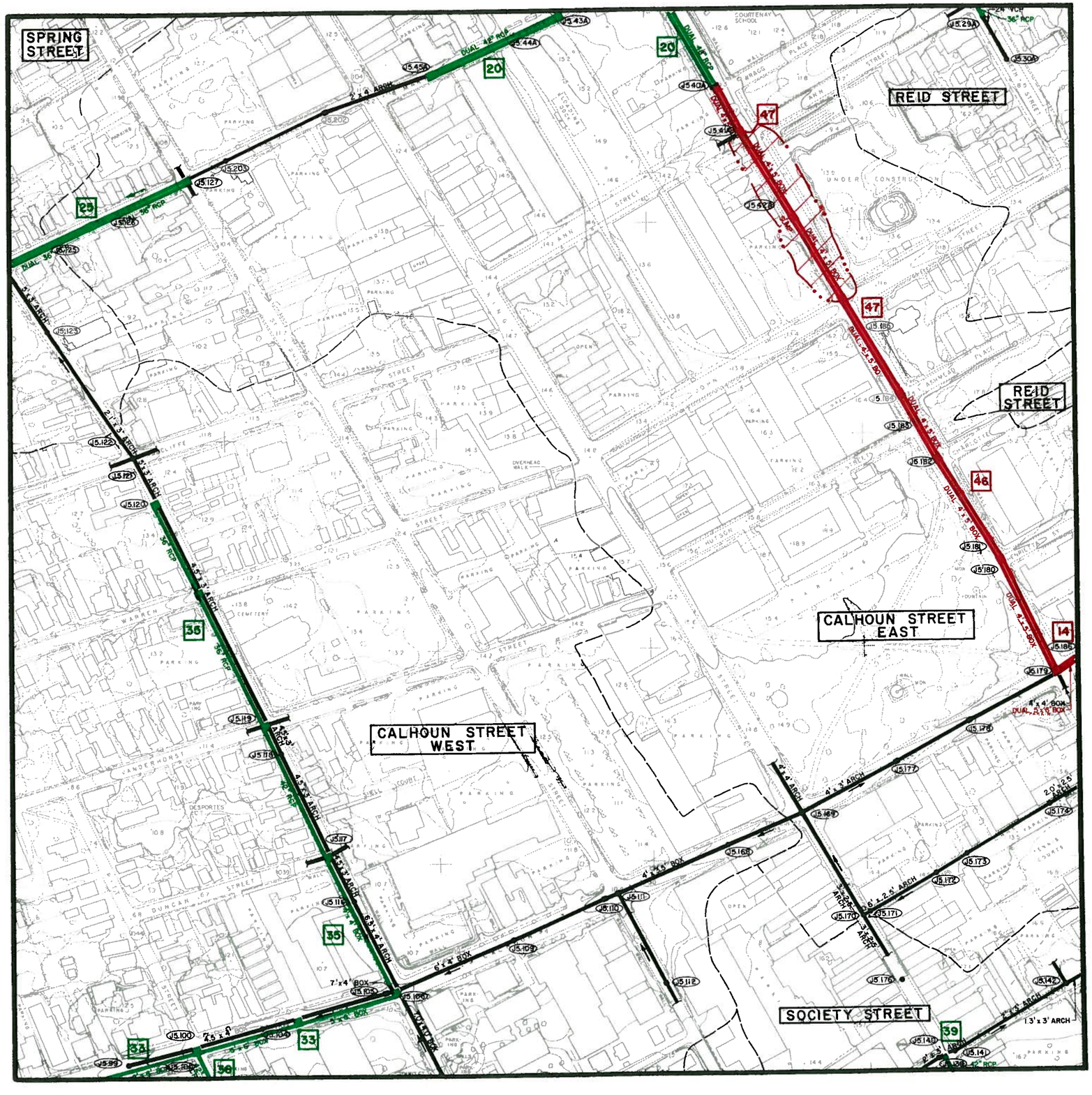
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

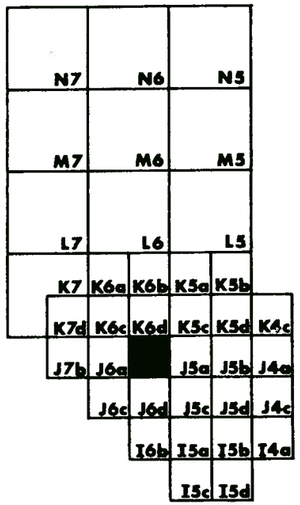
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DRAINAGE SYSTEMS — MAP J6b

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

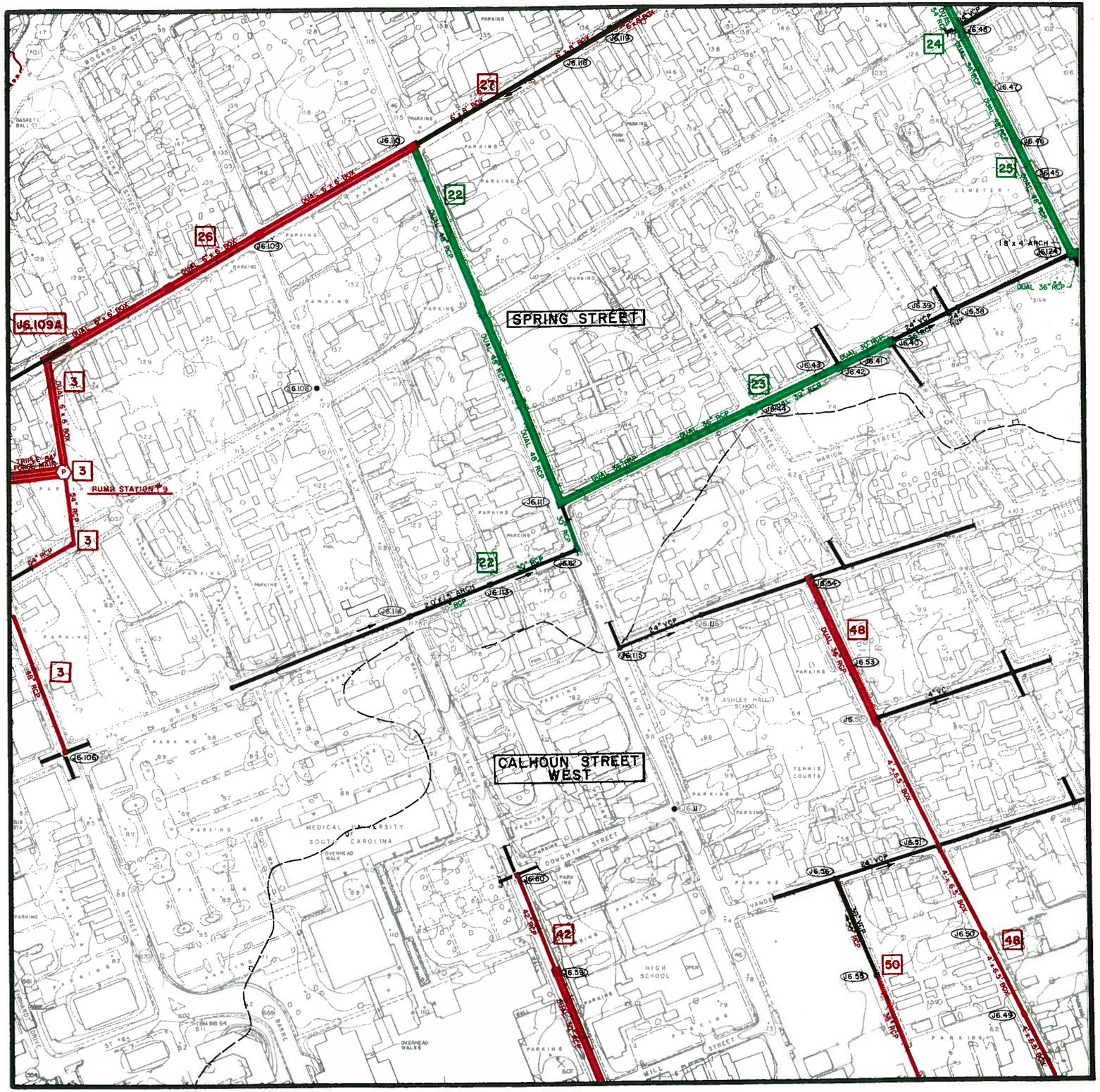
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

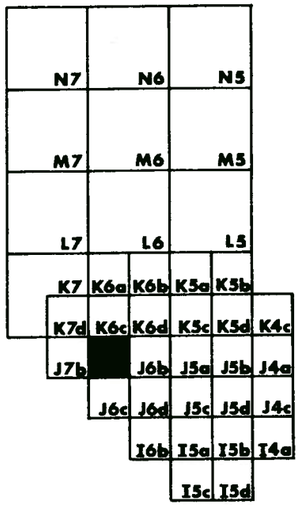
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DRAINAGE SYSTEMS — MAP J6a

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA





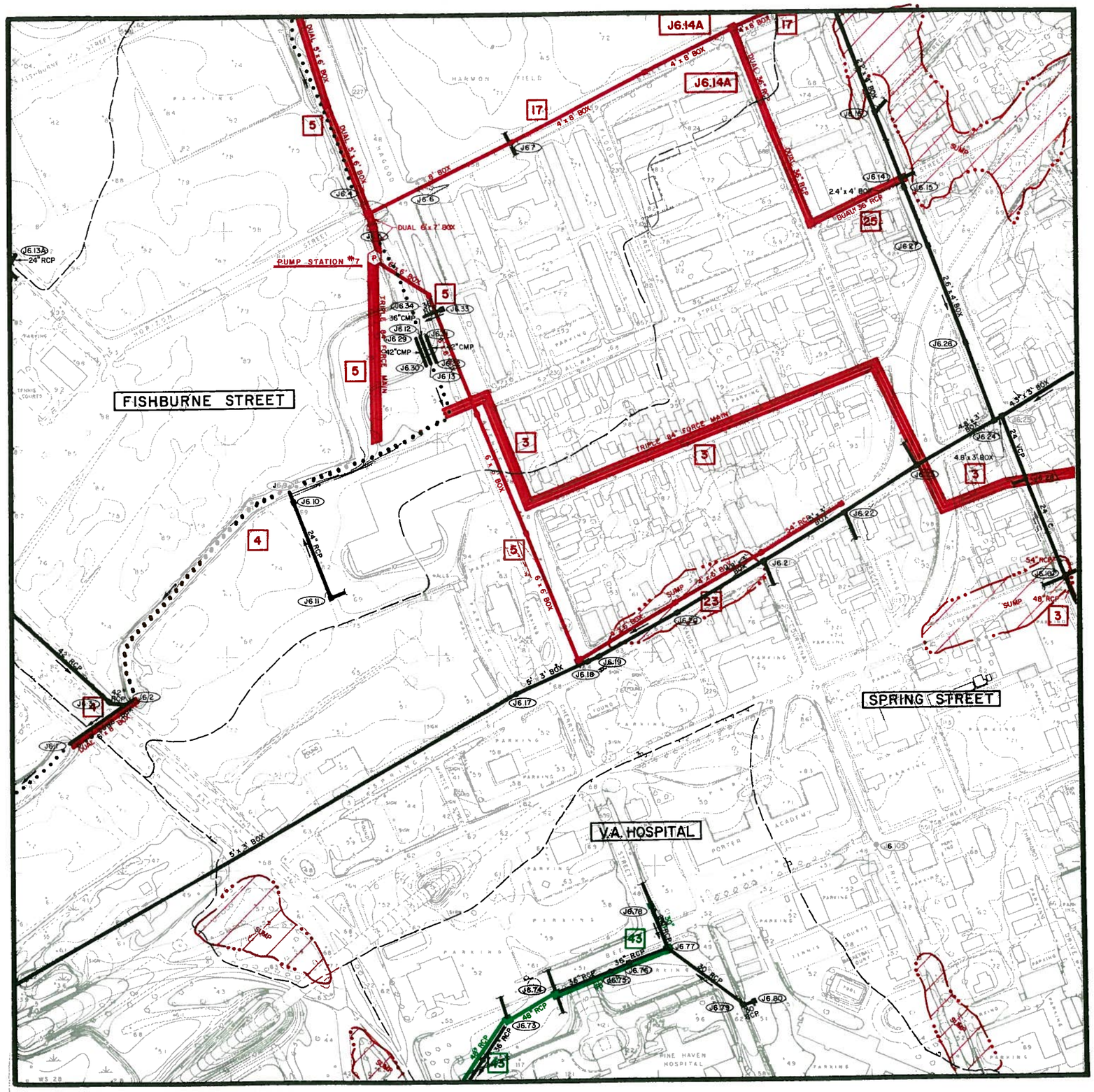
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

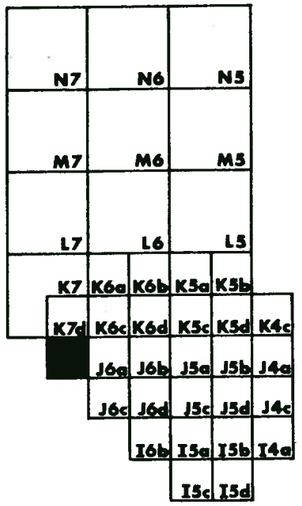
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DRAINAGE SYSTEMS — MAP J7b

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

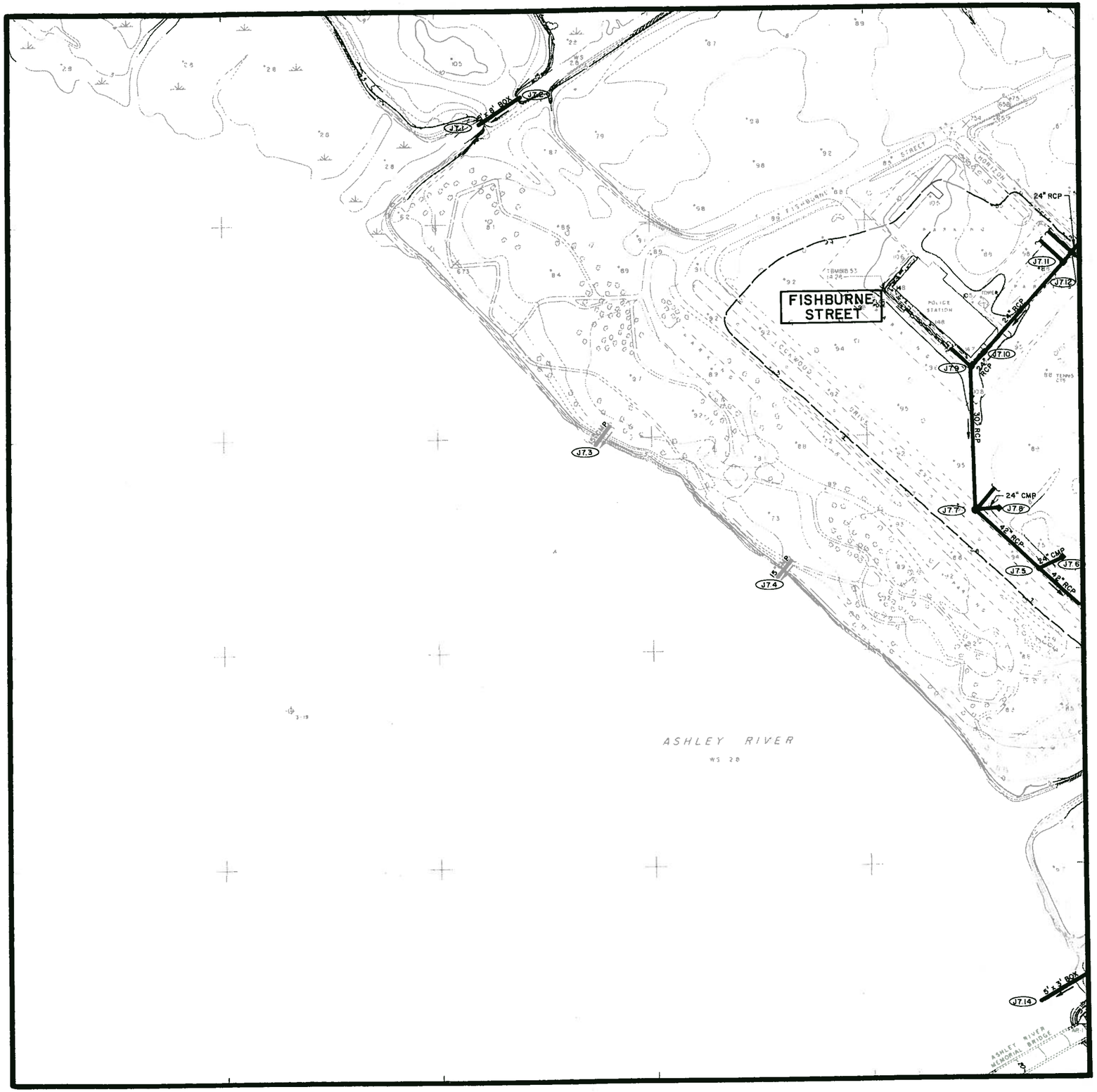
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

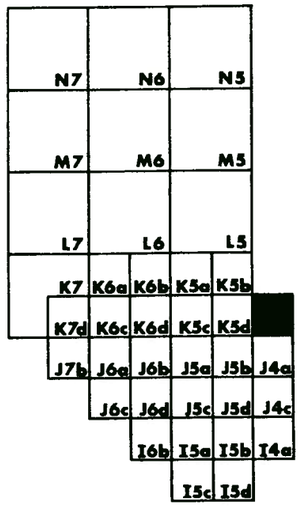
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DRAINAGE SYSTEMS — MAP K4c

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

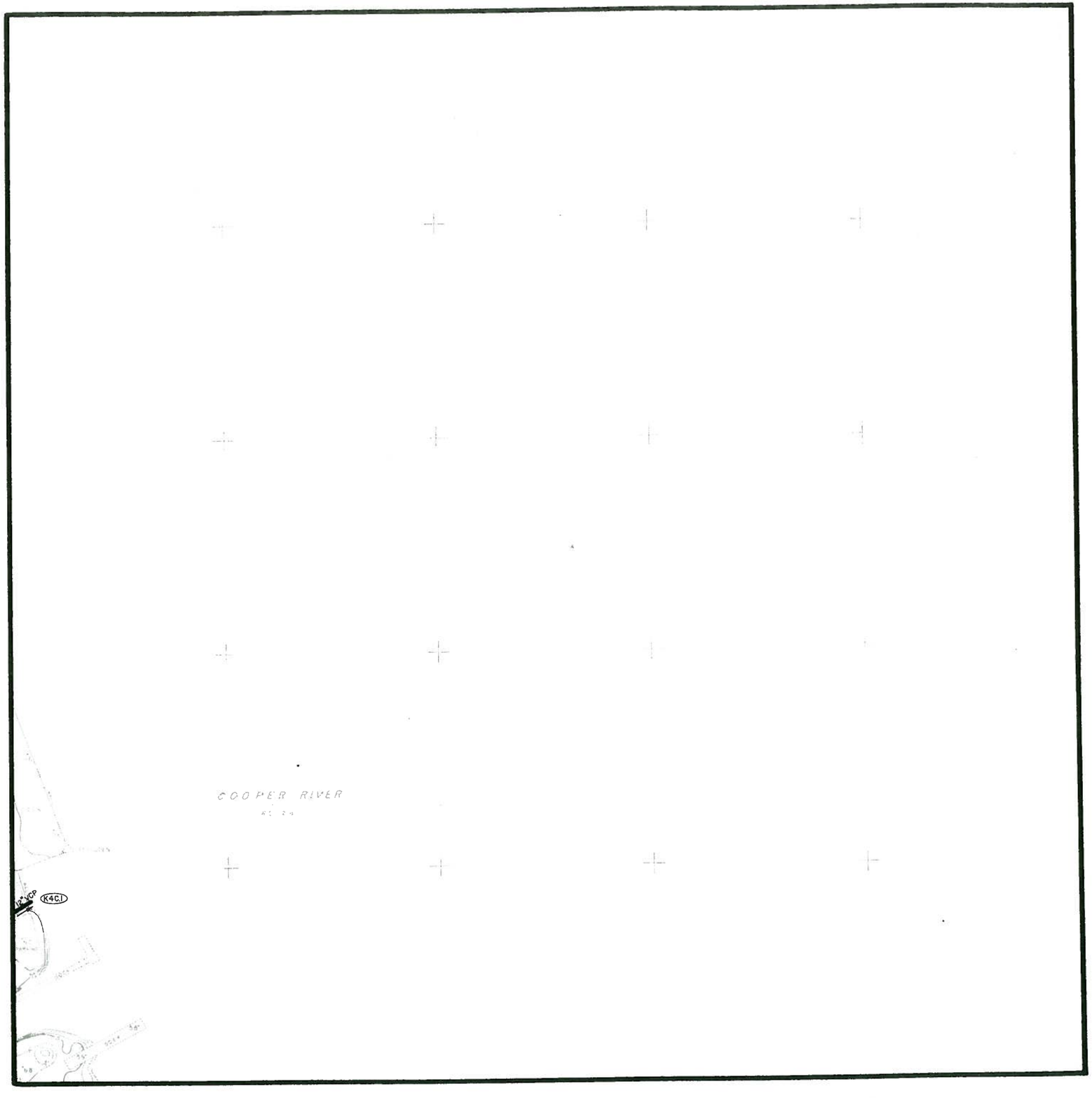
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

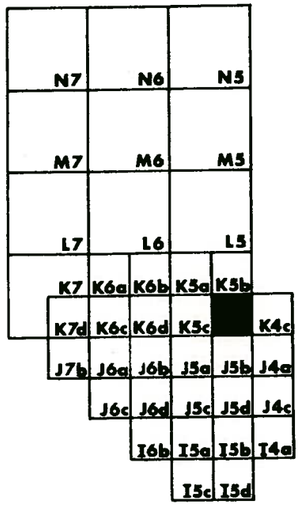
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DRAINAGE SYSTEMS — MAP K5d

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

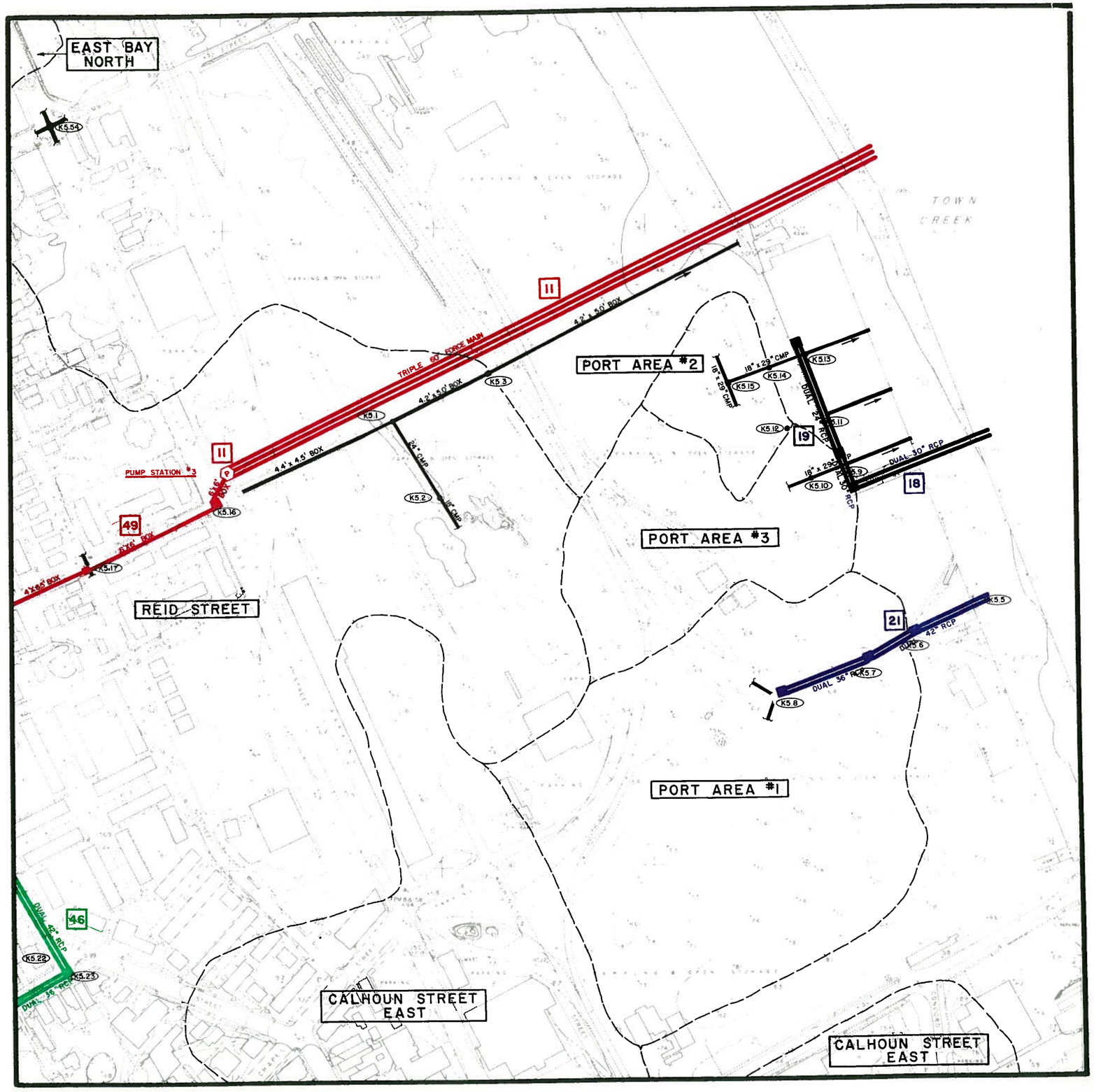
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

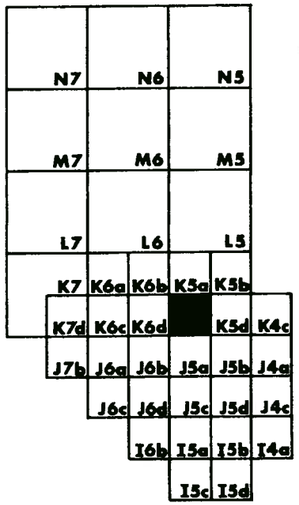
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DRAINAGE SYSTEMS | MAP K5c

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

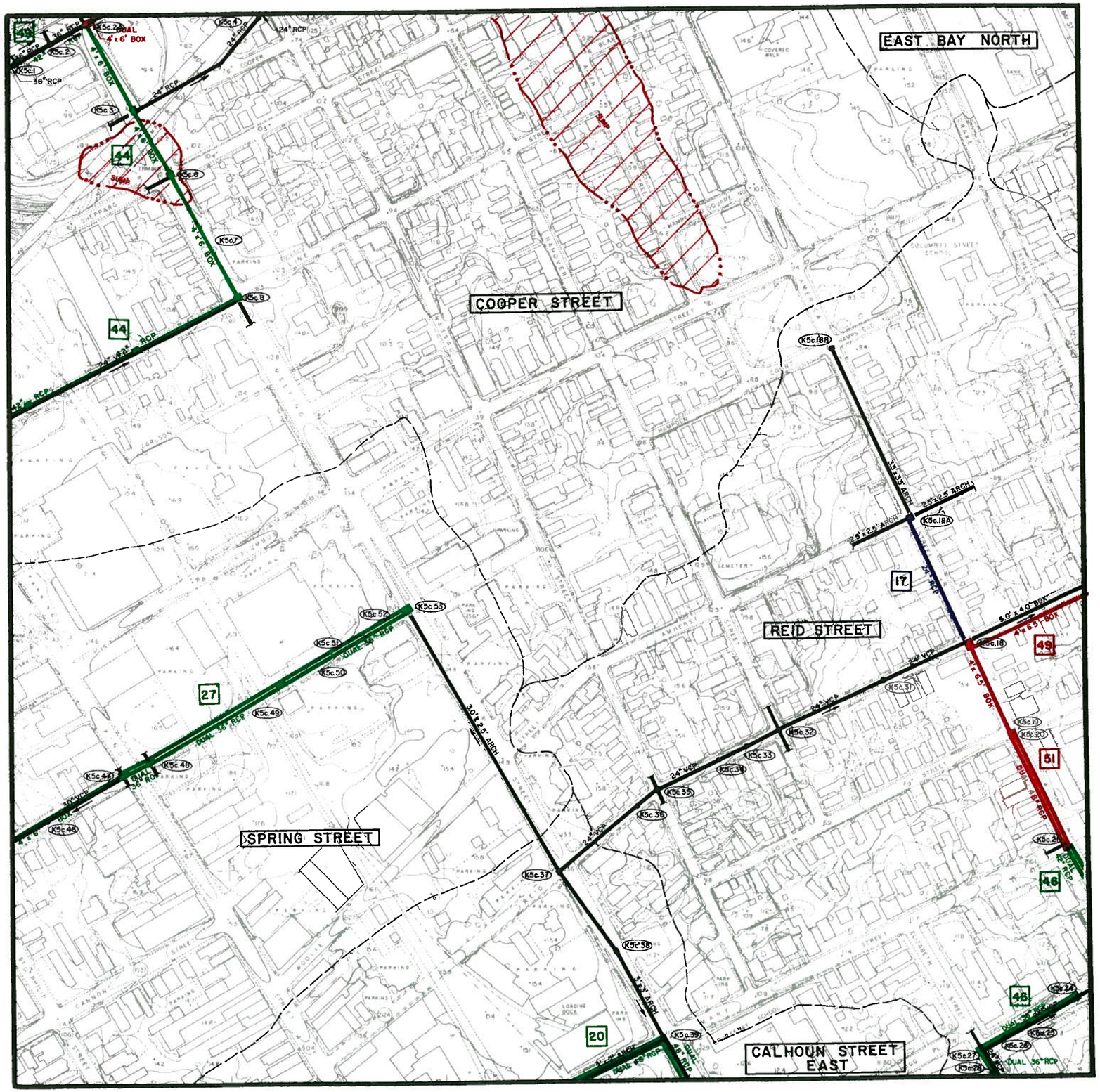
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

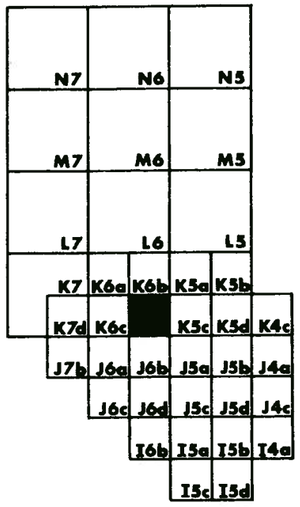
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DRAINAGE SYSTEMS | MAP K6d

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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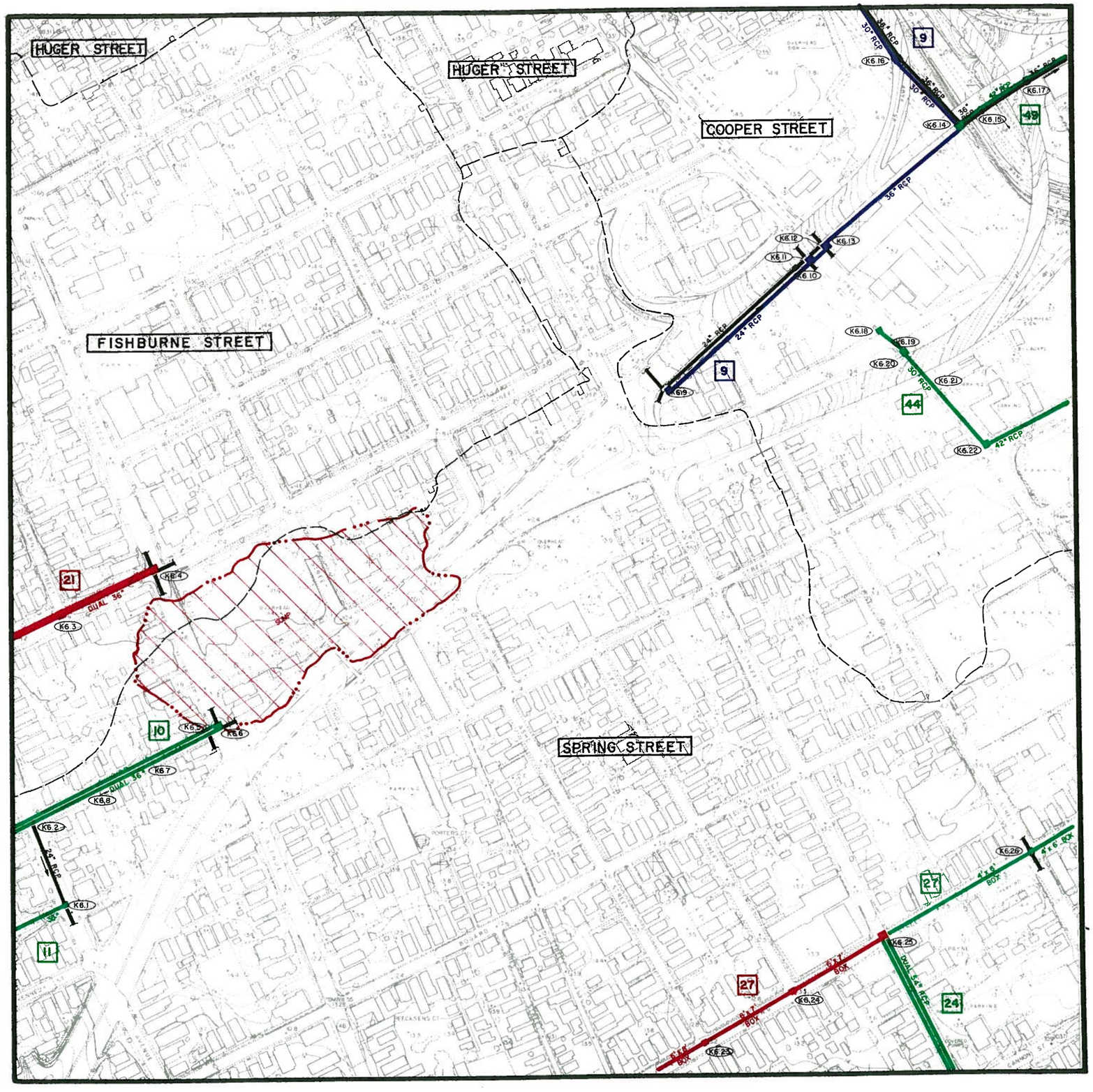
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

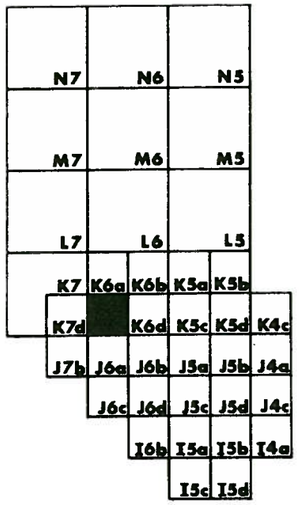
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DRAINAGE SYSTEMS | MAP K6c

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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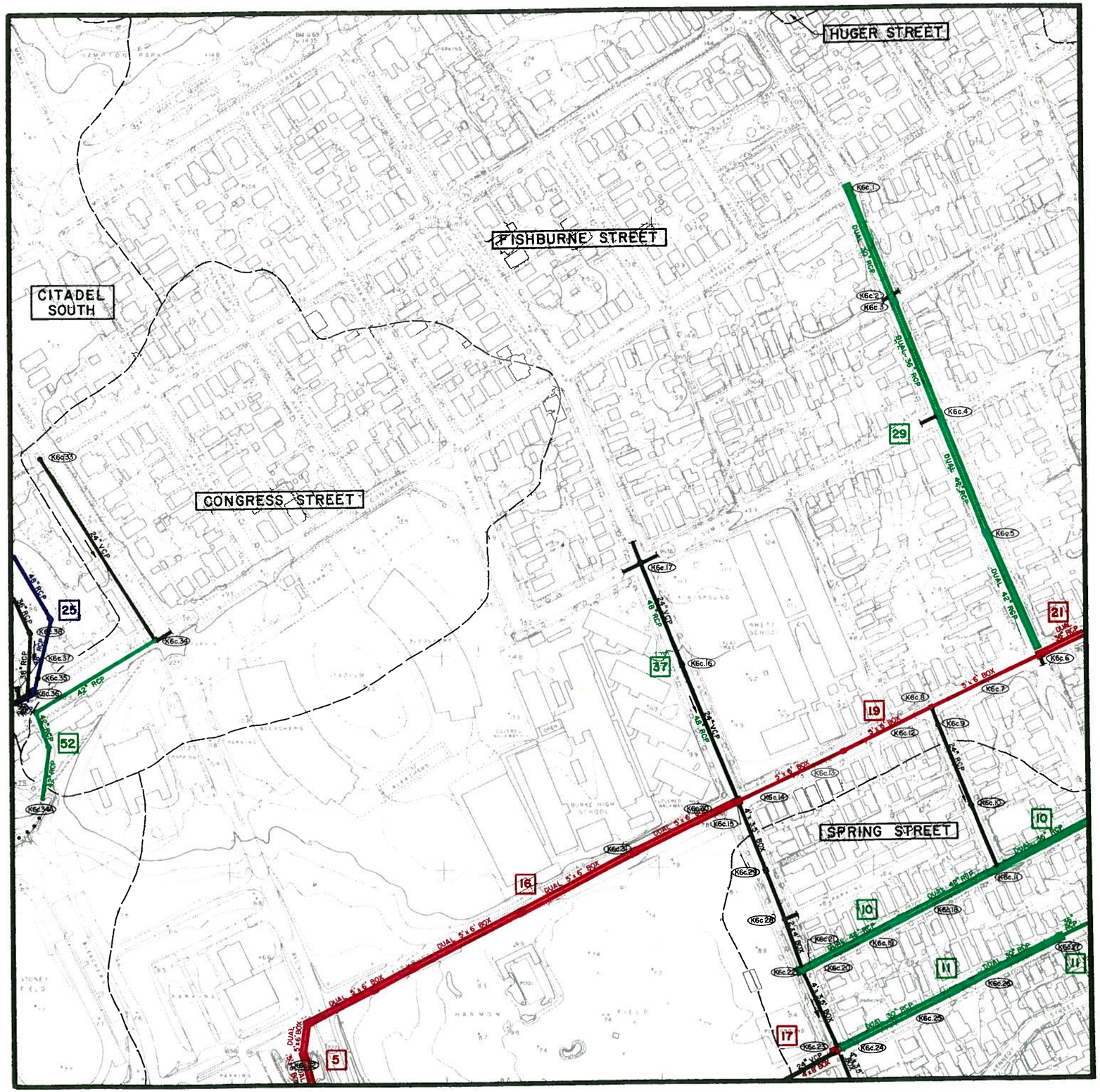
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
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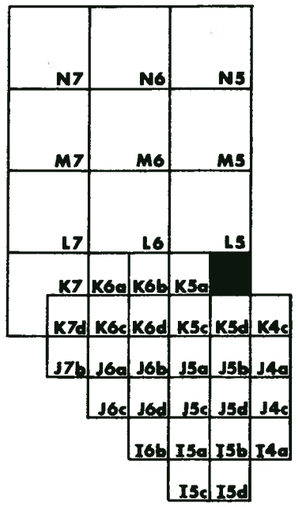
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DRAINAGE SYSTEMS — MAP K5b

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

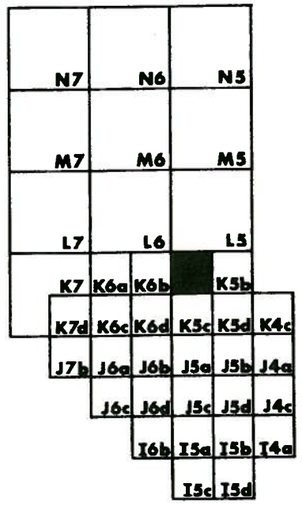
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DRAINAGE SYSTEMS | MAP K5a

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



high
medium
low

N

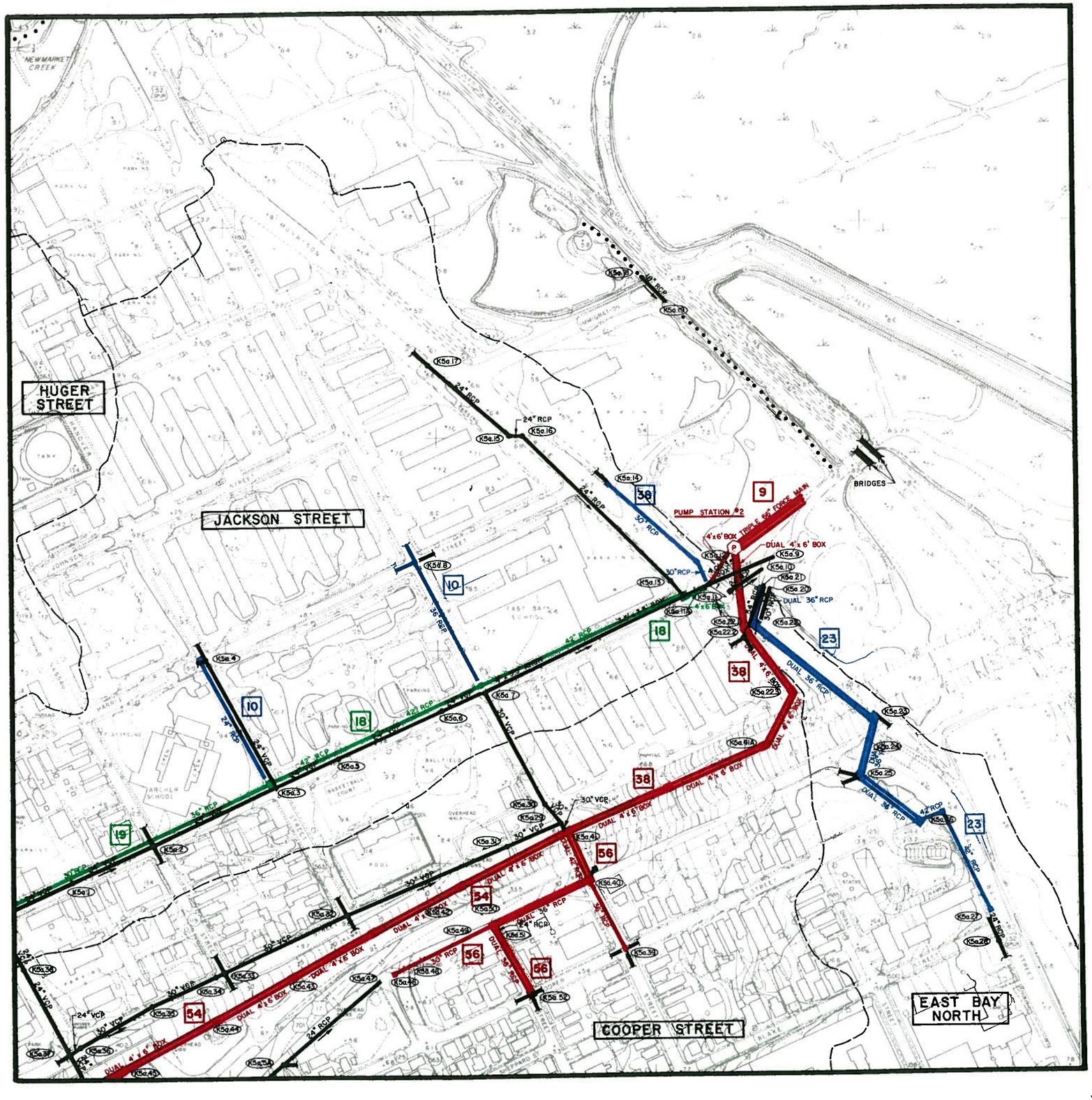
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

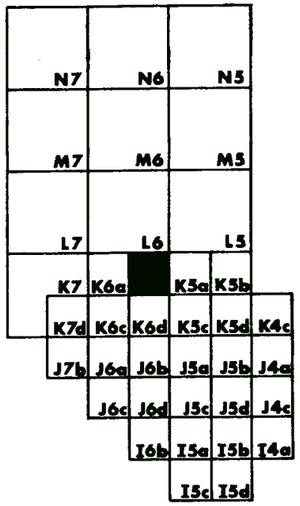
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DRAINAGE SYSTEMS | MAP K6b

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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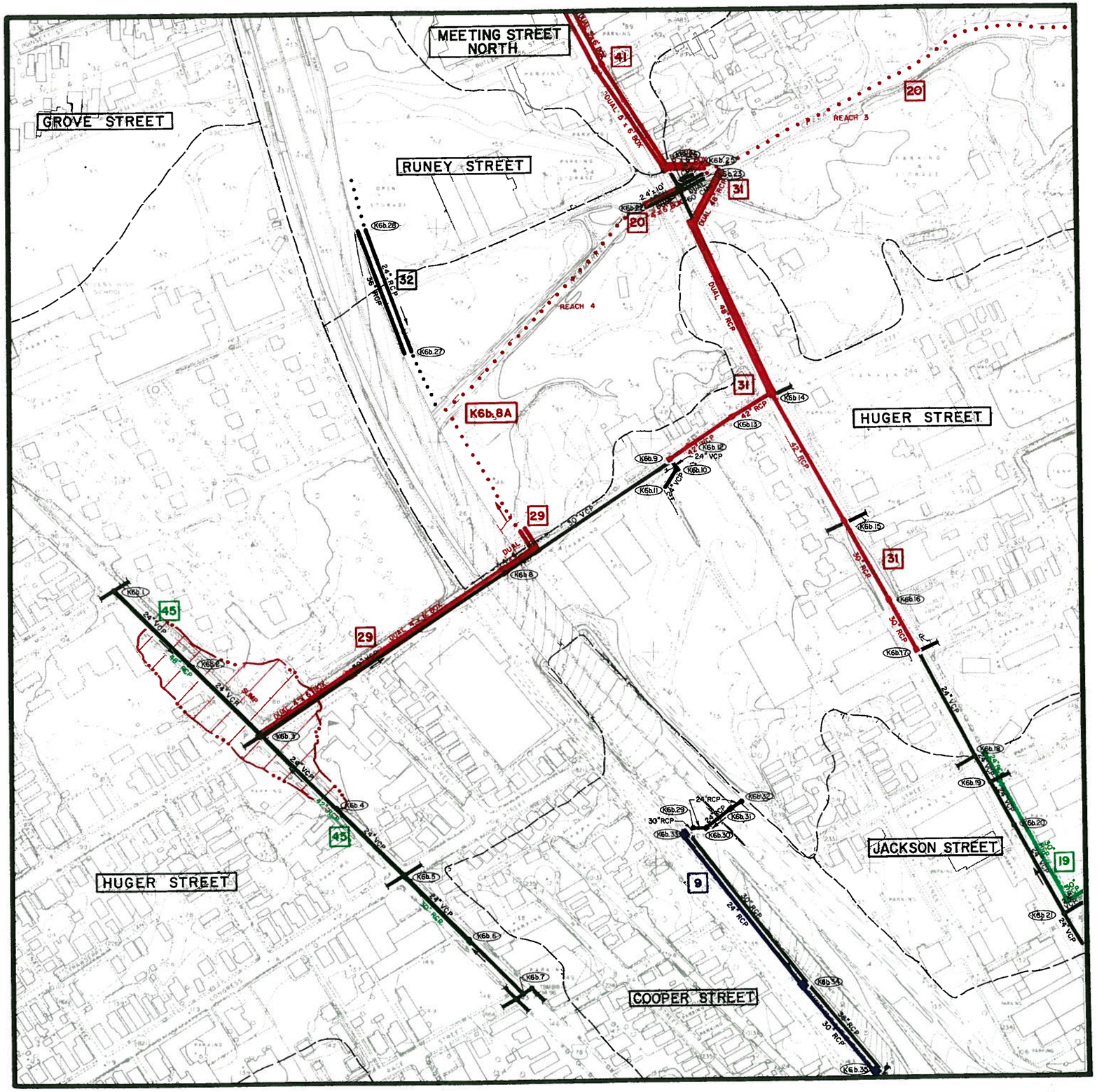
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
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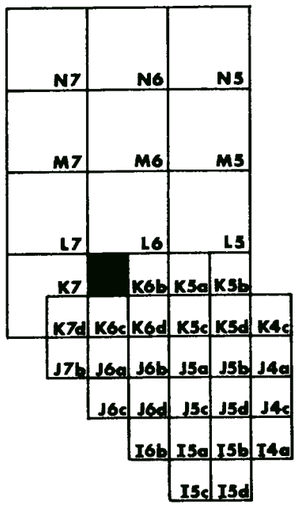
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DRAINAGE SYSTEMS | MAP K6a

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

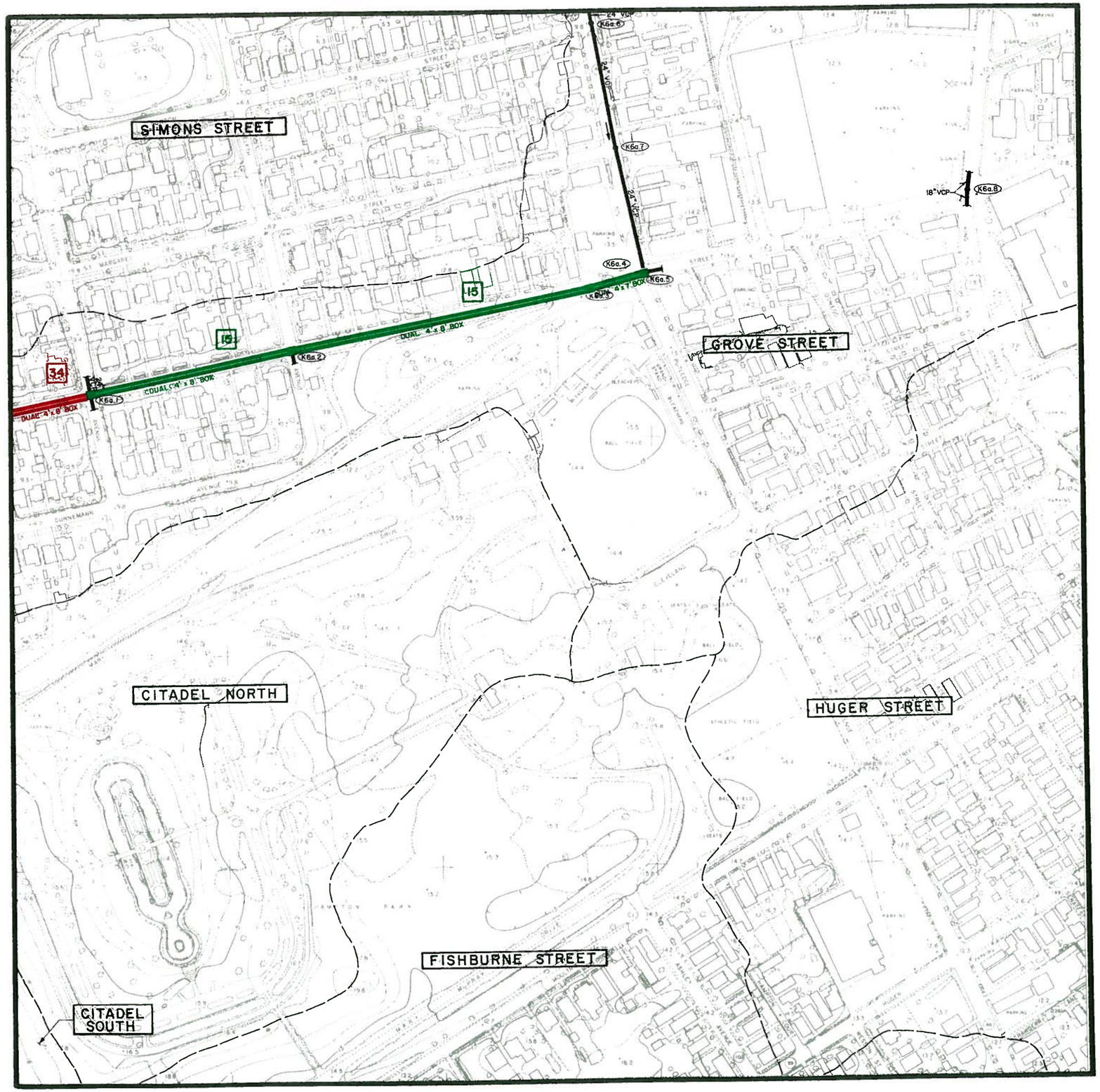
PROPOSED SYSTEM PRIORITIES

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GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

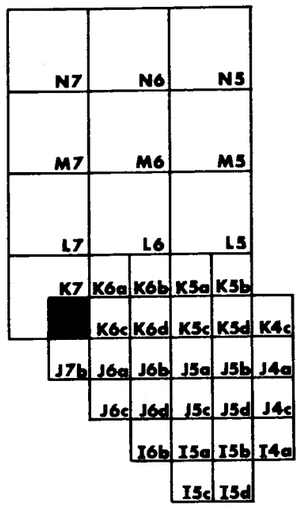
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DRAINAGE SYSTEMS — MAP K7d

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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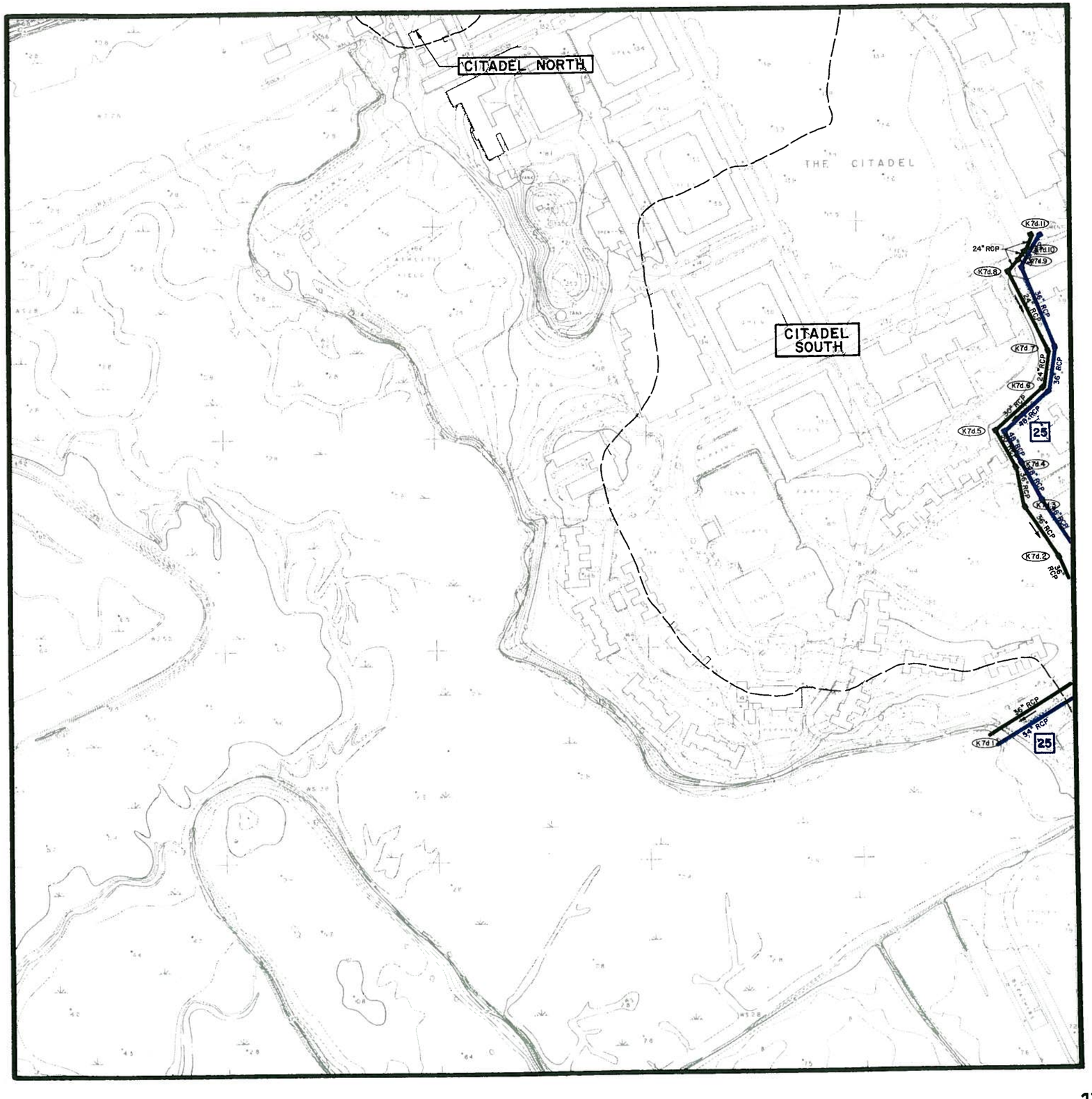
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

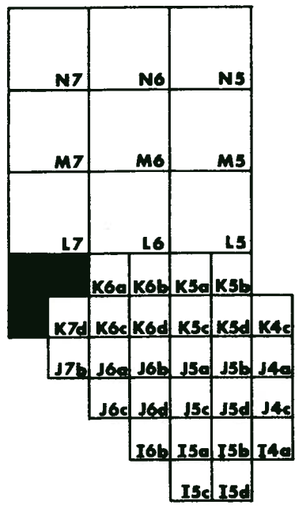
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DRAINAGE SYSTEMS — MAP K7

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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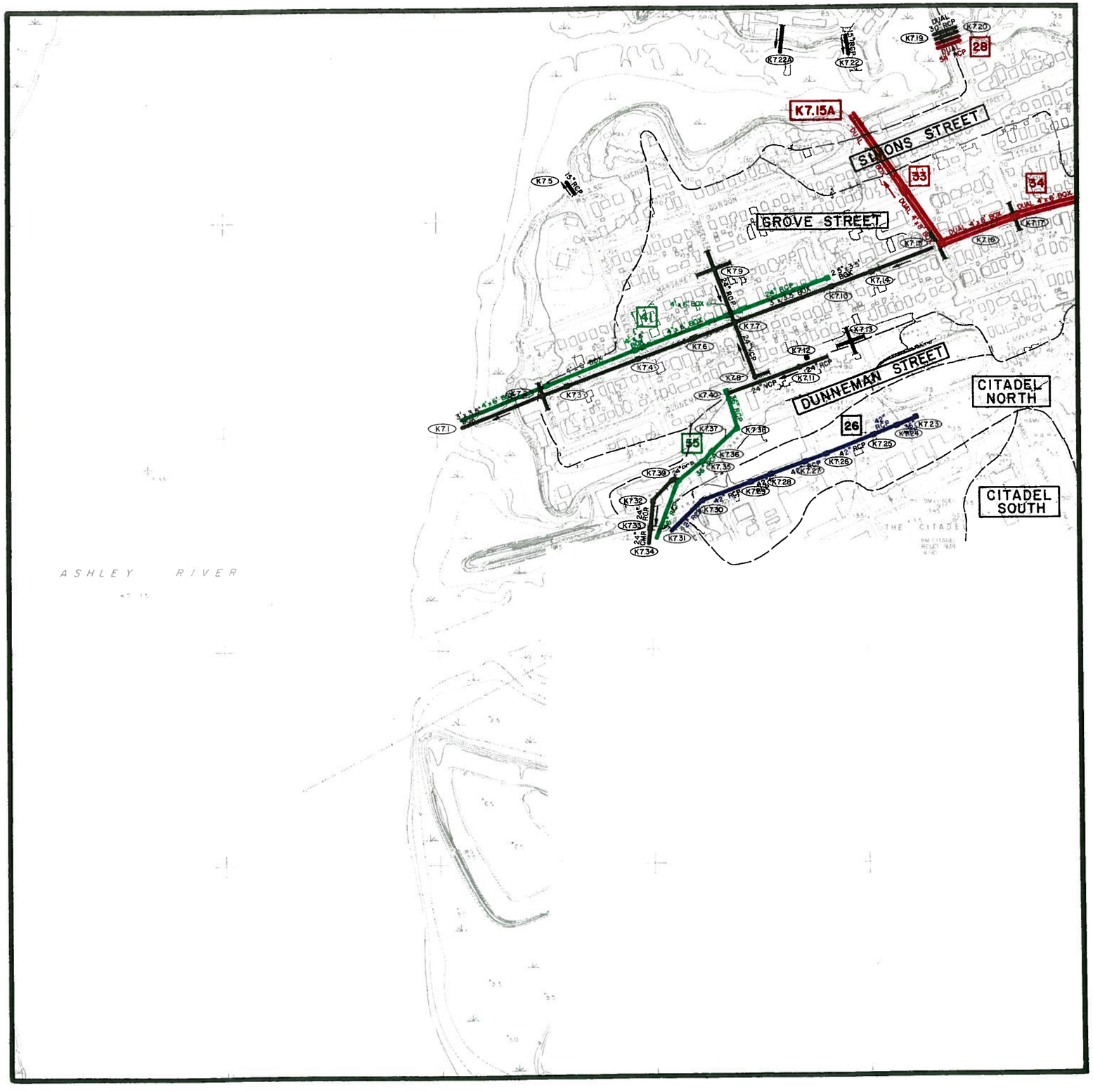
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

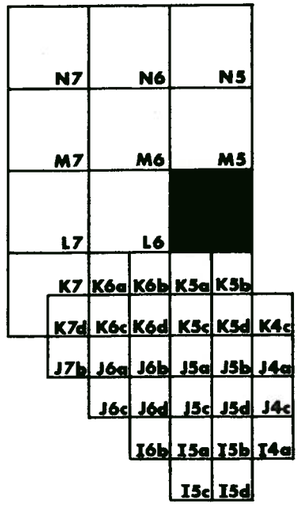
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DRAINAGE SYSTEMS — MAP L5

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

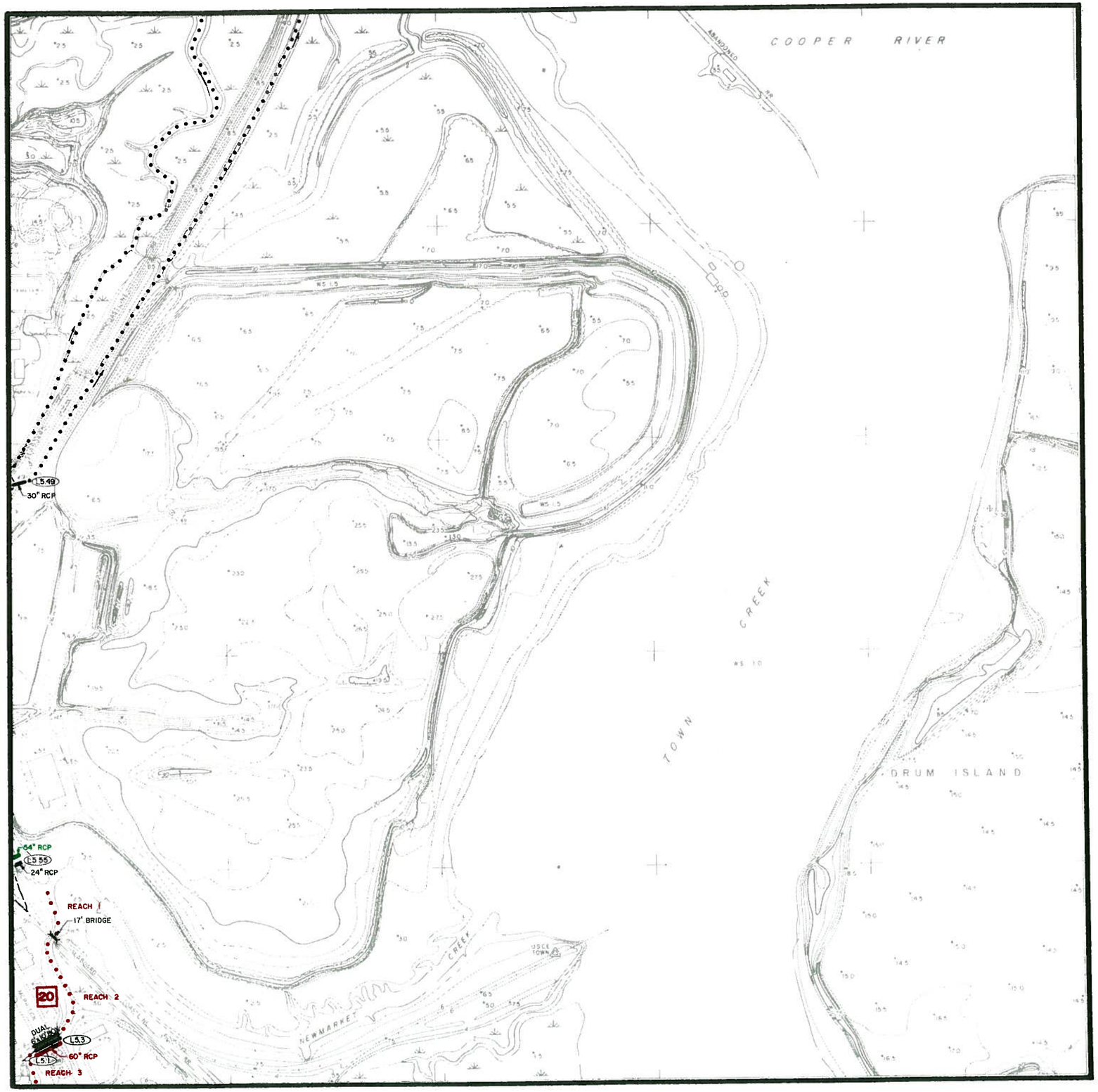
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

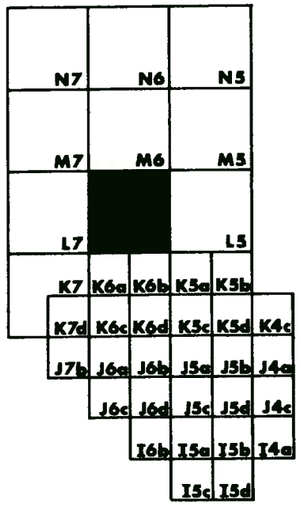
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DRAINAGE SYSTEMS — MAP L6

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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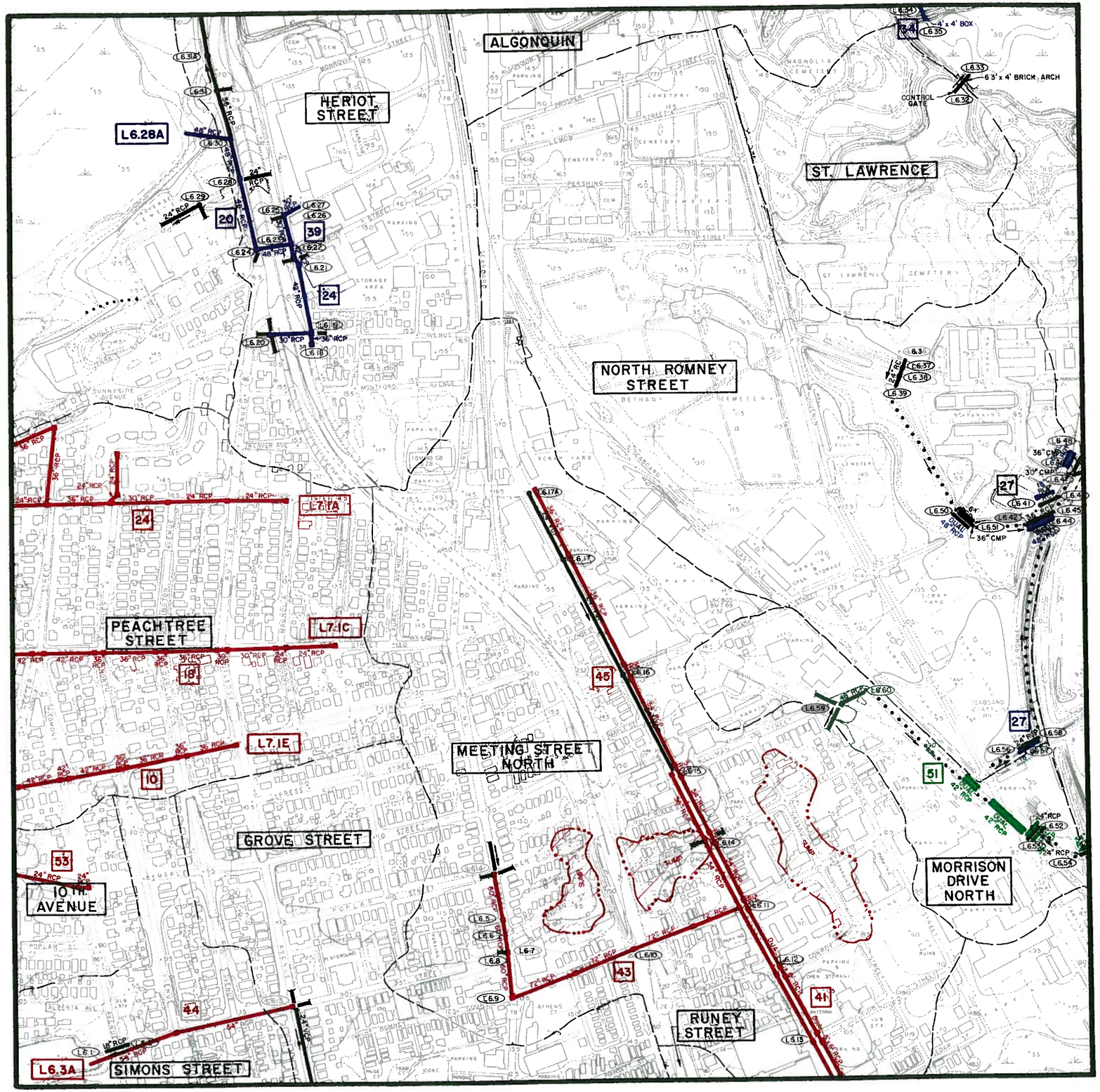
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

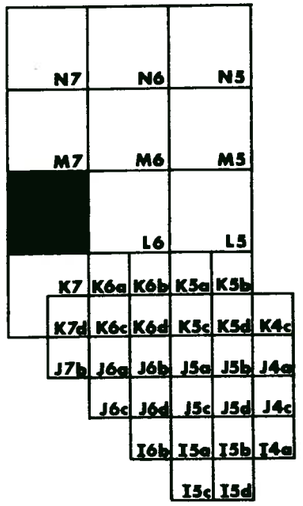
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DRAINAGE SYSTEMS — MAP L7

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

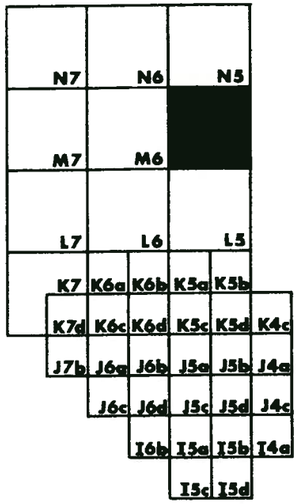
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DRAINAGE SYSTEMS — MAP M5

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



PROPOSED SYSTEM PRIORITIES

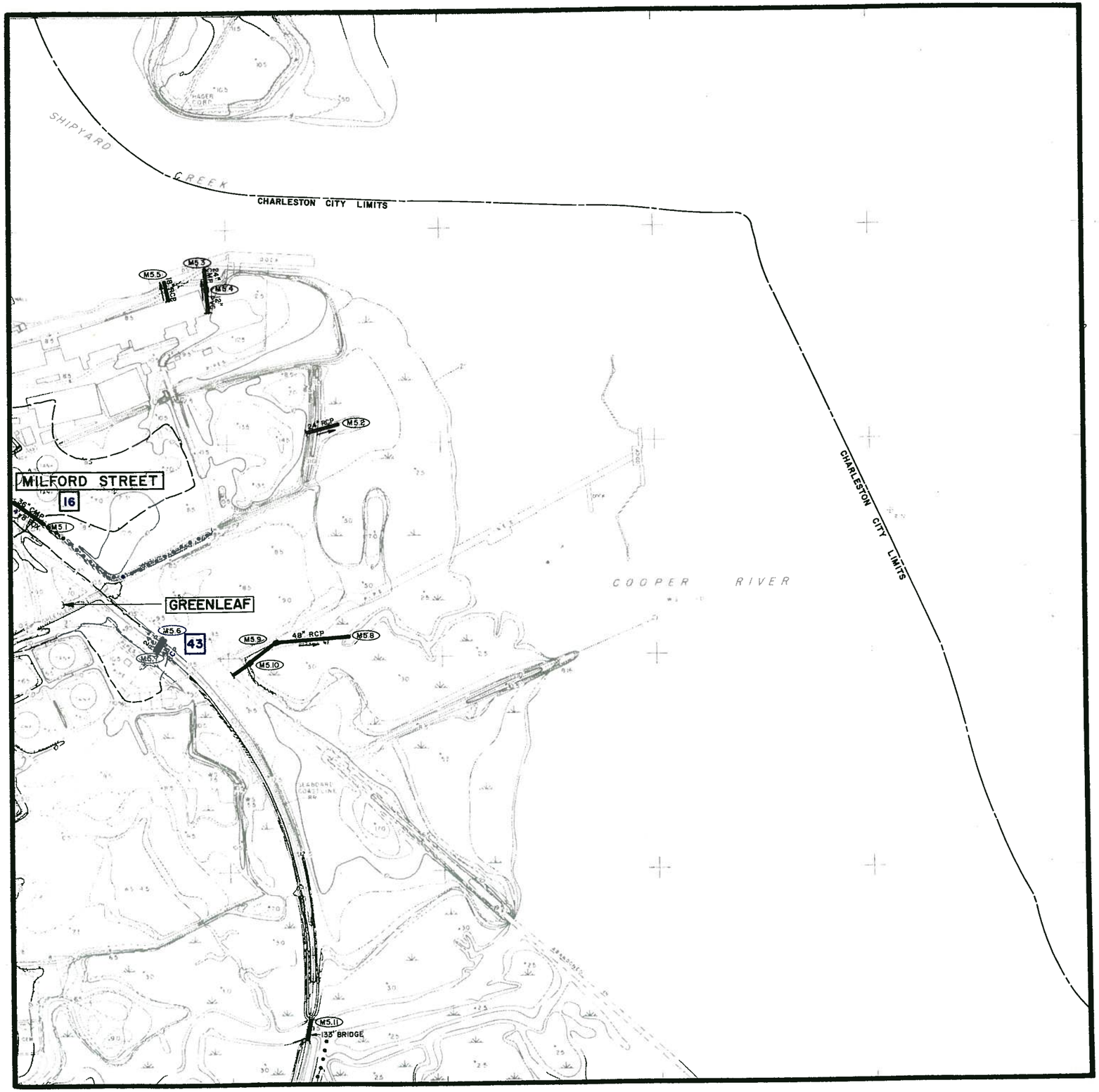
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

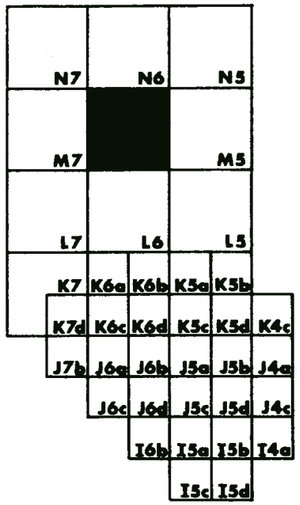
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DRAINAGE SYSTEMS | MAP M6

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

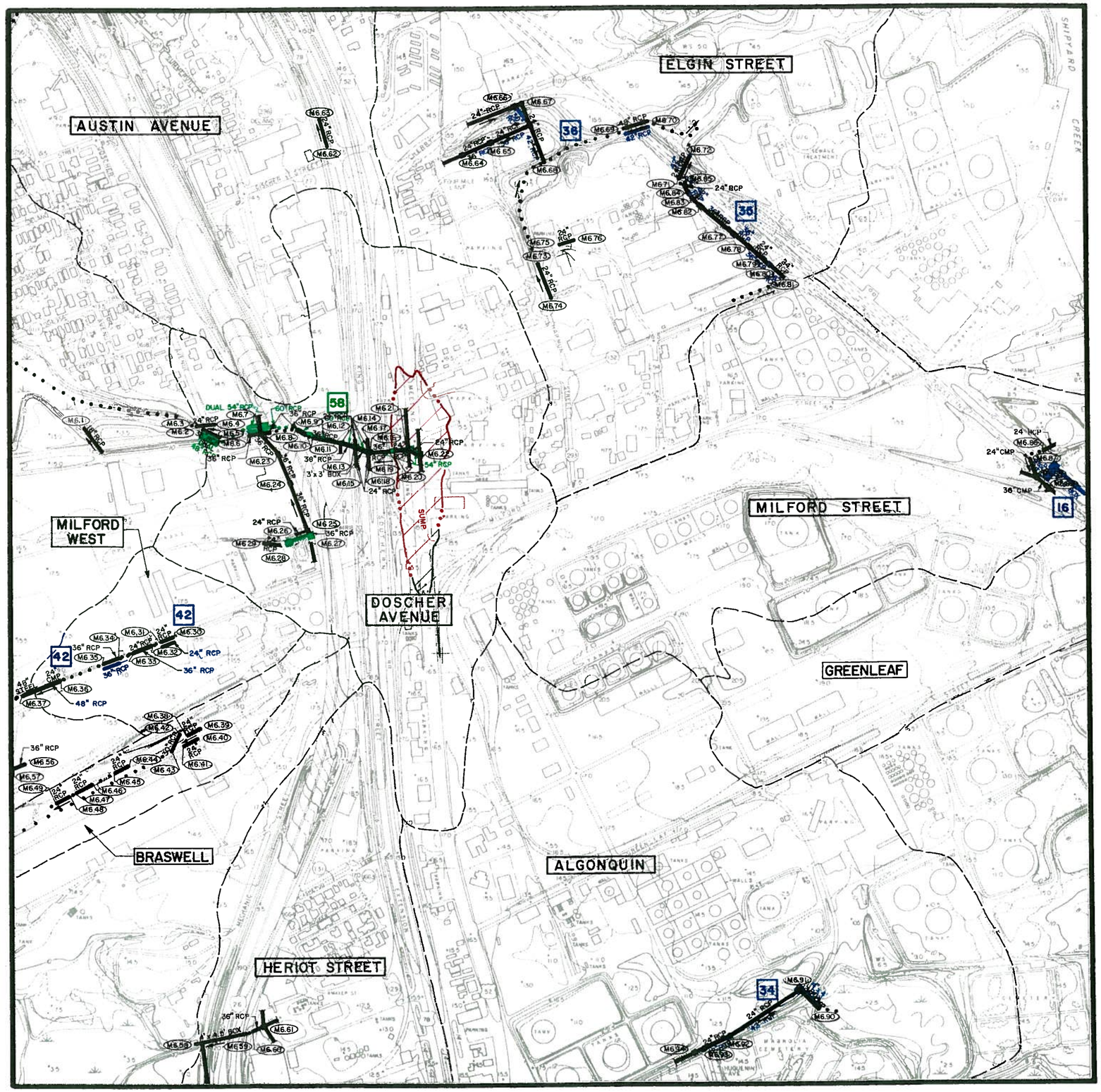
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

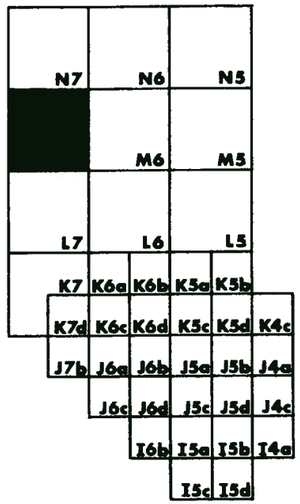
GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP M7

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

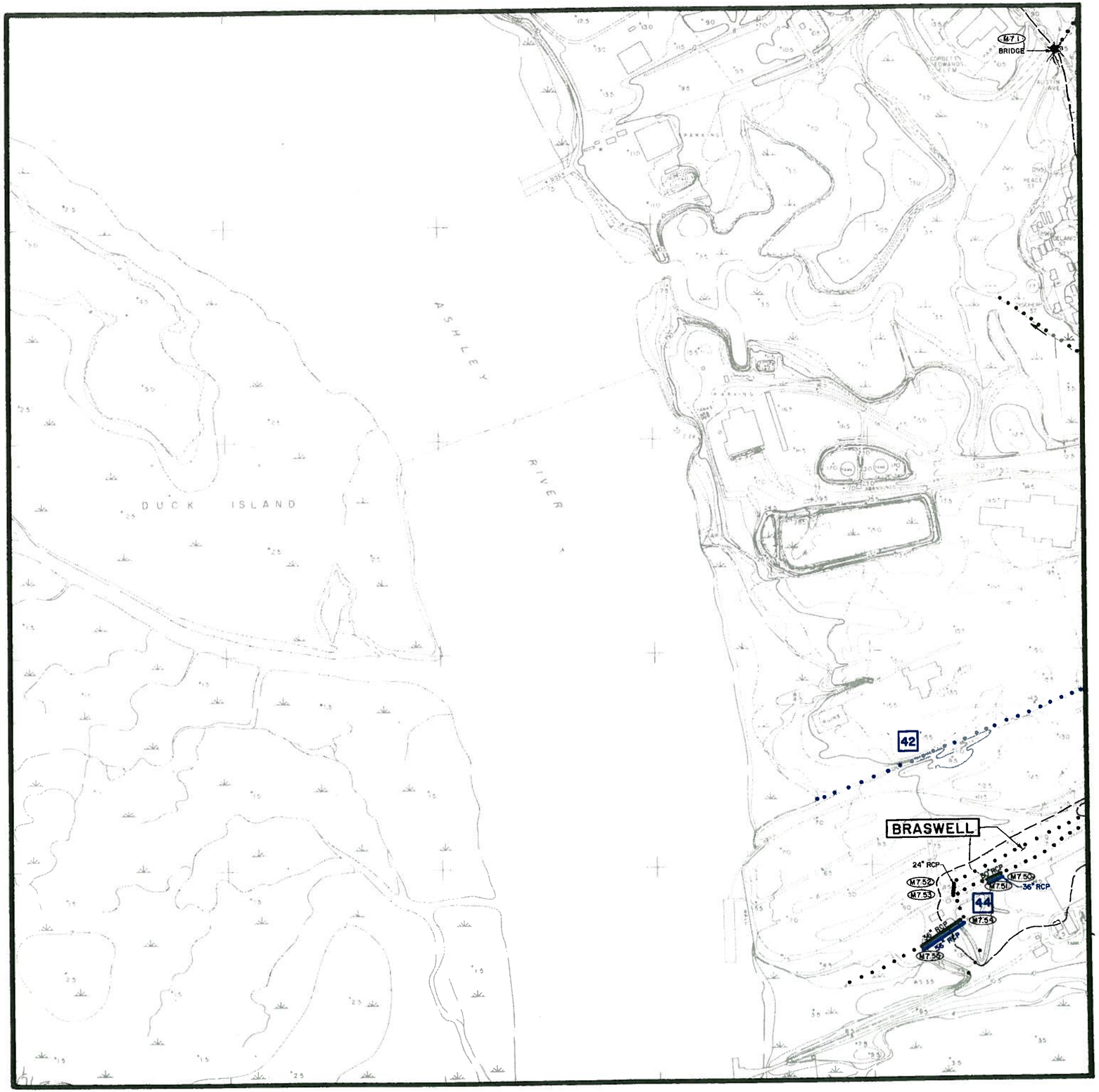
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

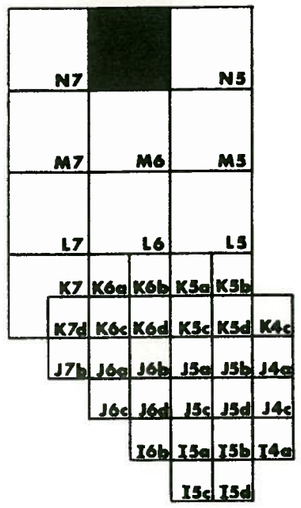
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DRAINAGE SYSTEMS — MAP N6

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



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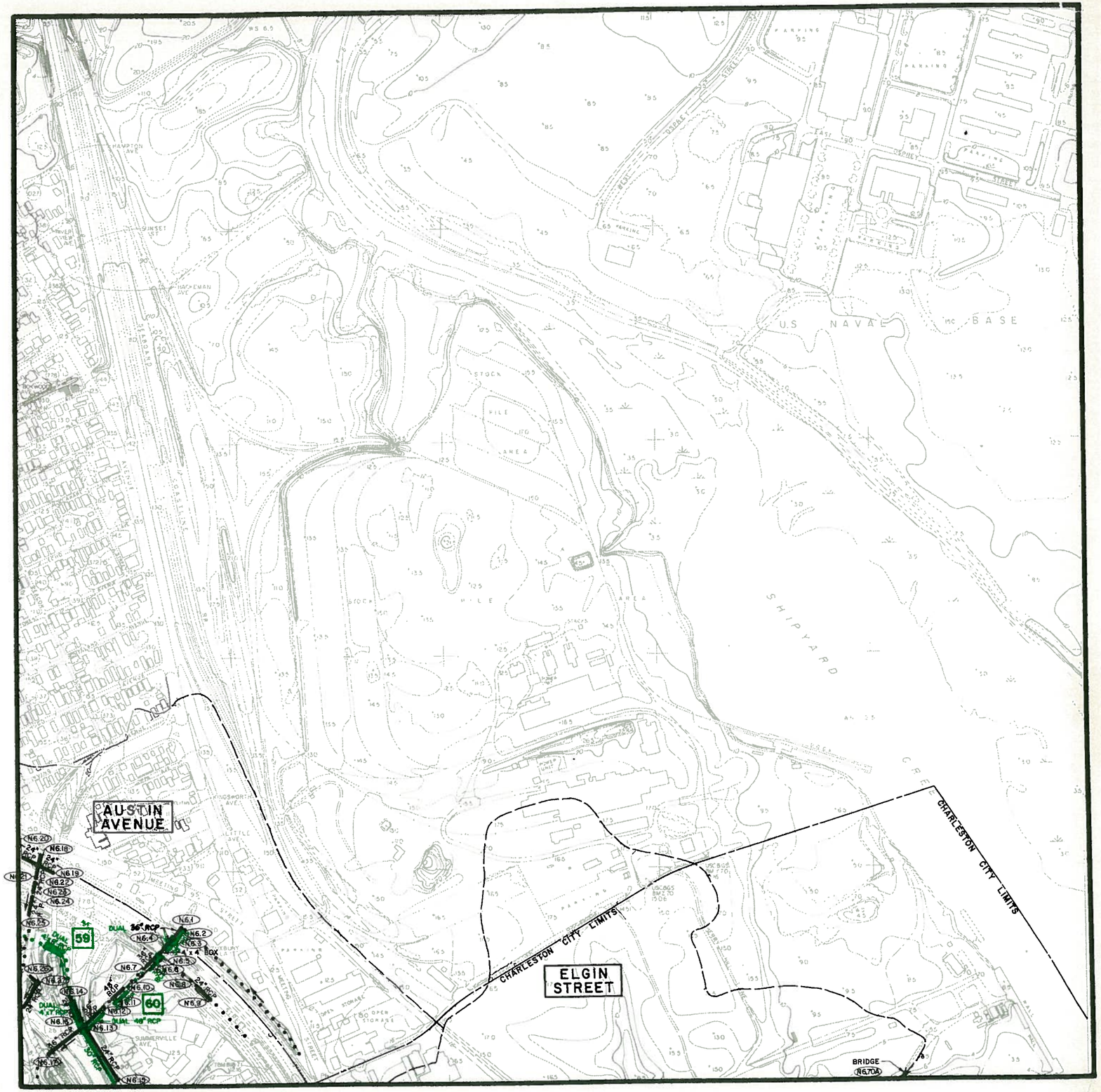
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

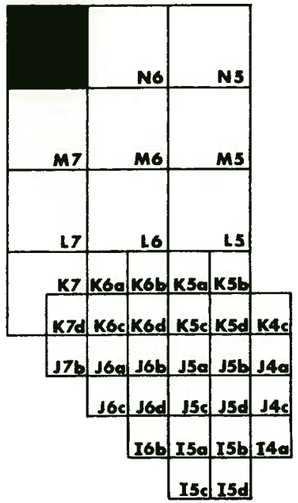
GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP N7

recommended improvements
CITY OF CHARLESTON

PENINSULAR AREA



N

PROPOSED SYSTEM PRIORITIES

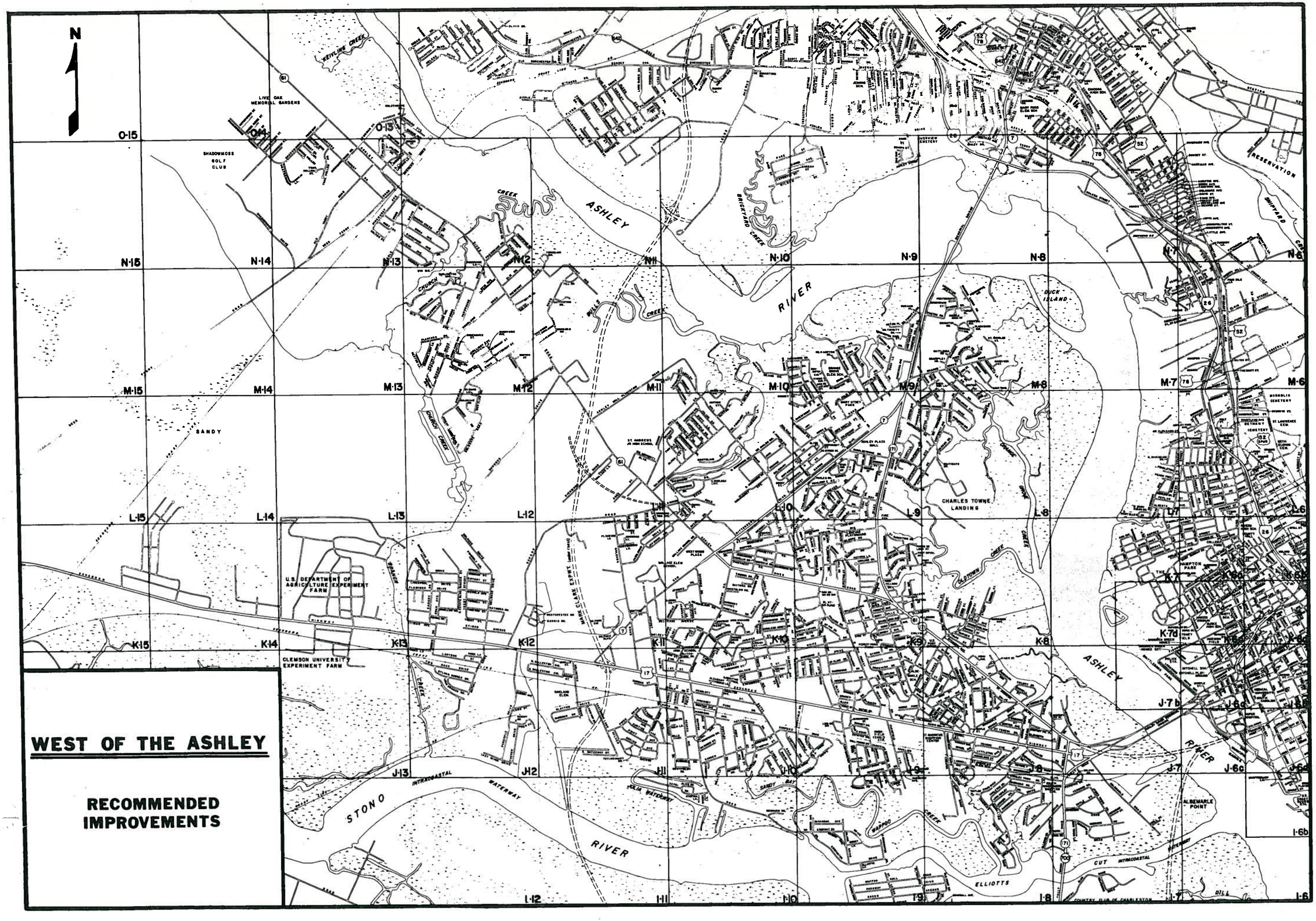
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

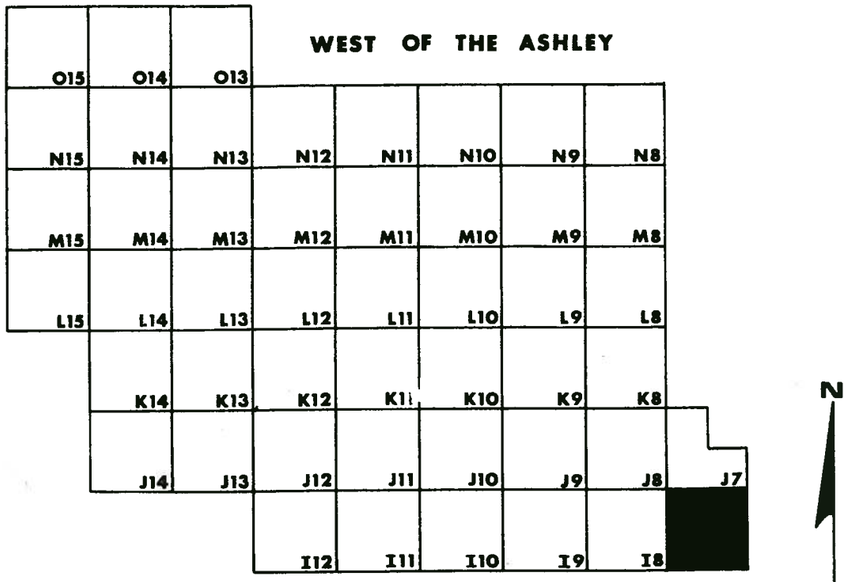
GRAPHIC SCALE 500 0 500 1000 1500 FEET




N
WEST OF THE ASHLEY
RECOMMENDED IMPROVEMENTS
ASHLEY
RIVER
KEYLINE CREEK
CHURCH CREEK
WILLS CREEK
BRICKYARD CREEK
SHADOWMOSS GOLF CLUB
LIVE OAK MEMORIAL GARDENS
SANDY
U.S. DEPARTMENT OF AGRICULTURE EXPERIMENT FARM
CLEMSON UNIVERSITY EXPERIMENT FARM
ST ANDREWS JR HIGH SCHOOL
CHARLES TOWNE LANDING
DUCK ISLAND
NAVAL RESERVATION
SHIPYARD CREEK
OLD TOWN CREEK
HAMPTON PARK
ALBEMARLE POINT
STONO
INTRACOASTAL WATERWAY
SANDY BAY
WAPPOO CREEK
ELLIOTTS CUT
INTRACOASTAL WATERWAY
COUNTRY CLUB OF CHARLESTON
HENRY C. WALLACE
JOHN CLARK EXPWY
O-15
O-14
O-13
N-15
N-14
N-13
N-12
N-11
N-10
N-9
N-8
N-7
N-6
M-15
M-14
M-13
M-12
M-11
M-10
M-9
M-8
M-7
M-6
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L-7
L-6
K-15
K-14
K-13
K-12
K-11
K-10
K-9
K-8
K-7
K-7d
J-13
J-12
J-11
J-10
J-9
J-8
J-7
J-7b
J-6c
I-12
I-11
I-10
I-9
I-8
I-7
I-6
I-6b

DRAINAGE SYSTEMS | MAP I7

recommended improvements
CITY OF CHARLESTON



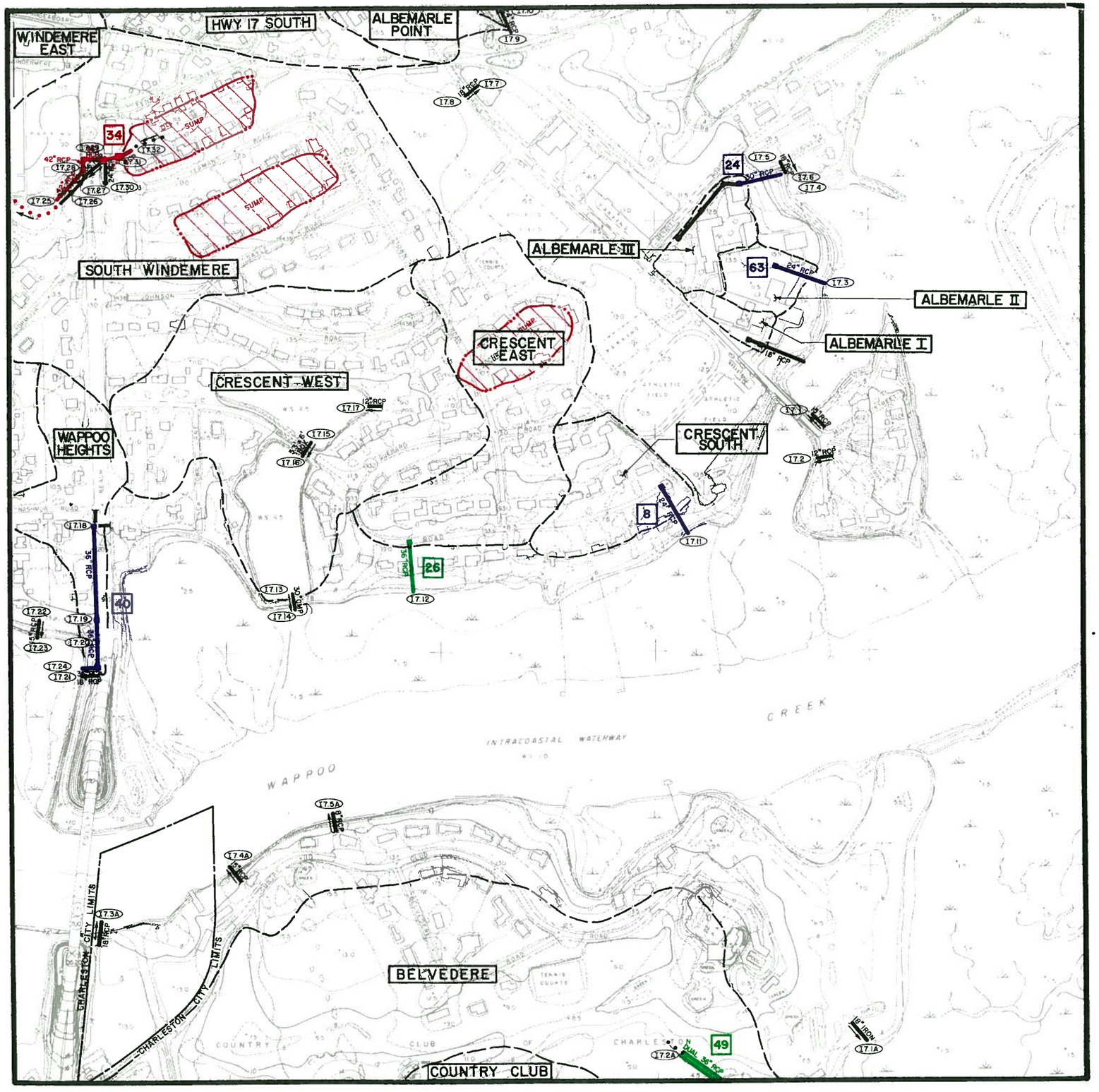
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

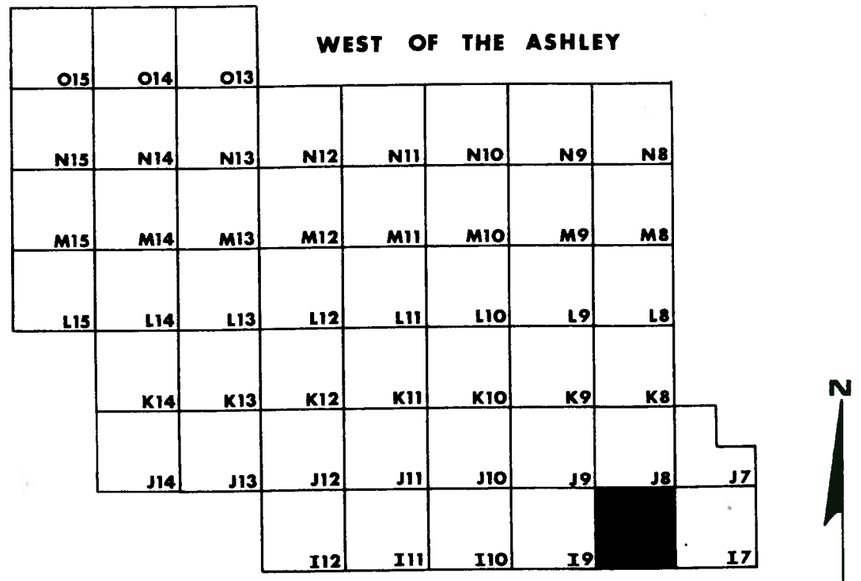
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP I8

recommended improvements
CITY OF CHARLESTON





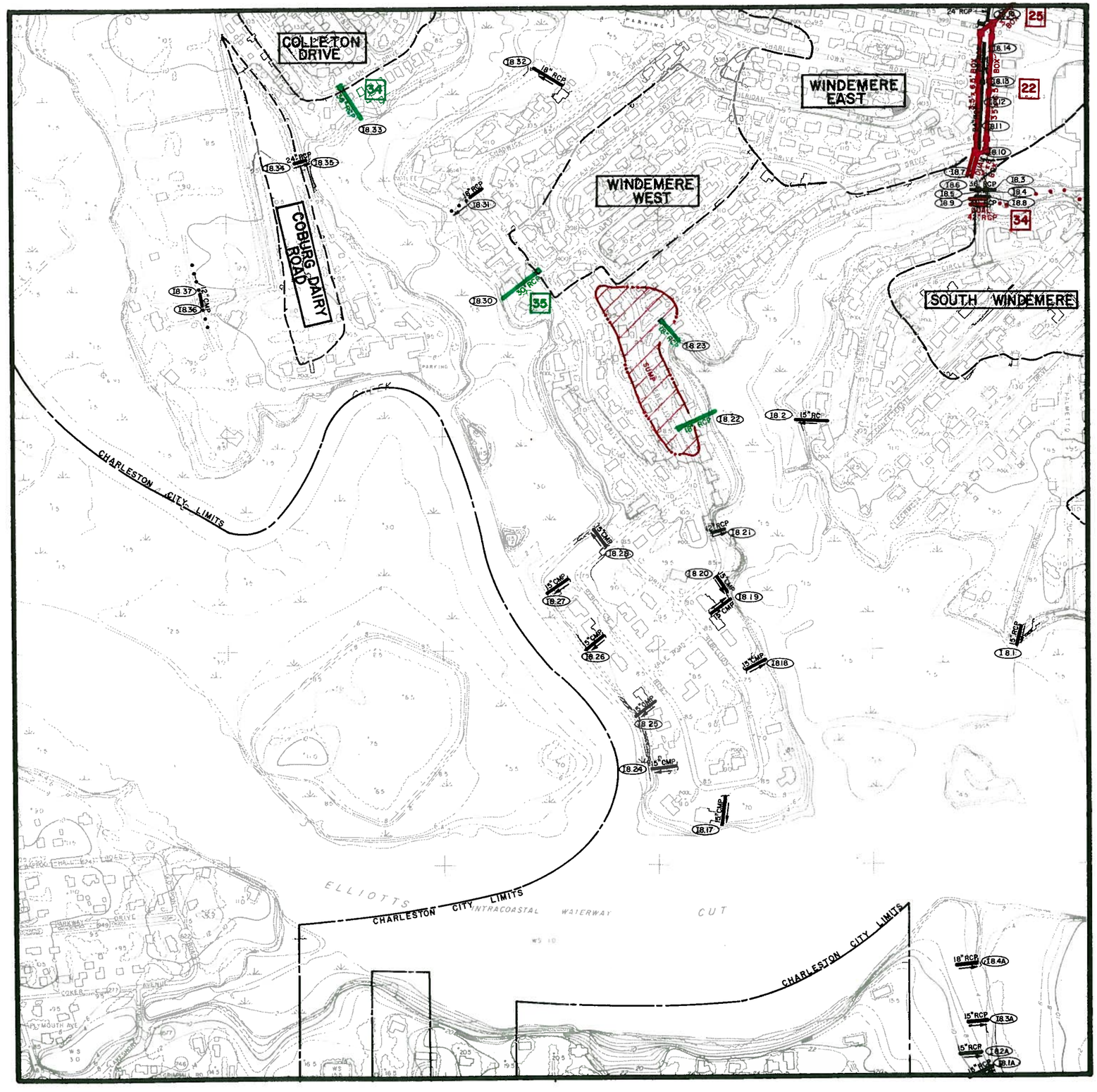
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

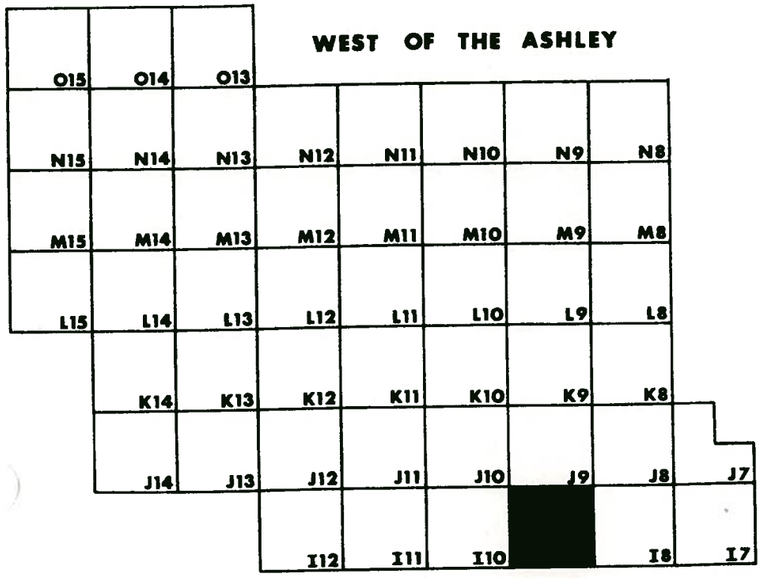
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP I9

recommended improvements
CITY OF CHARLESTON





PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

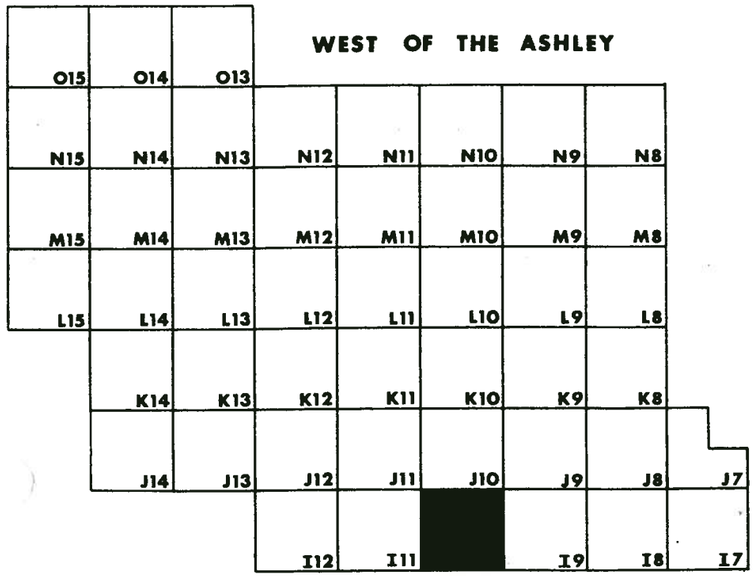
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP I10

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE

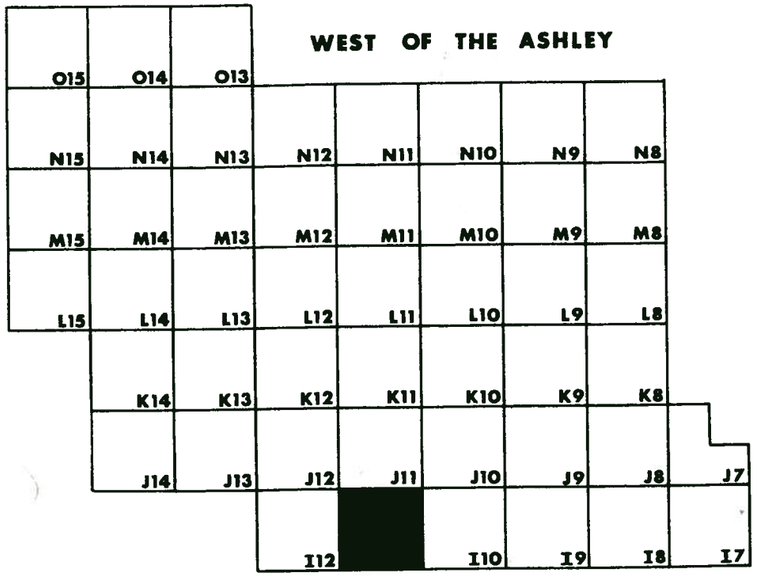
500 0 500 1000 1500

FEET



DRAINAGE SYSTEMS — MAP I11

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

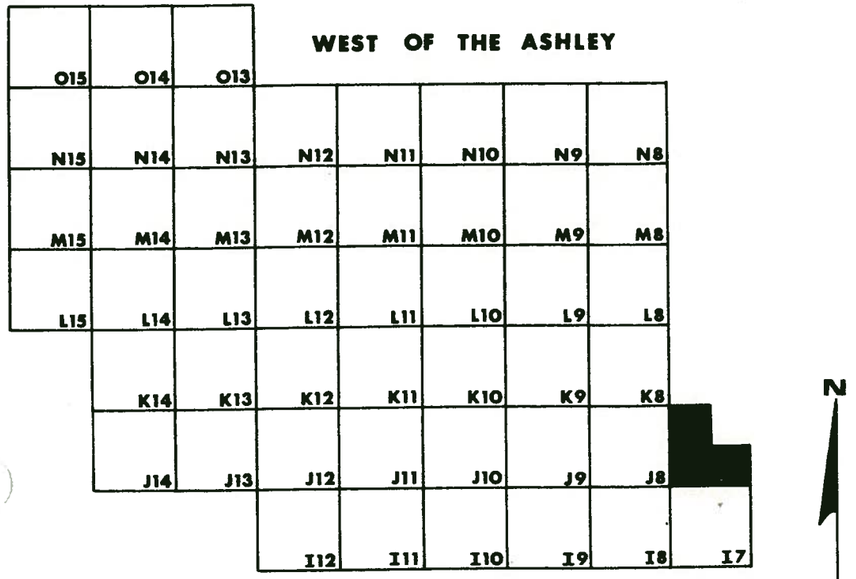
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE: 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP J7

recommended improvements
CITY OF CHARLESTON





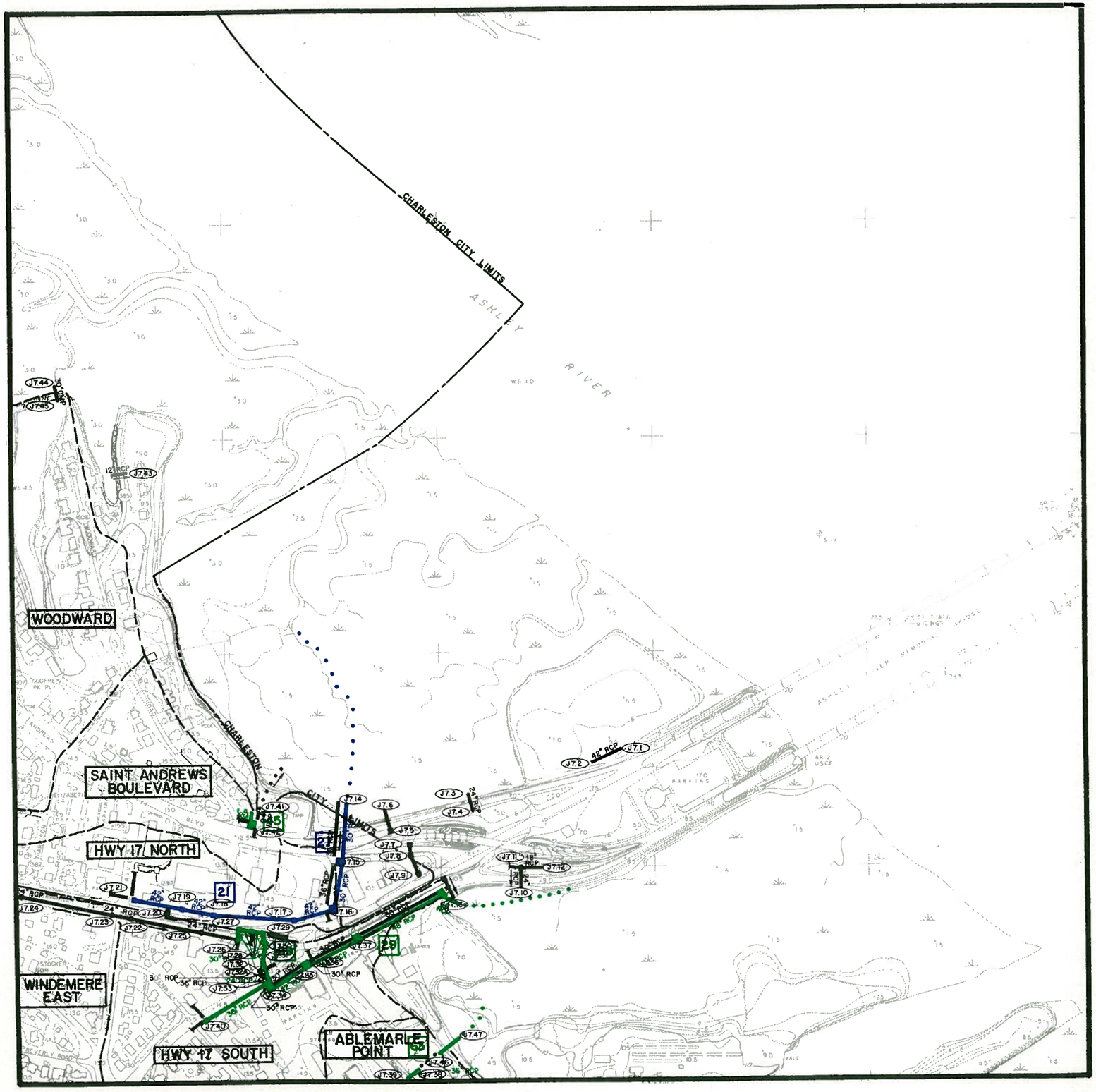
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

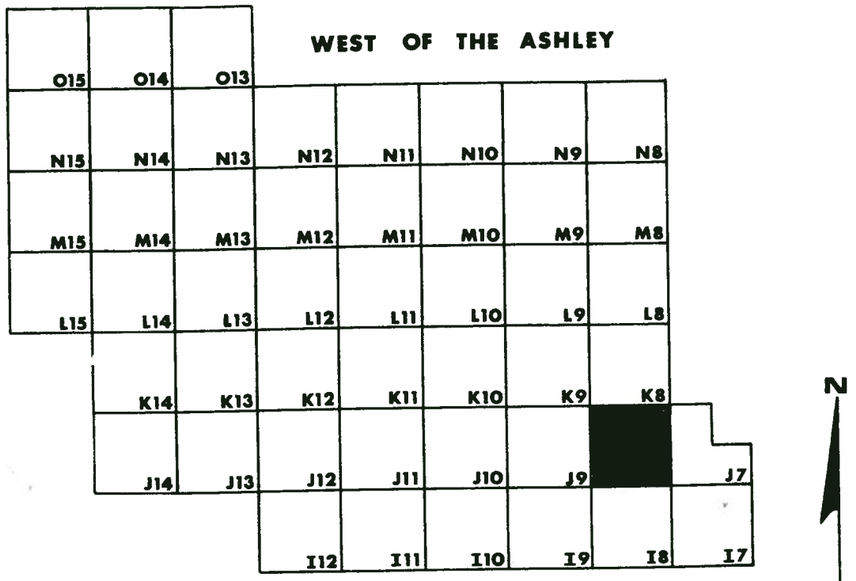
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP J8

recommended improvements
CITY OF CHARLESTON



N

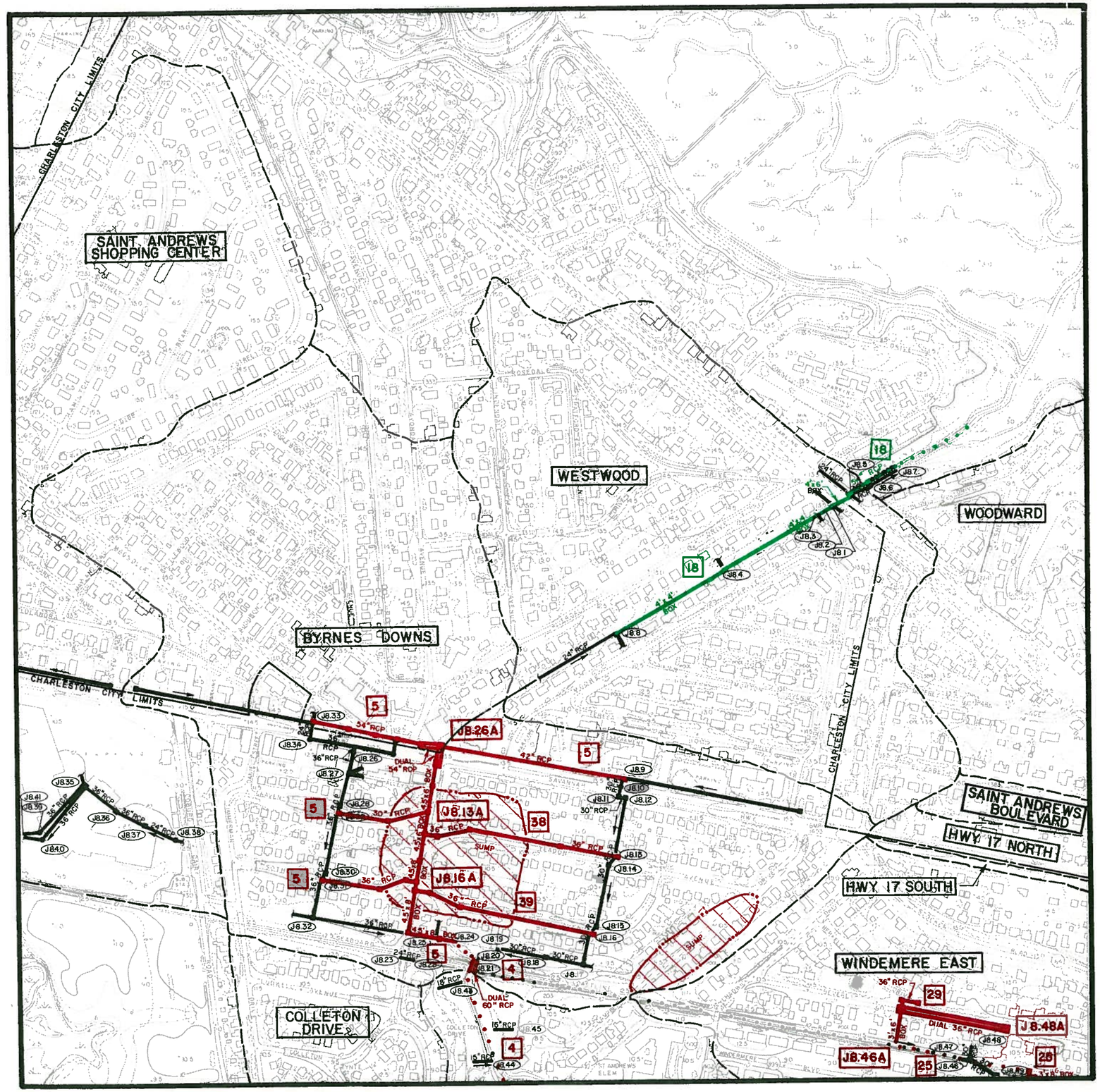
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

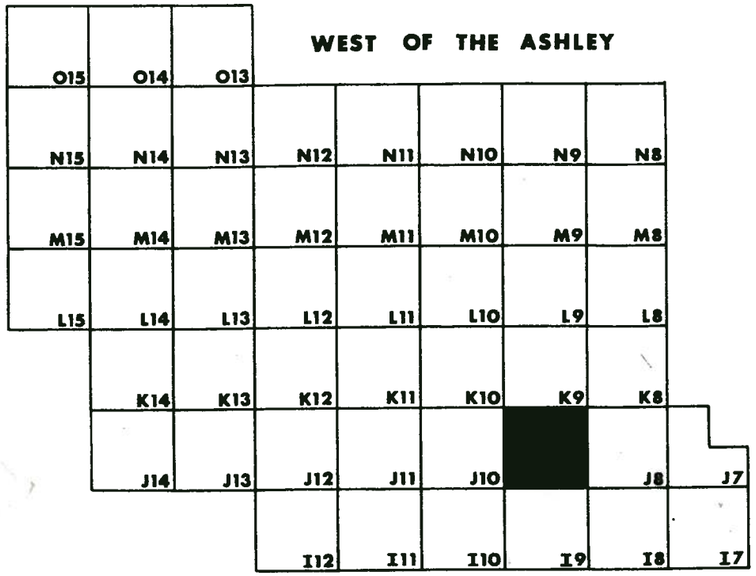
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- (P) — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP J9

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

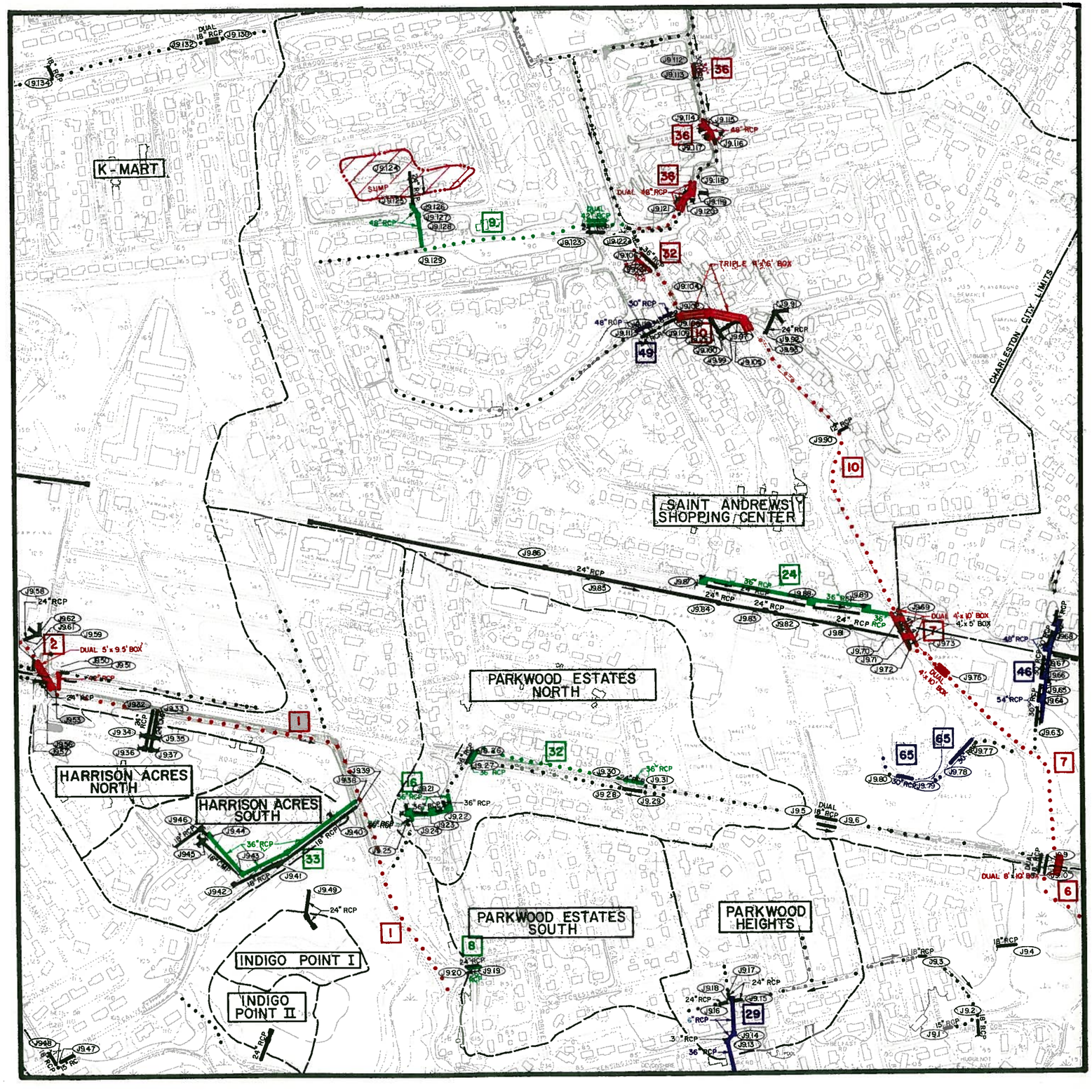
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

N



DRAINAGE SYSTEMS — MAP J10

recommended improvements
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11		J9	J8	J7
			I12	I11	I10	I9	I8	I7

N

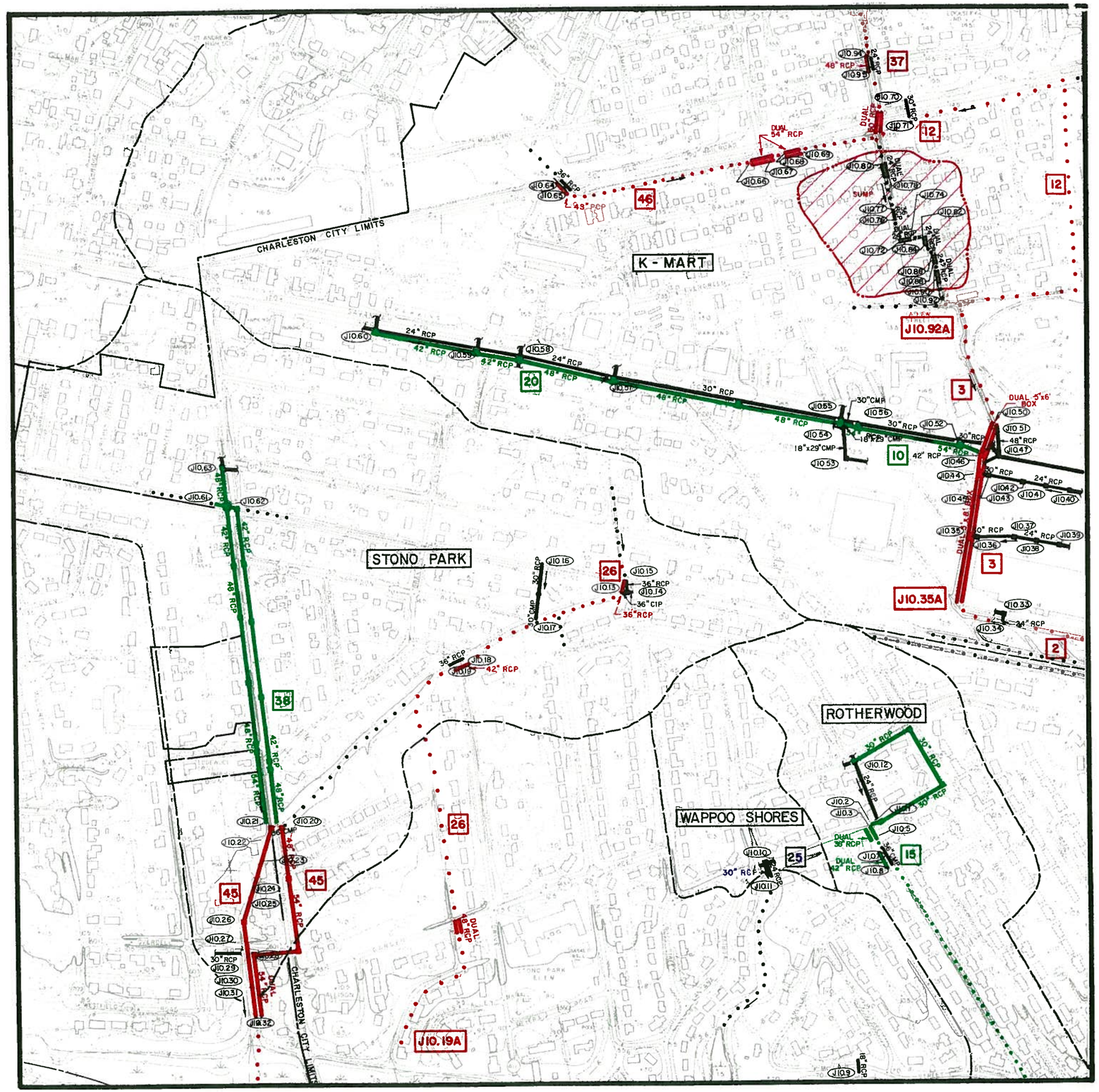
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

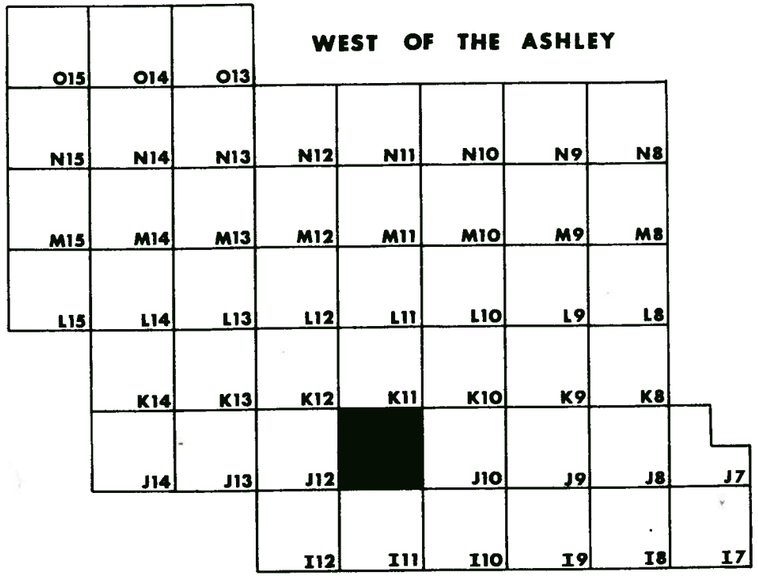
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP J11

recommended improvements
CITY OF CHARLESTON





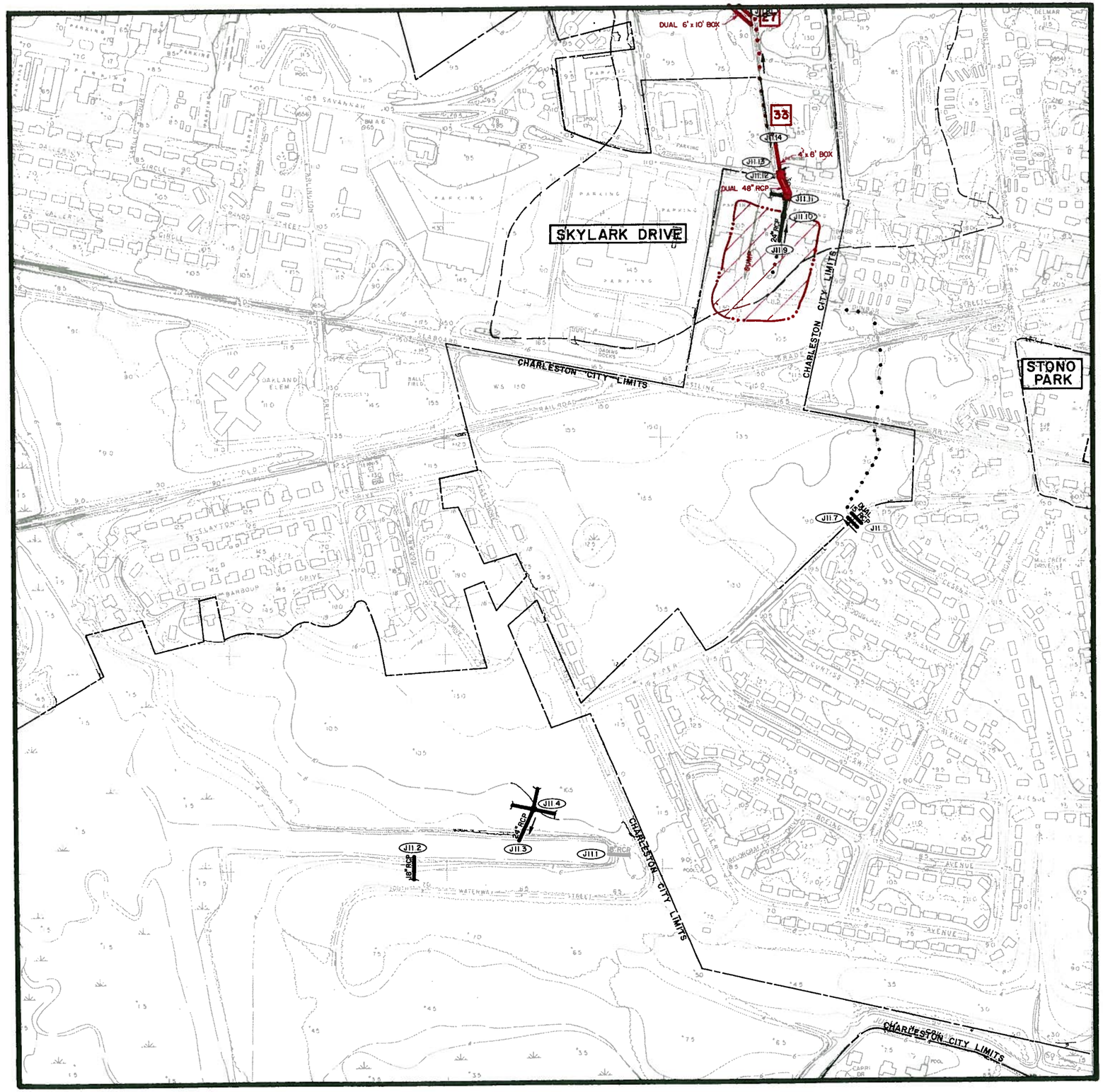
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

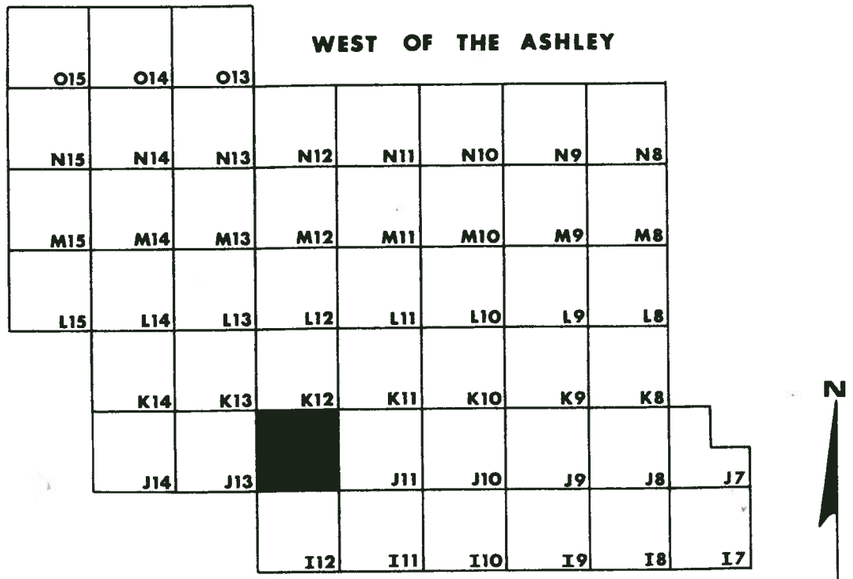
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP J12

recommended improvements
CITY OF CHARLESTON



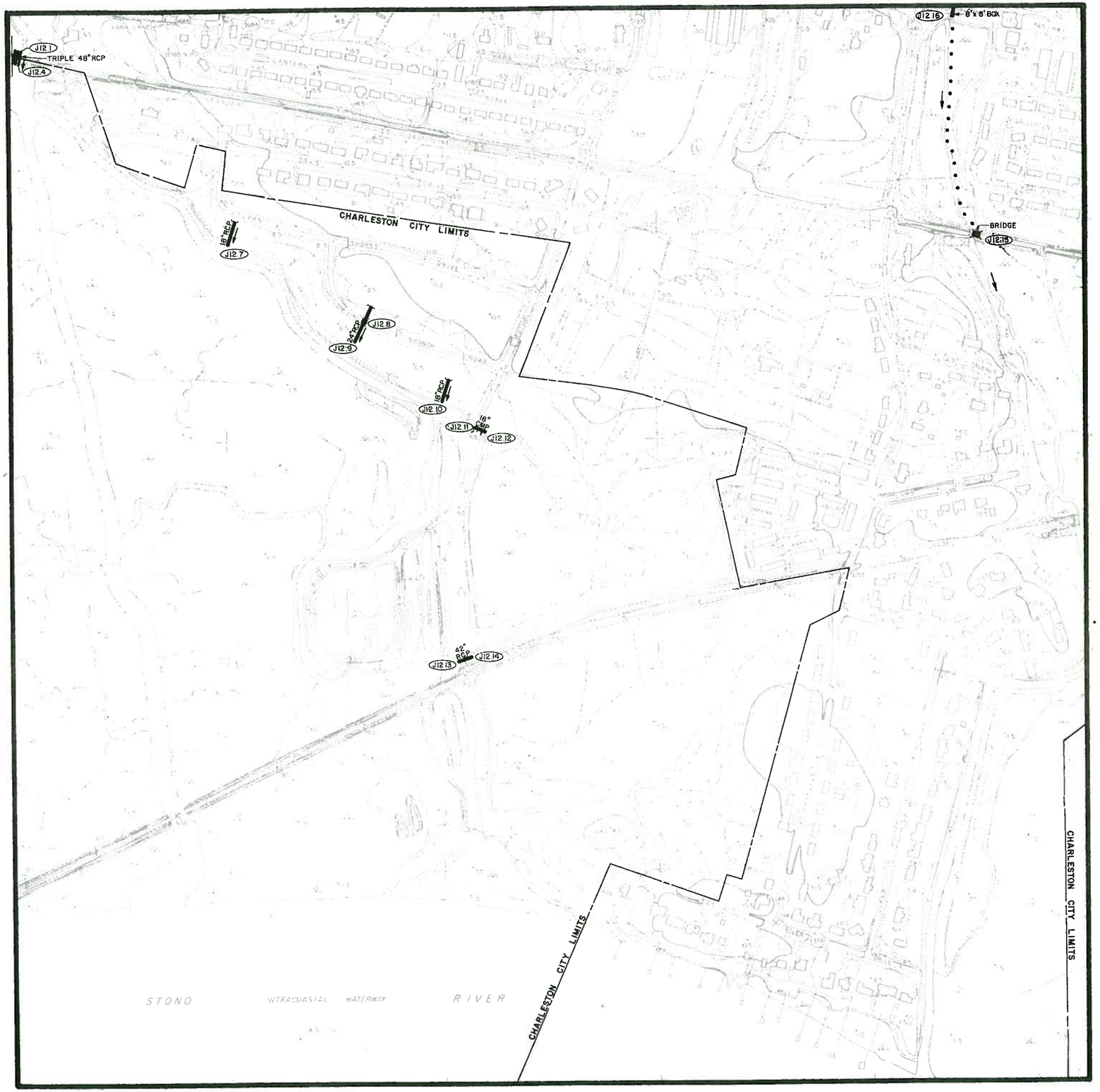
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

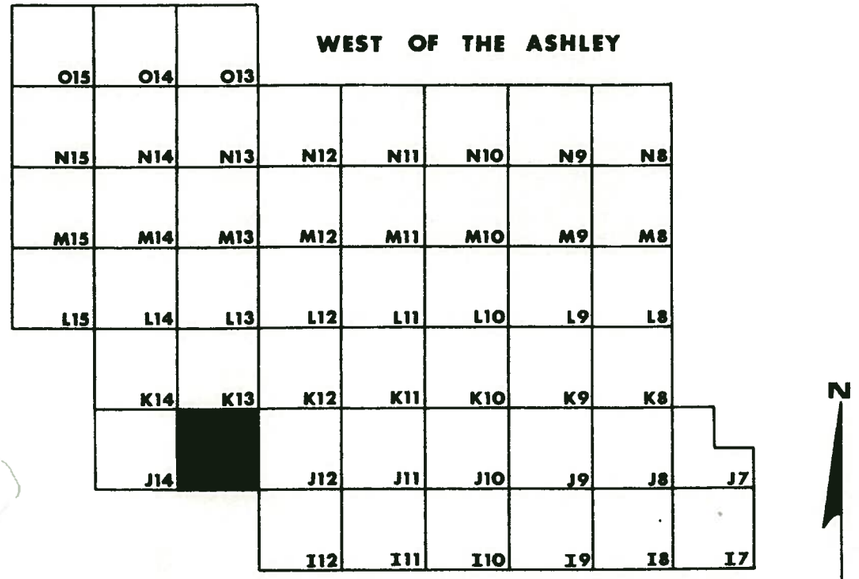
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP J13

recommended improvements
CITY OF CHARLESTON



N

PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

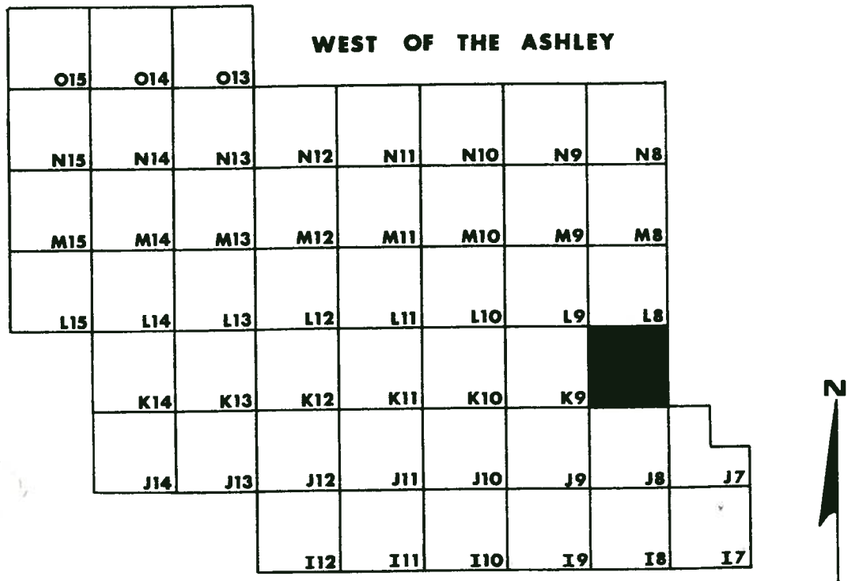
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP K8

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

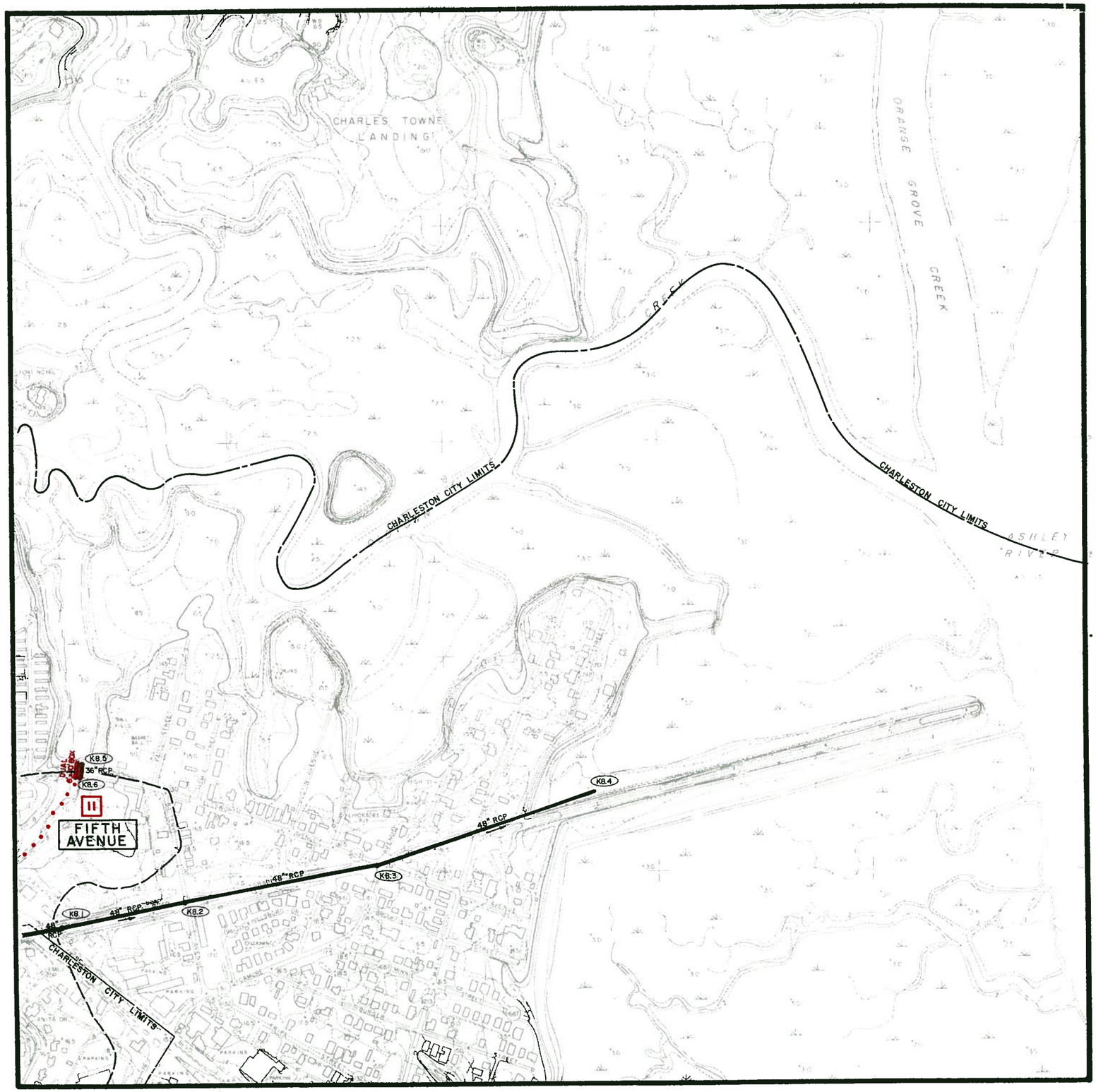
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

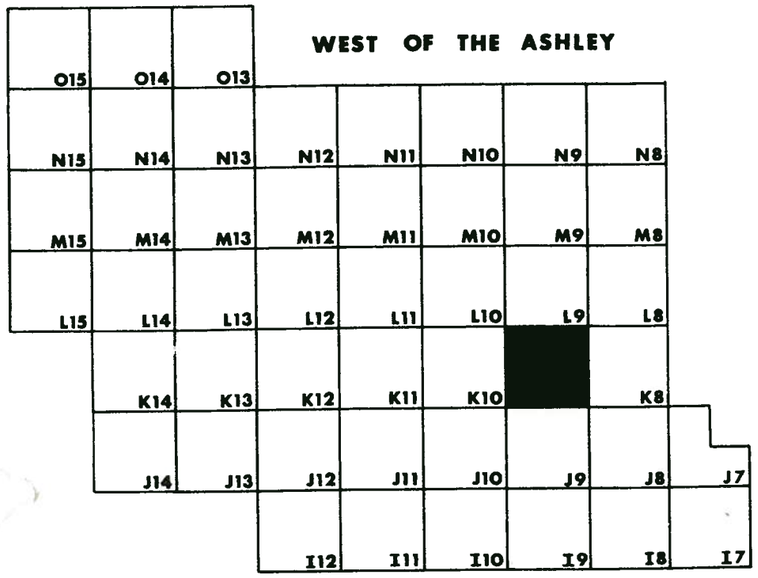
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N



DRAINAGE SYSTEMS | MAP K9

recommended improvements
CITY OF CHARLESTON



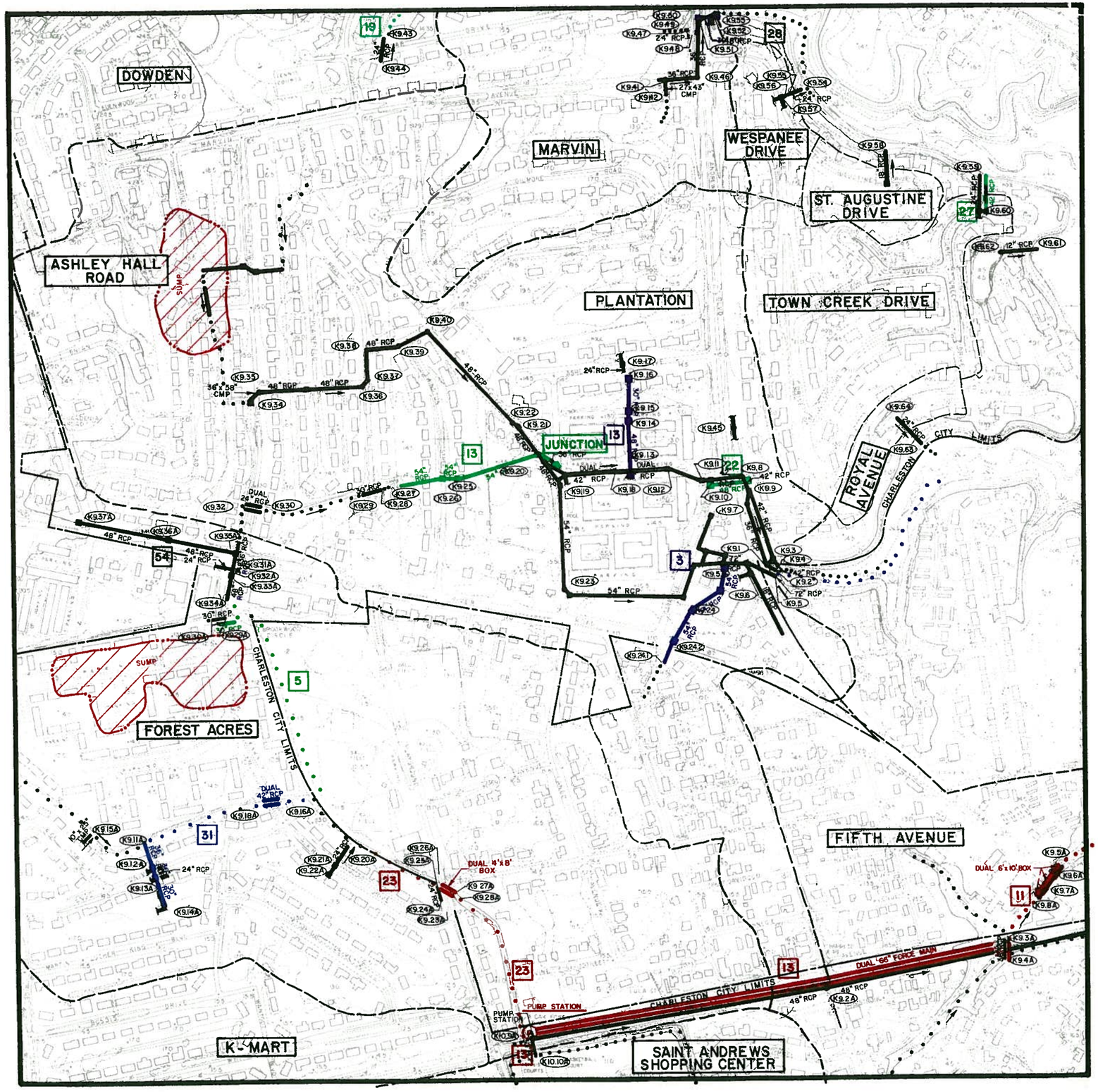
PROPOSED SYSTEM PRIORITIES

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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

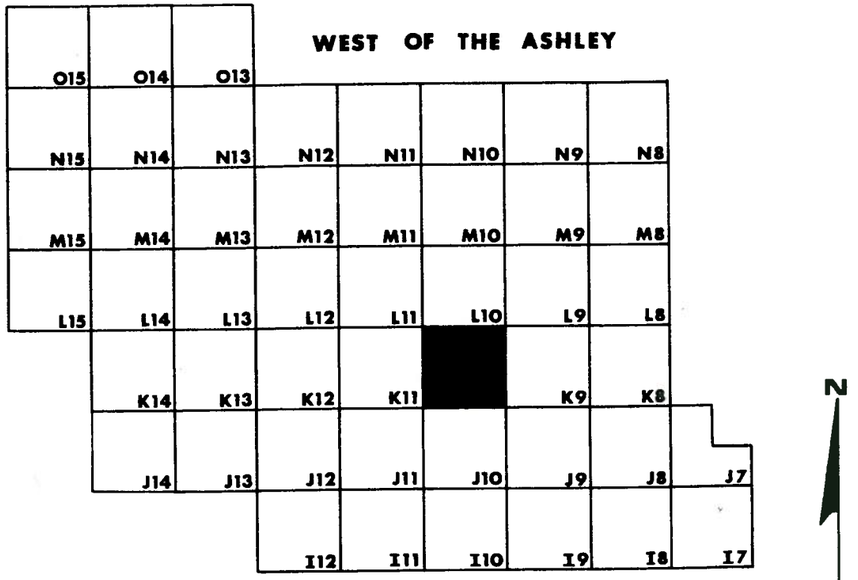
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- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- (P) — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP K10

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

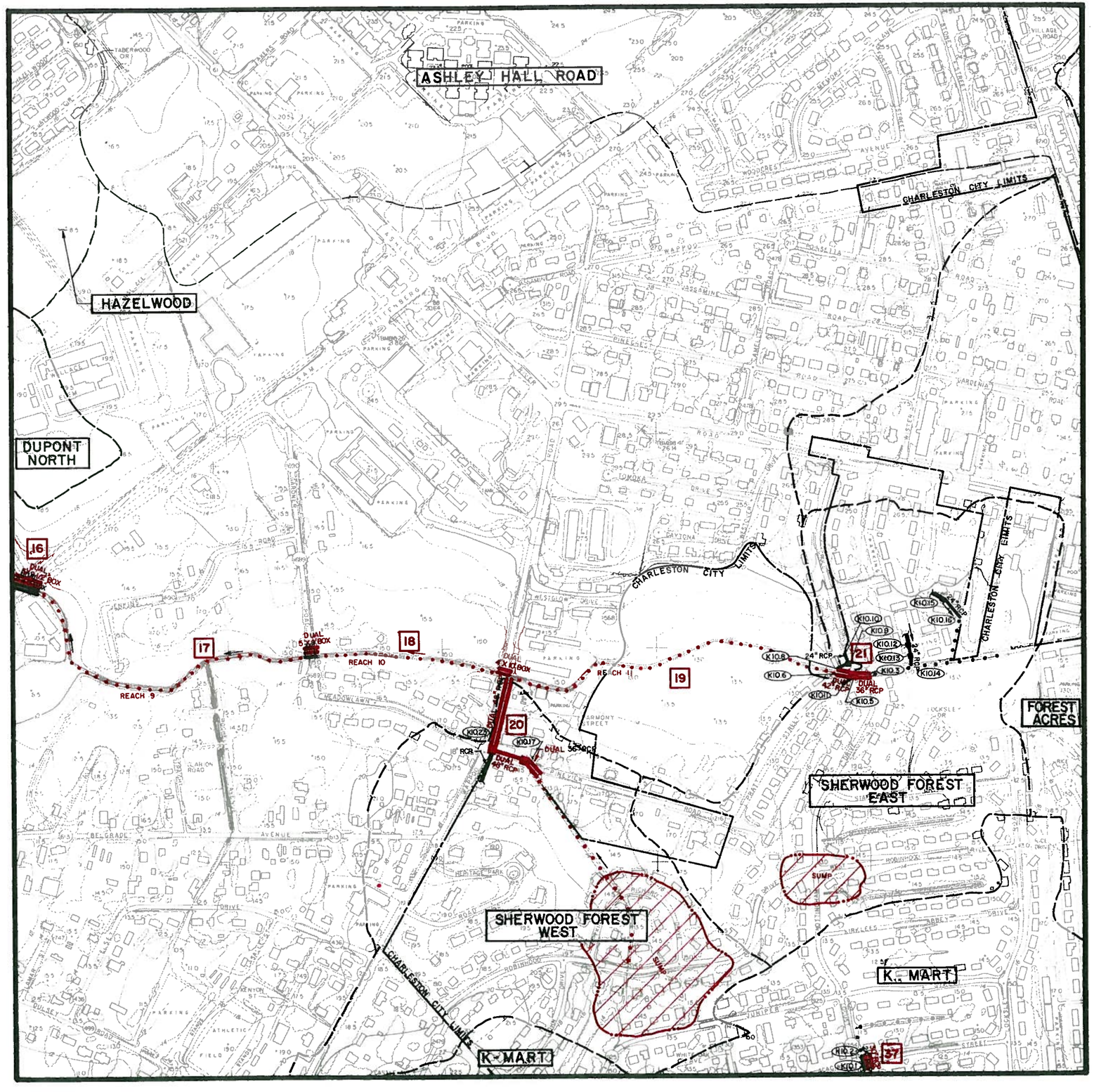
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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
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- DETENTION BASIN
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- J5.13 — MANHOLE IDENTIFICATION NO.
- (P) — PUMPING STATION

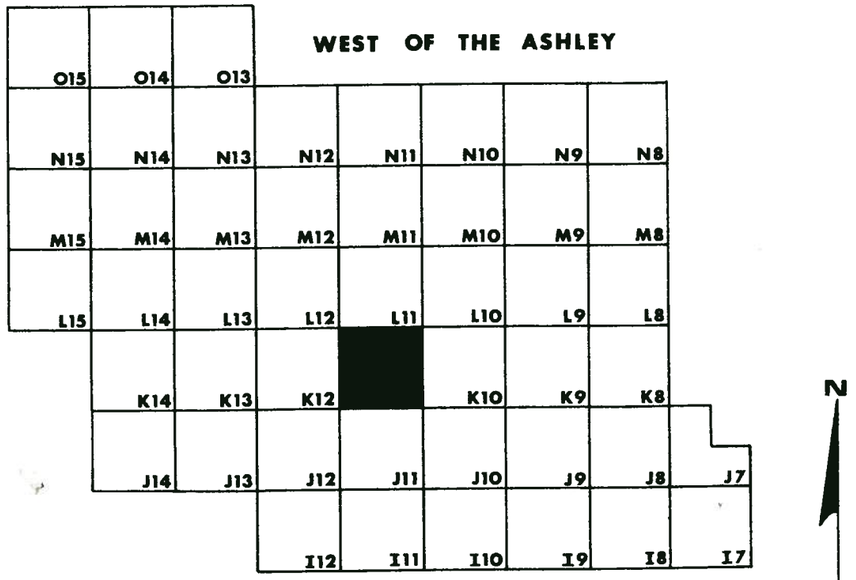
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DRAINAGE SYSTEMS — MAP K11

recommended improvements
CITY OF CHARLESTON



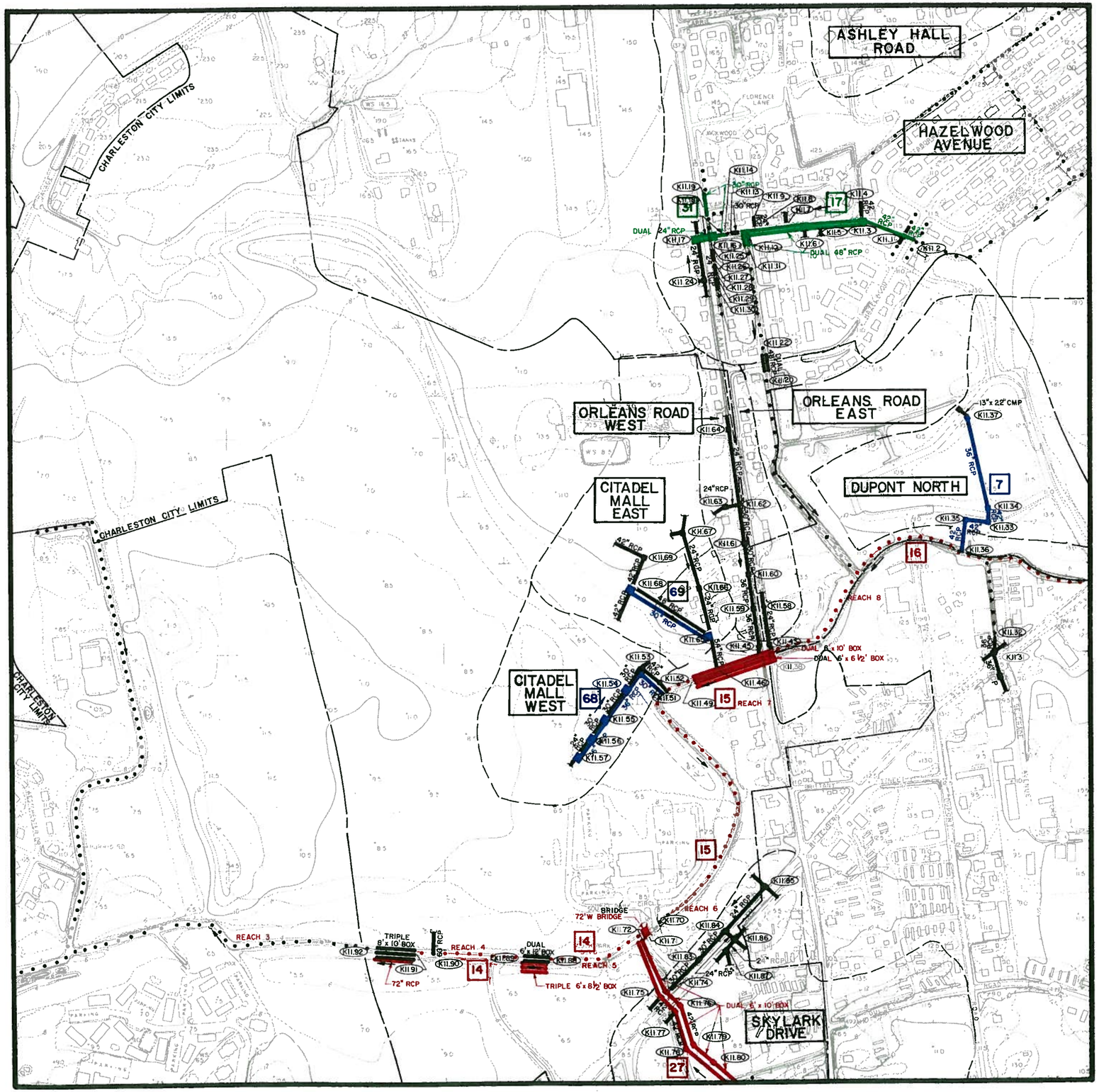
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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

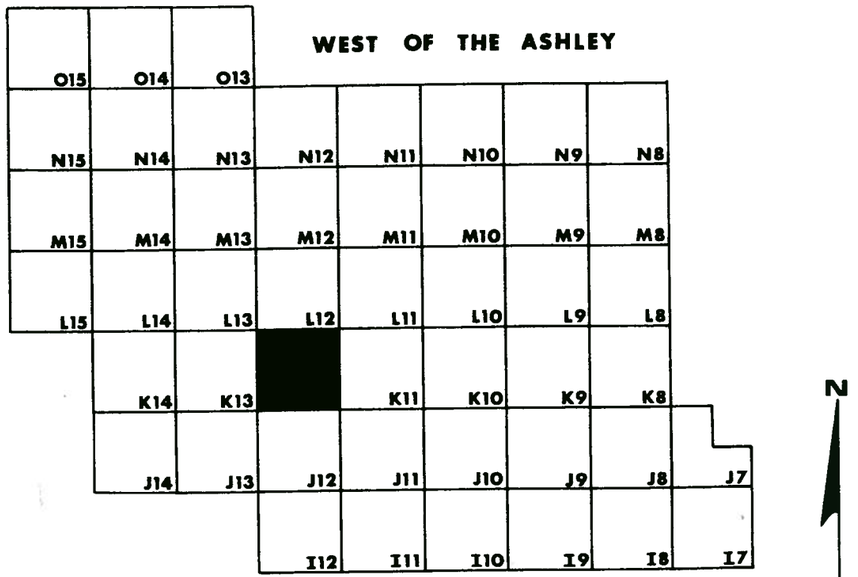
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- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP K12

recommended improvements
CITY OF CHARLESTON



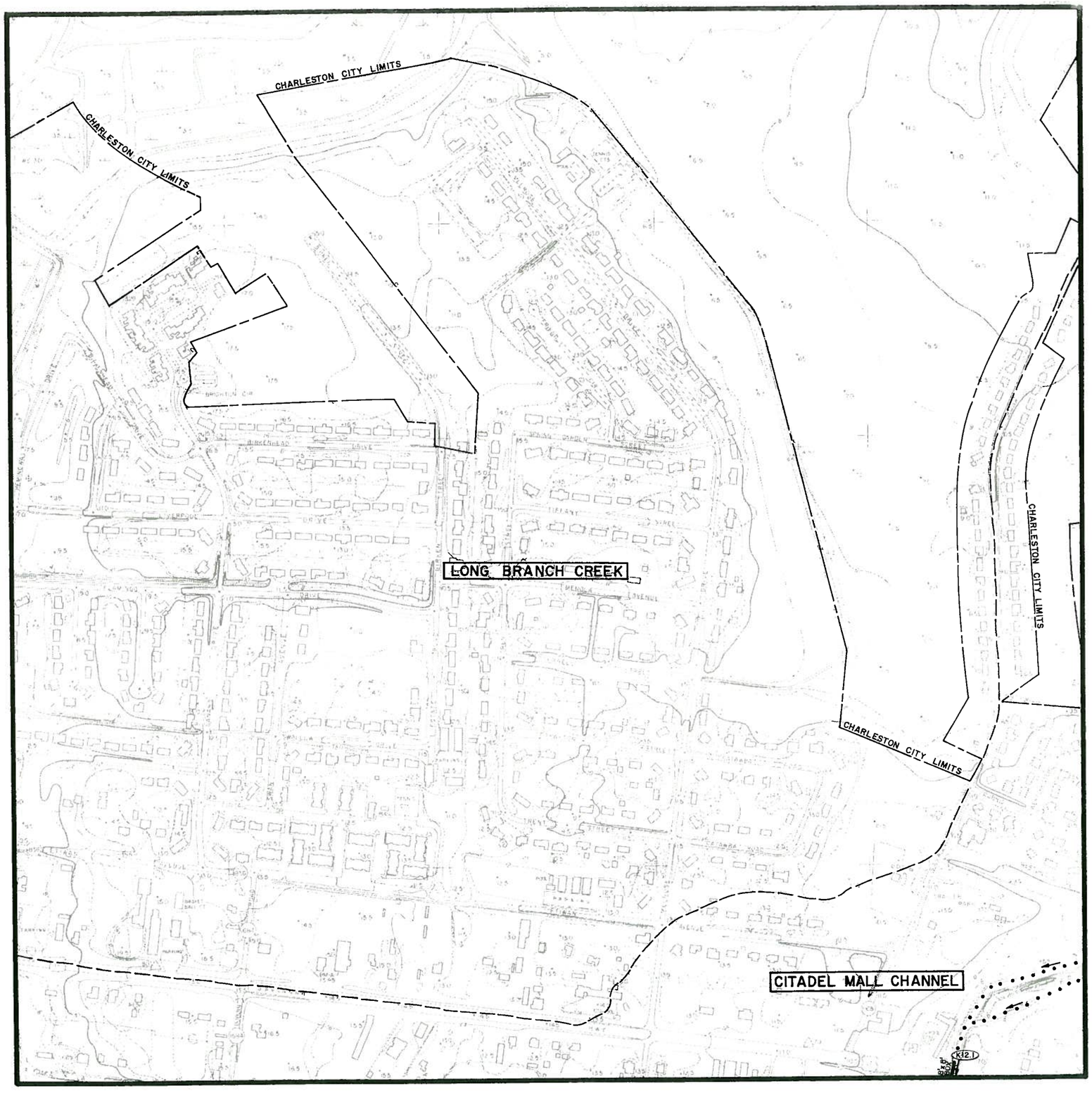
PROPOSED SYSTEM PRIORITIES

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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

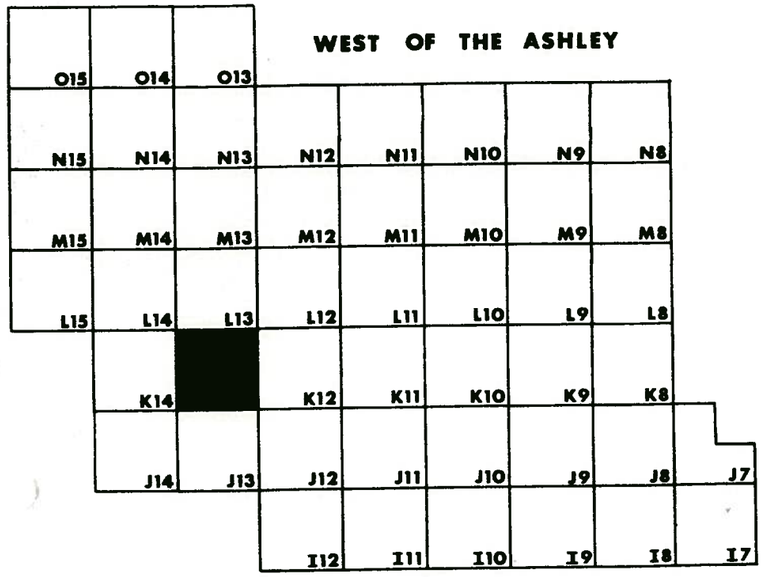
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- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP K13

recommended improvements
CITY OF CHARLESTON





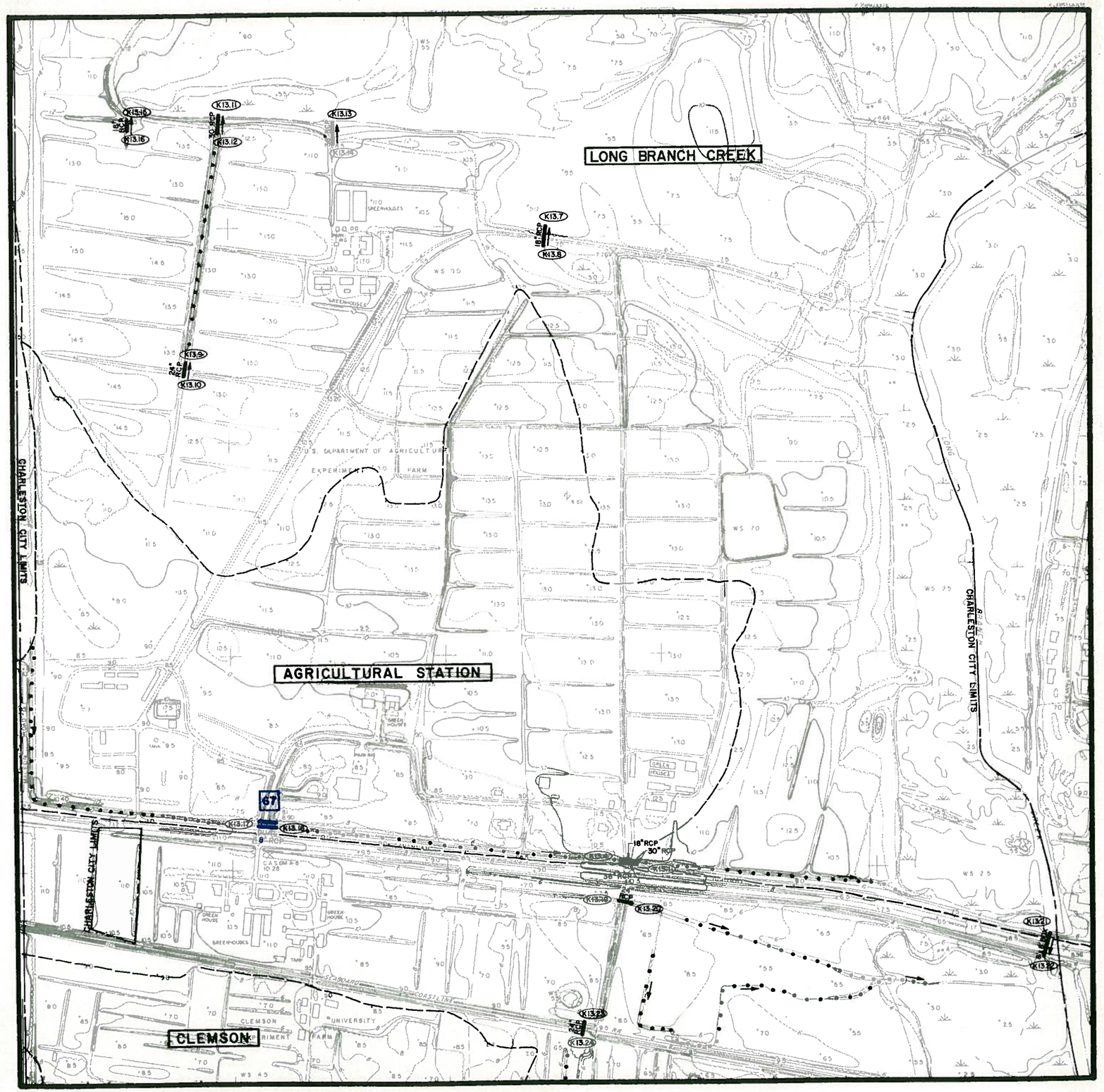
PROPOSED SYSTEM PRIORITIES

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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

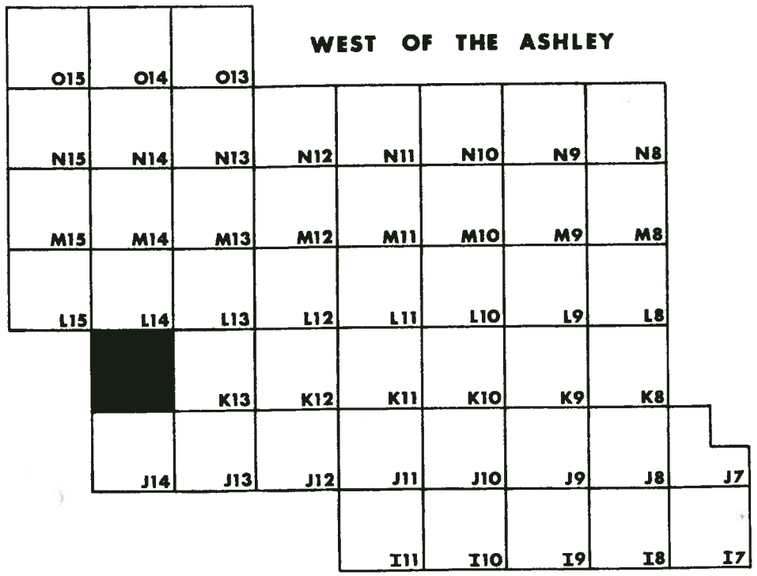
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- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
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- DETENTION BASIN
- BRIDGE
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- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



INVENTORY | MAP K14

existing drainage facilities
CITY OF CHARLESTON







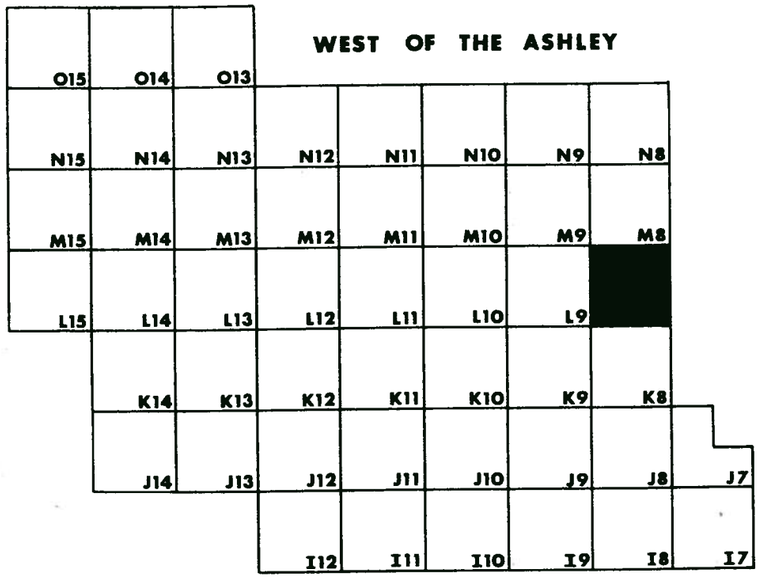
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- DRAINAGE PIPE
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- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

DRAINAGE SYSTEMS — MAP L8

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

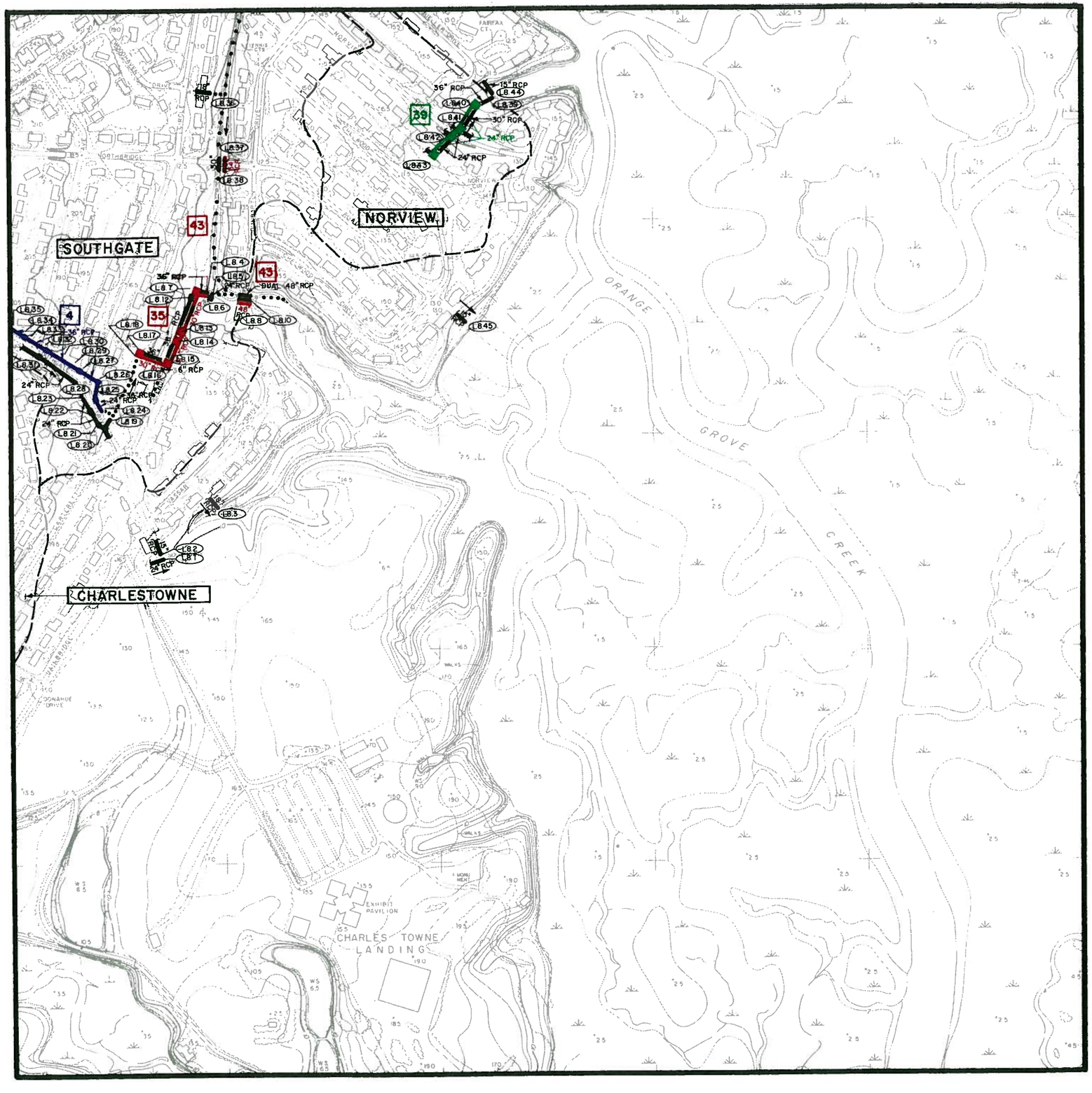
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
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- WATERSHED BOUNDARY
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- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

N



DRAINAGE SYSTEMS | MAP L9

recommended improvements
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10		L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
			I12	I11	I10	I9	I8	I7

N

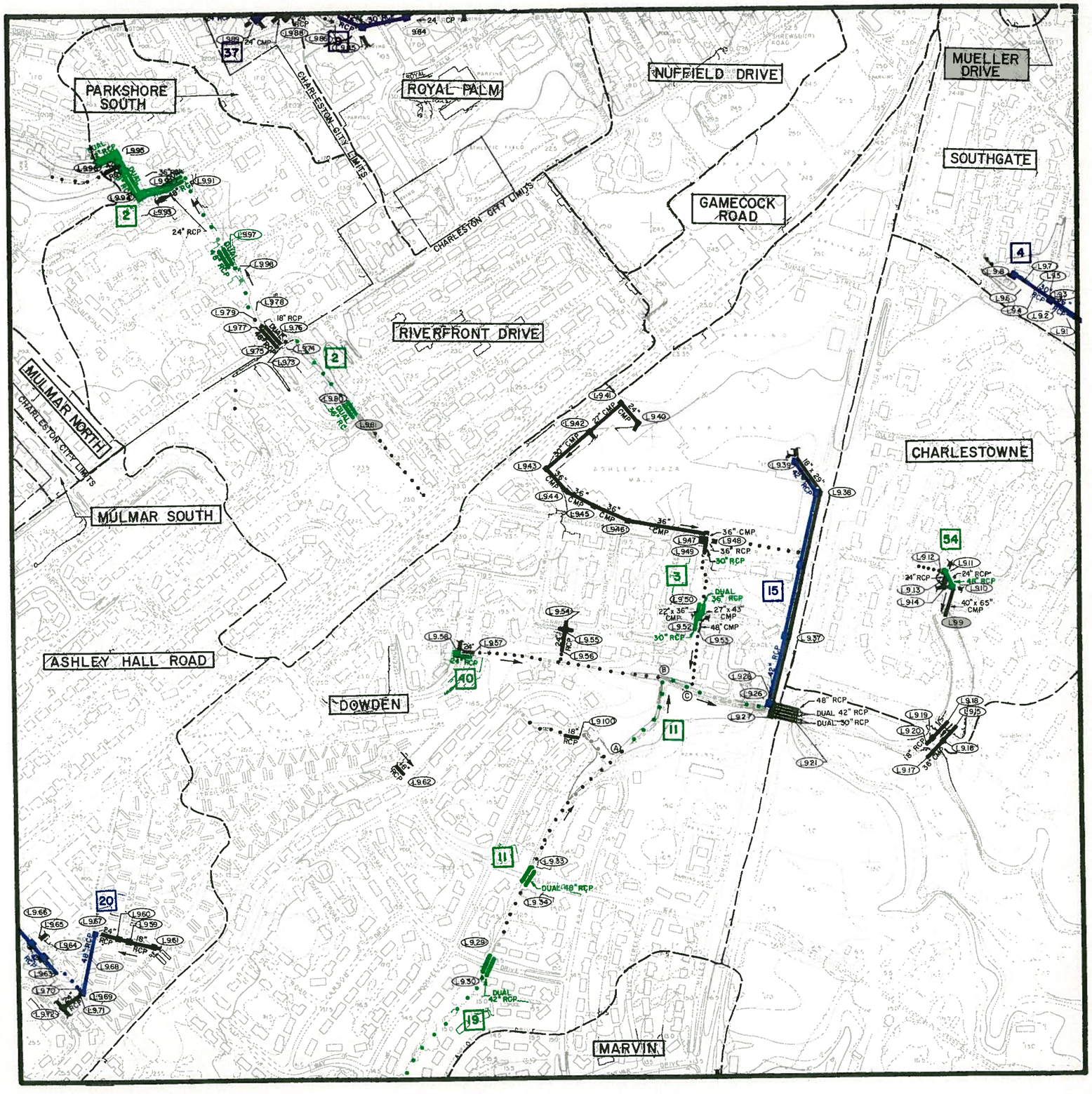
PROPOSED SYSTEM PRIORITIES

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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

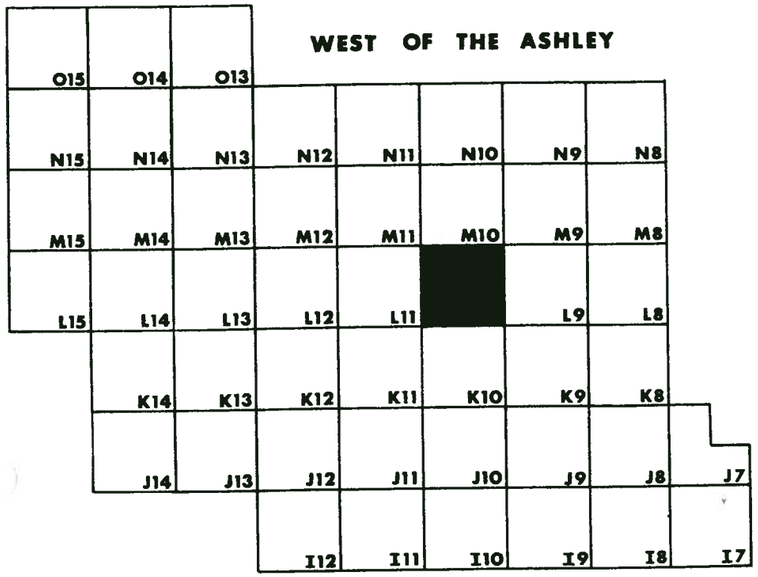
- DRAINAGE PIPE
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- BRIDGE
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- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP L10

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

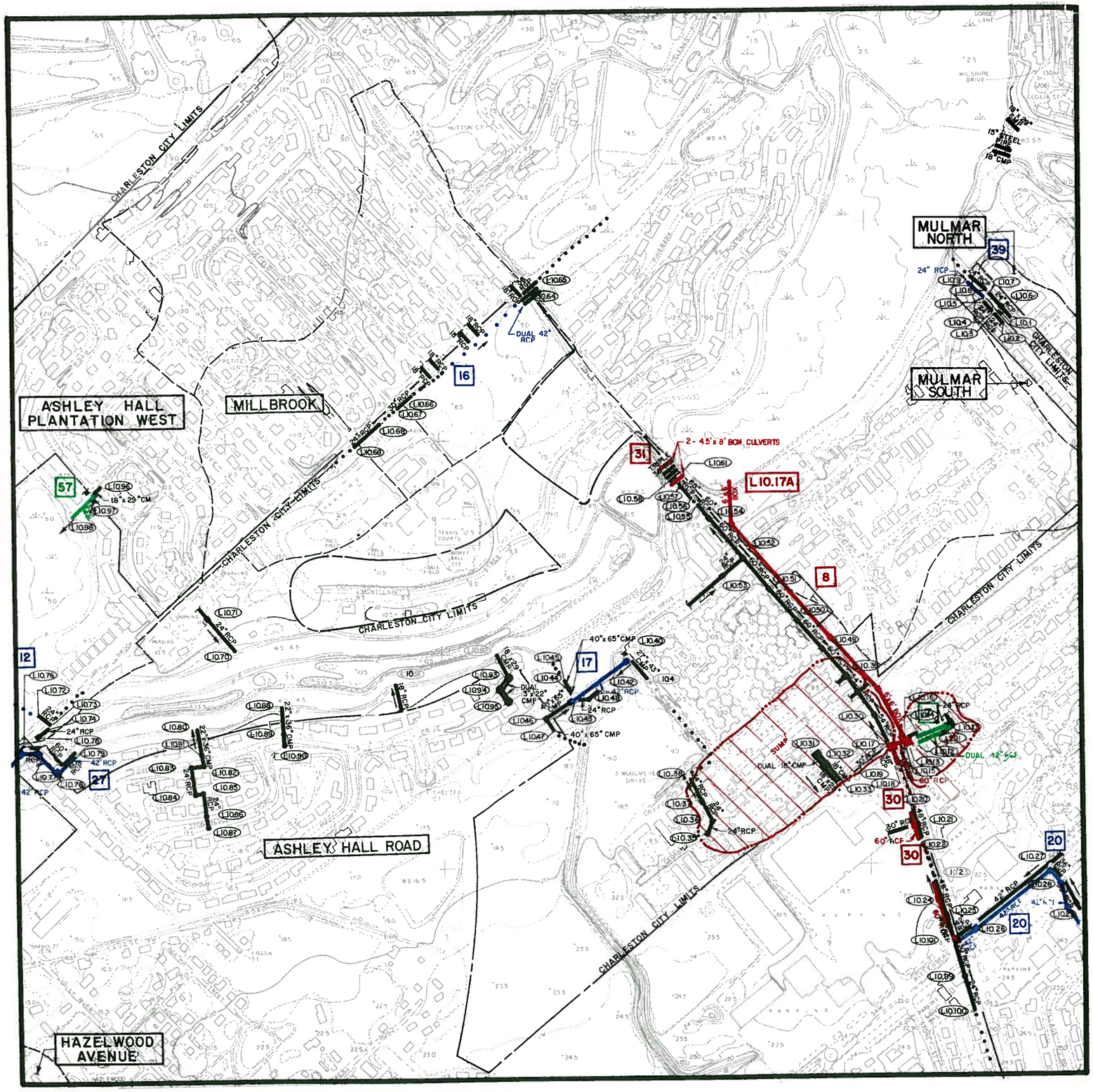
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
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- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
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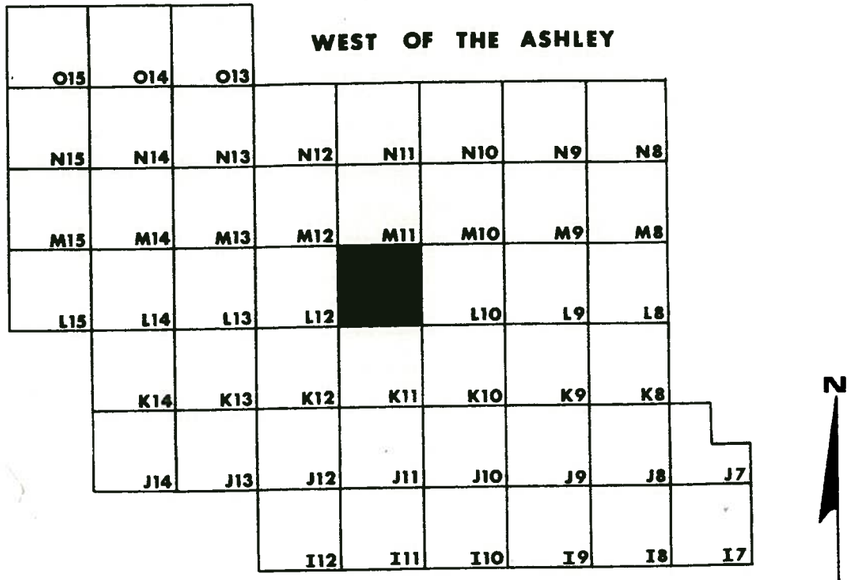
GRAPHIC SCALE 500 0 500 1000 1500 FEET

N



DRAINAGE SYSTEMS | MAP L11

recommended improvements
CITY OF CHARLESTON



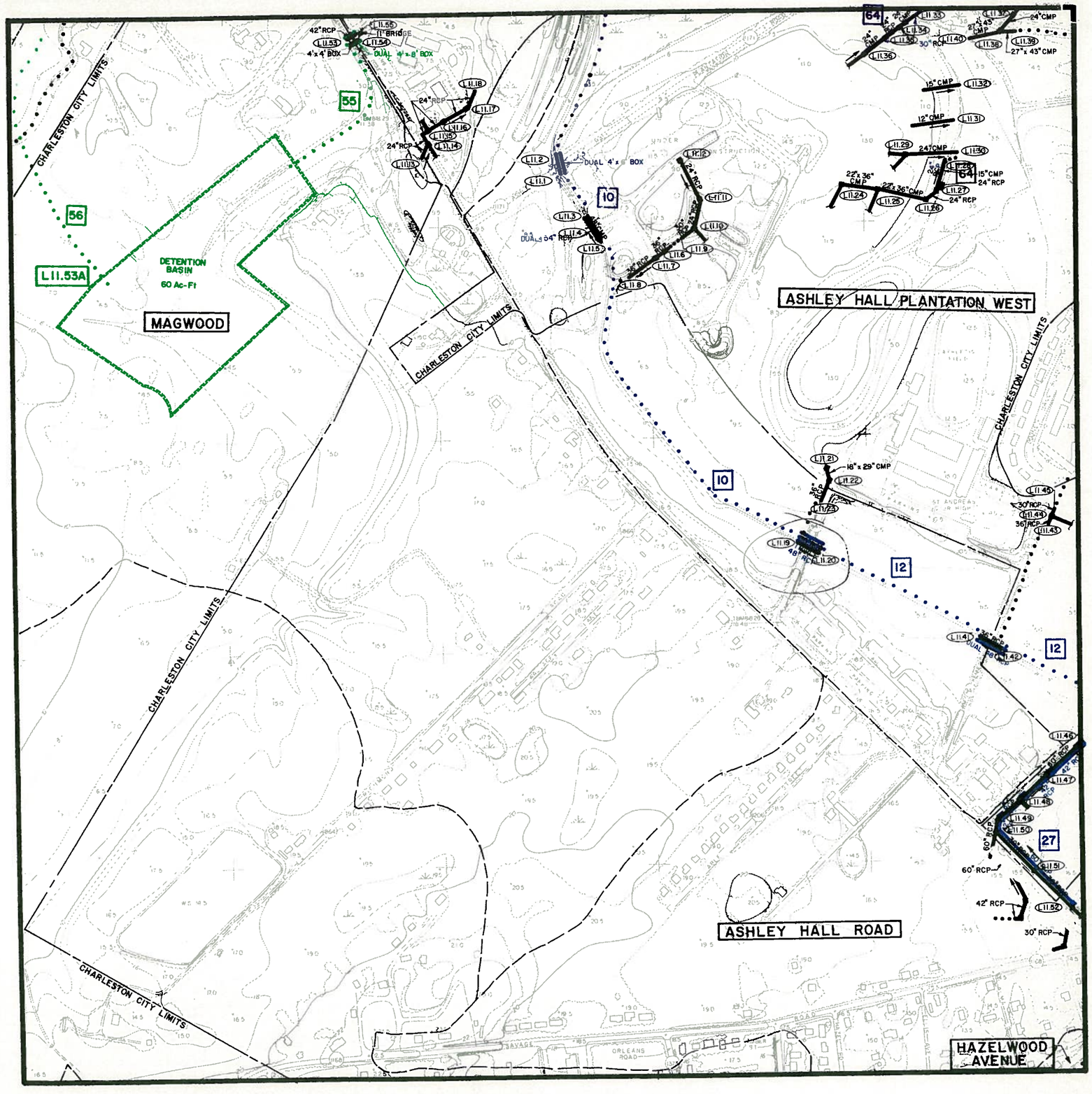
PROPOSED SYSTEM PRIORITIES

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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

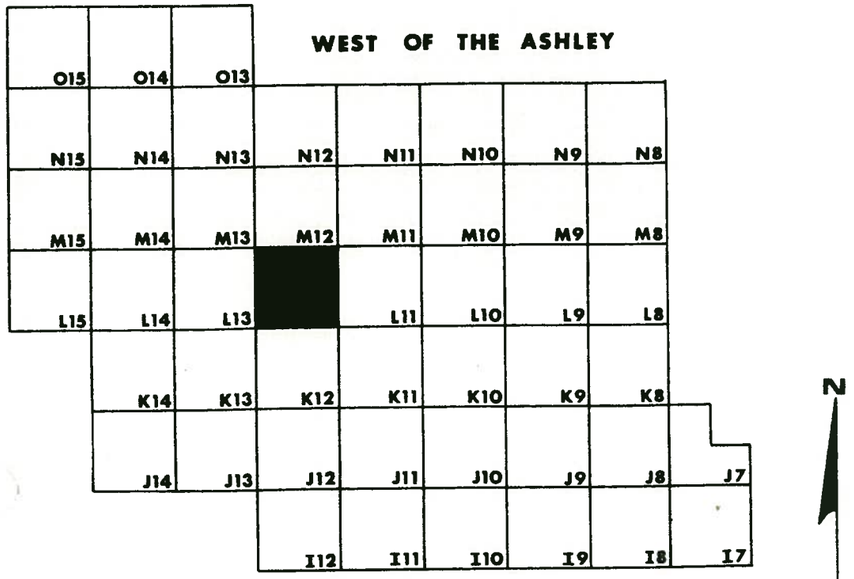
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- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP L12

recommended improvements
CITY OF CHARLESTON



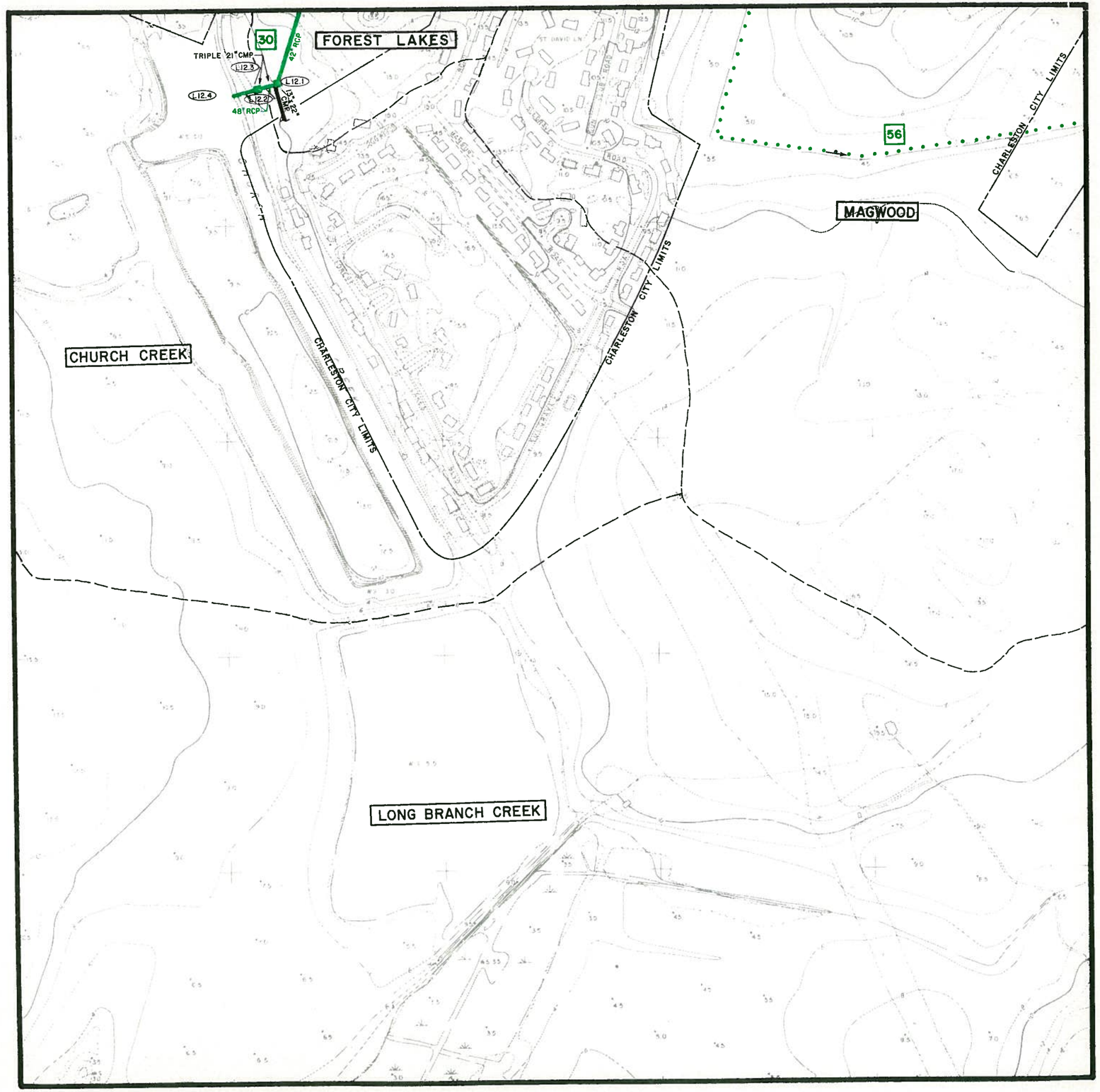
PROPOSED SYSTEM PRIORITIES

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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
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LEGEND

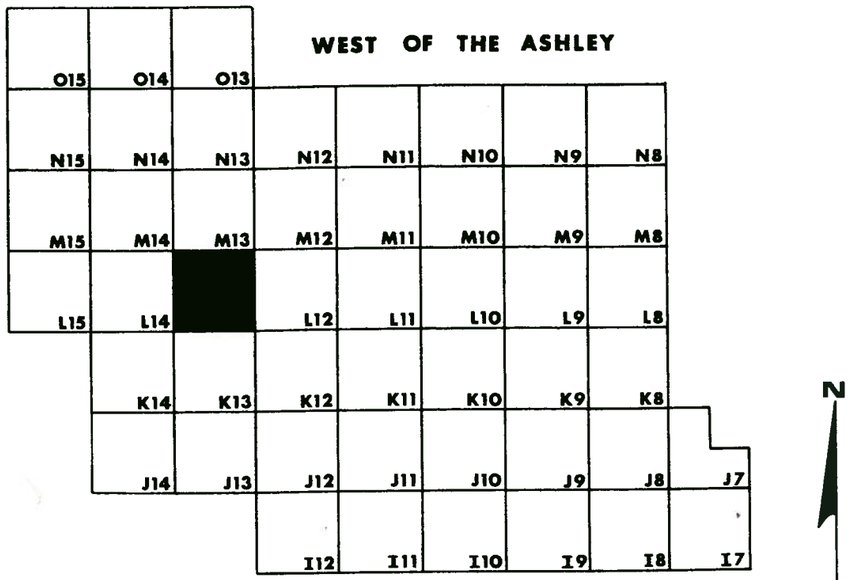
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- BRIDGE
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- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP L13

recommended improvements
CITY OF CHARLESTON





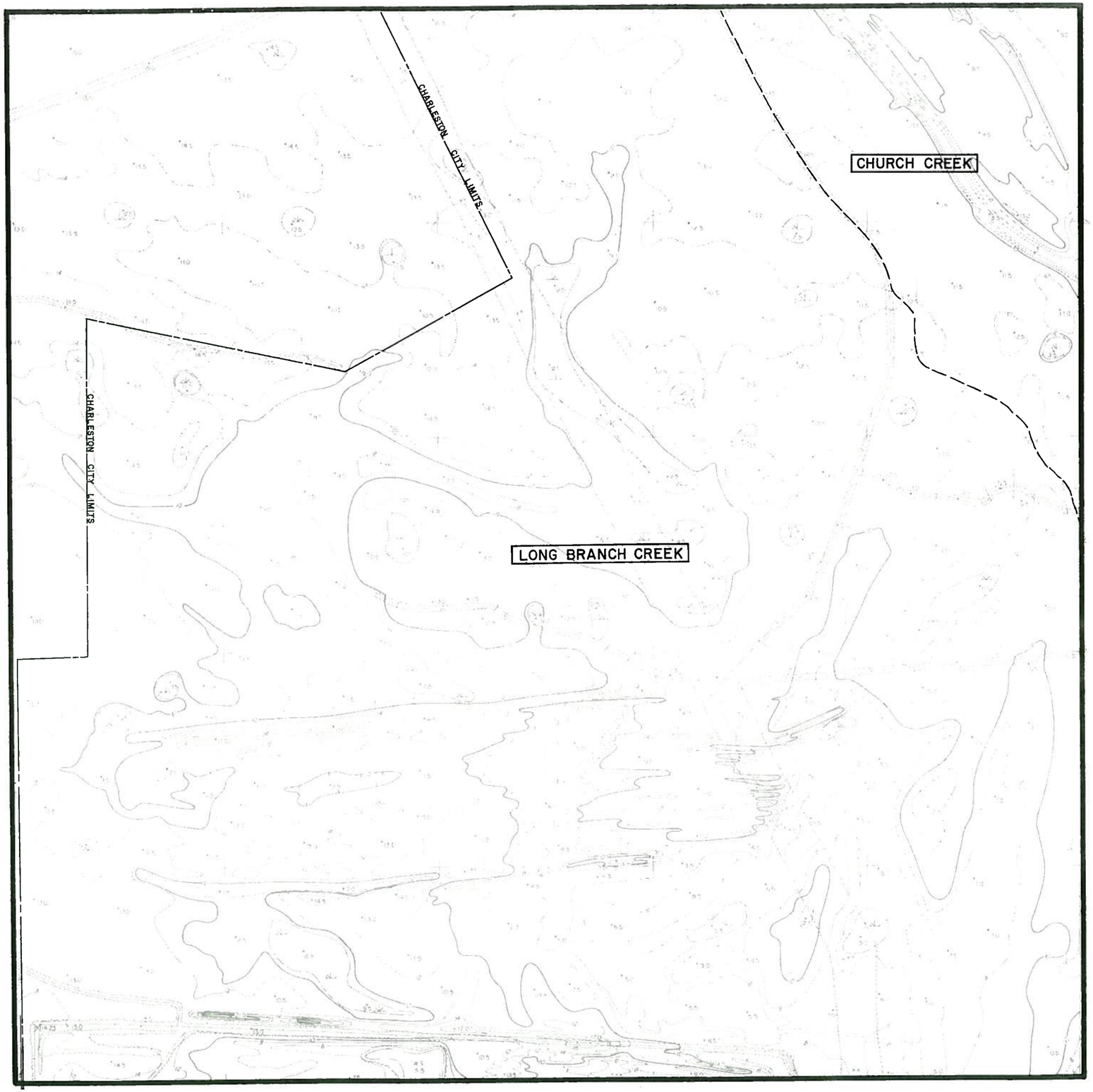
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GREEN	SECOND PRIORITY
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LEGEND

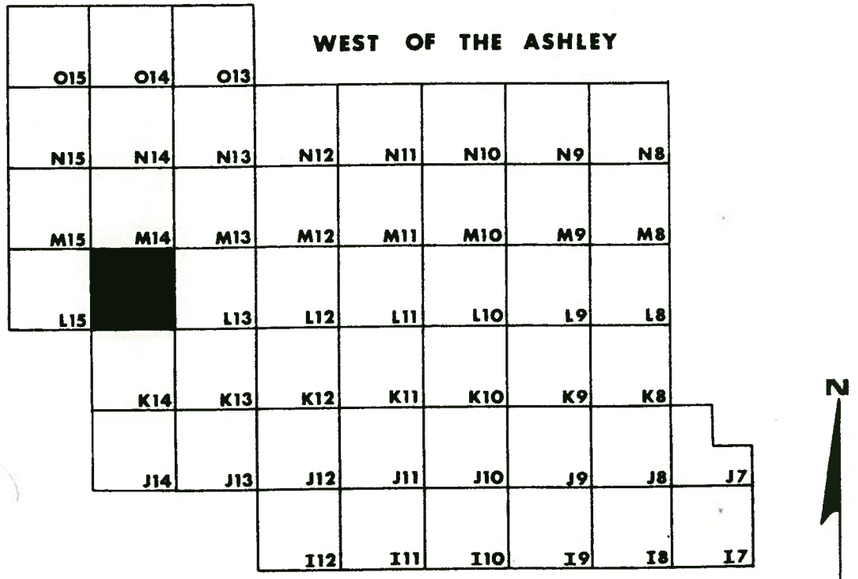
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- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP L14

recommended improvements
CITY OF CHARLESTON



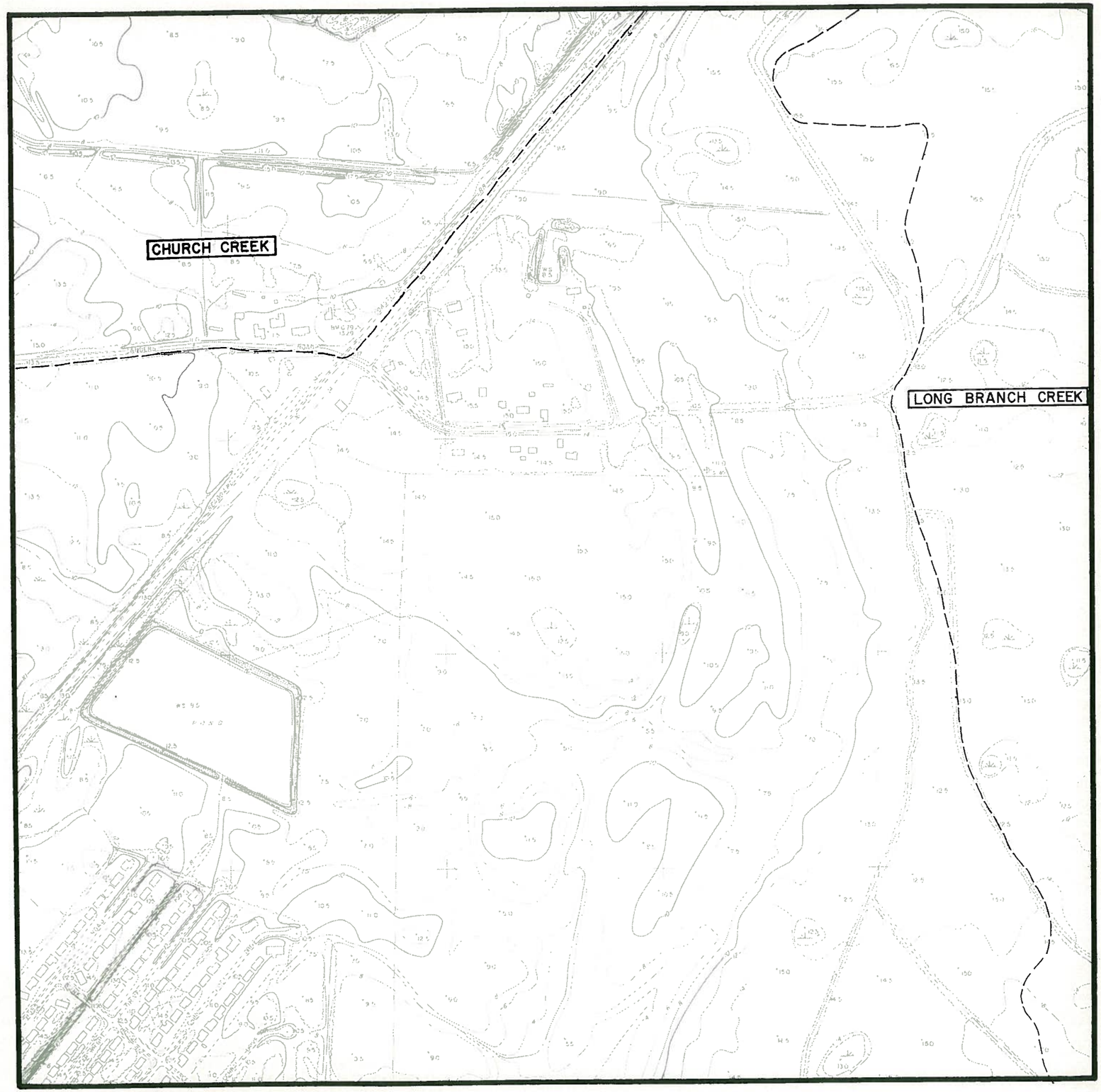
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
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- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
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- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

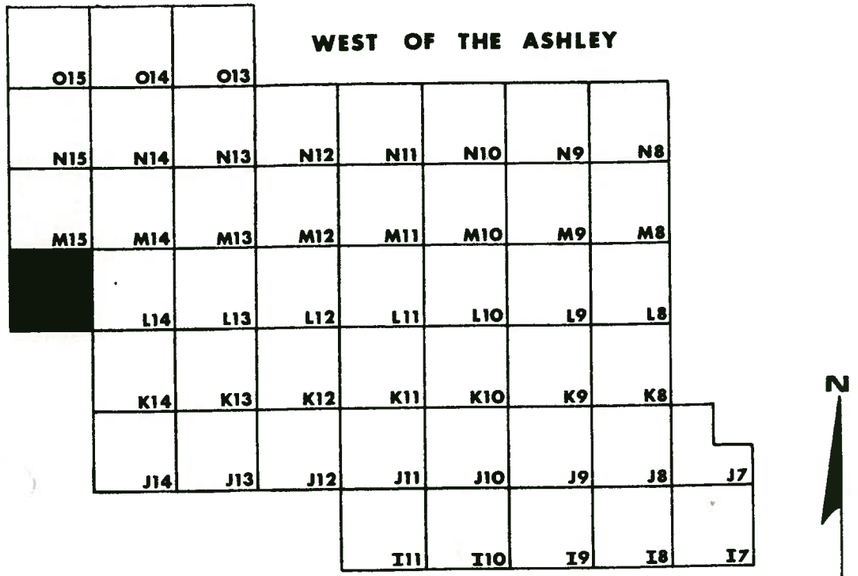
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INVENTORY

MAP L15

existing drainage facilities
CITY OF CHARLESTON







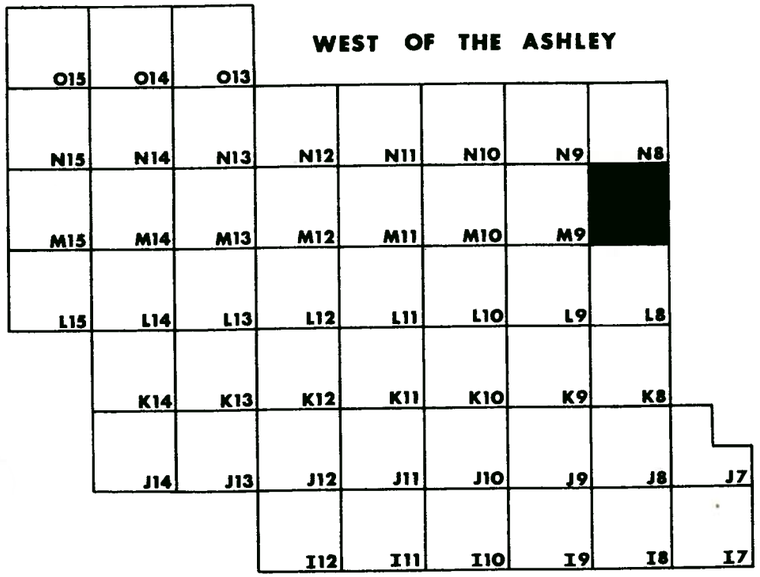
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- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

DRAINAGE SYSTEMS — MAP M8

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

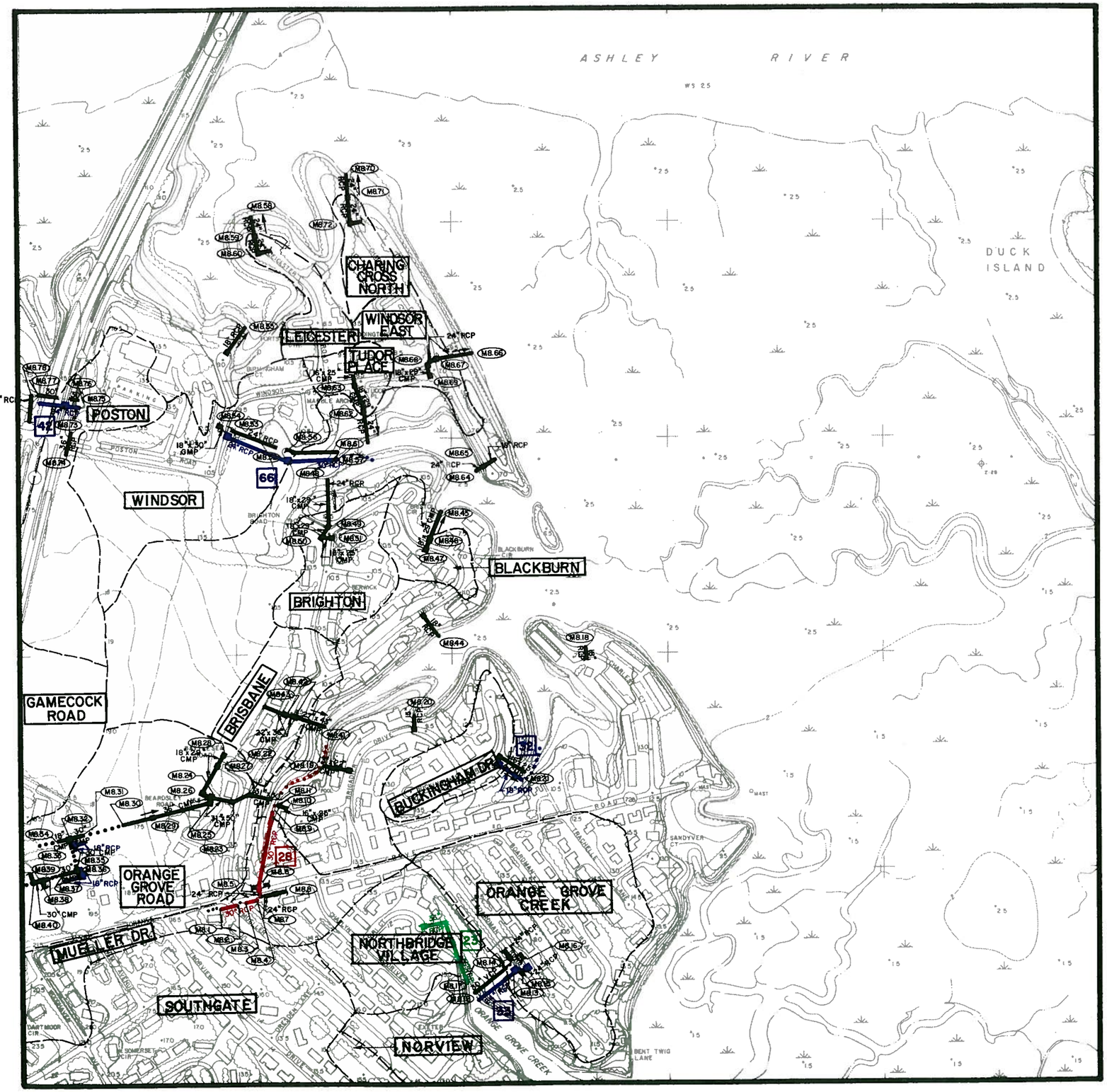
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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
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LEGEND

- DRAINAGE PIPE
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- WATERSHED BOUNDARY
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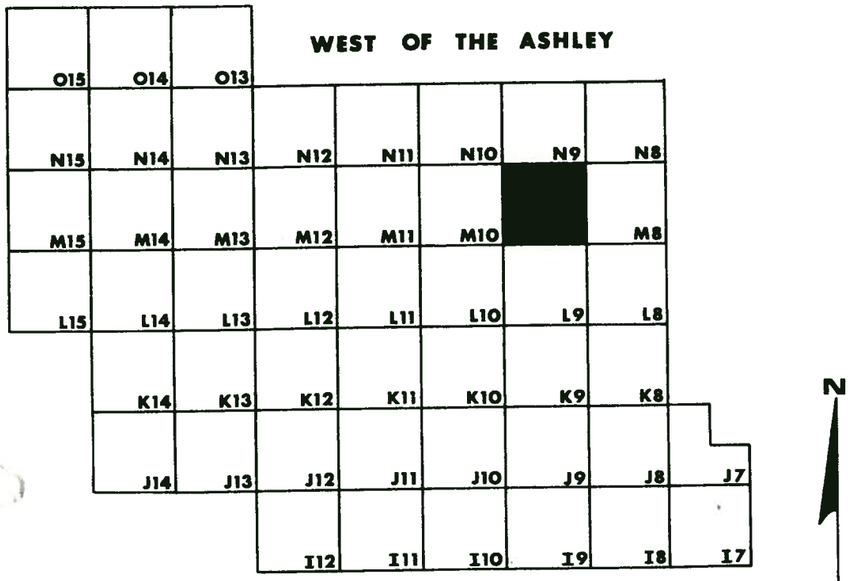
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DRAINAGE SYSTEMS — MAP M9

recommended improvements
CITY OF CHARLESTON



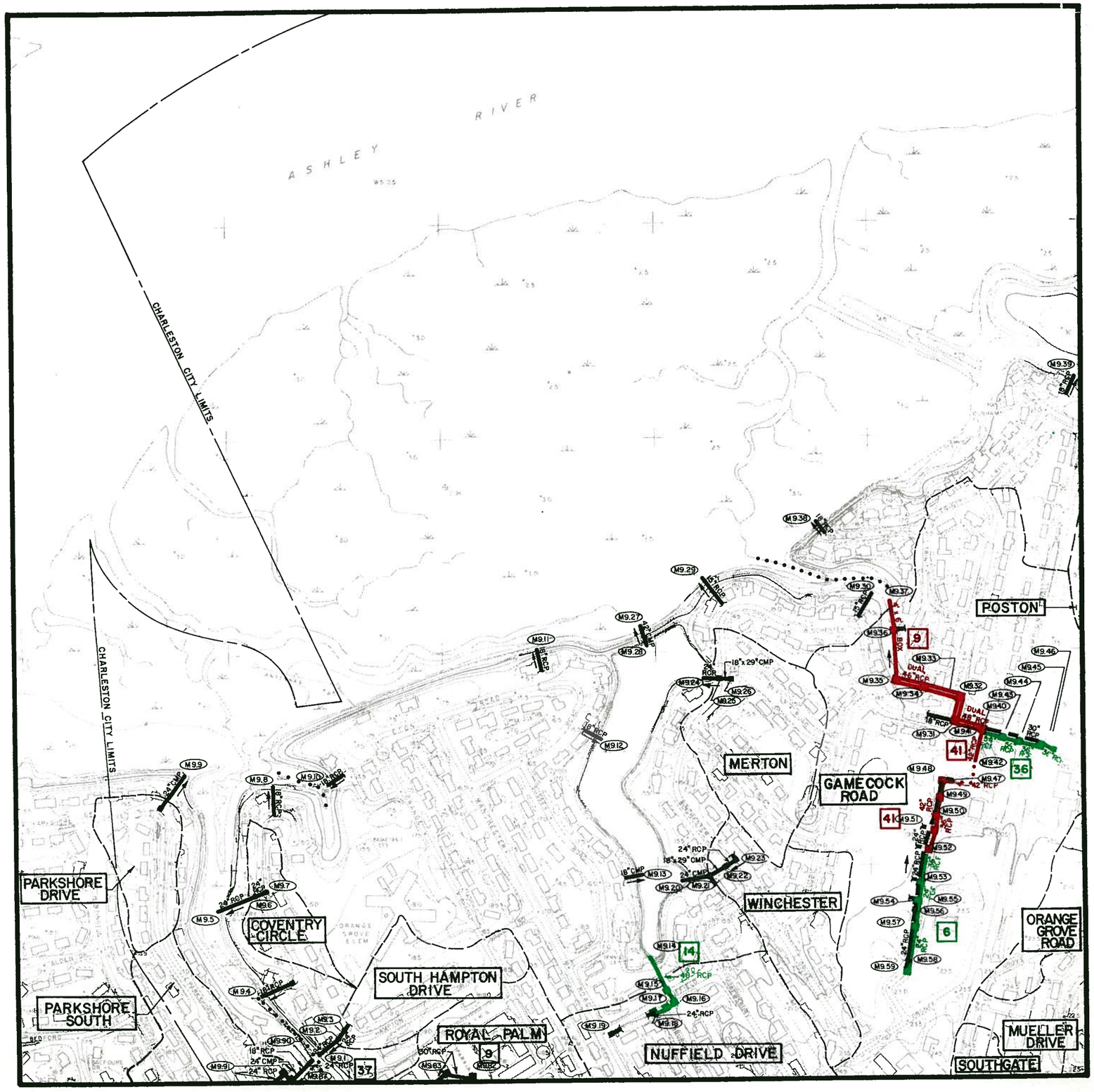
PROPOSED SYSTEM PRIORITIES

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RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
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LEGEND

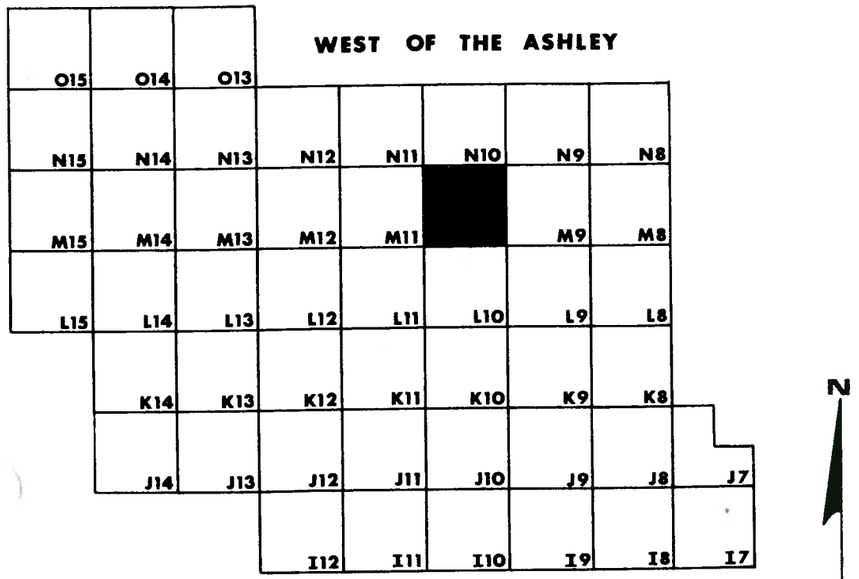
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- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP M10

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

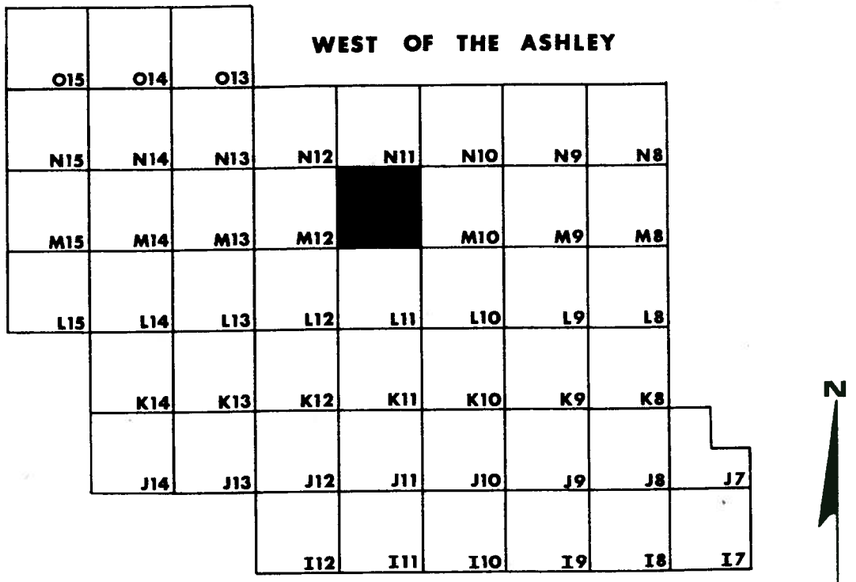
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- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
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- BRIDGE
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GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP M11

recommended improvements
CITY OF CHARLESTON





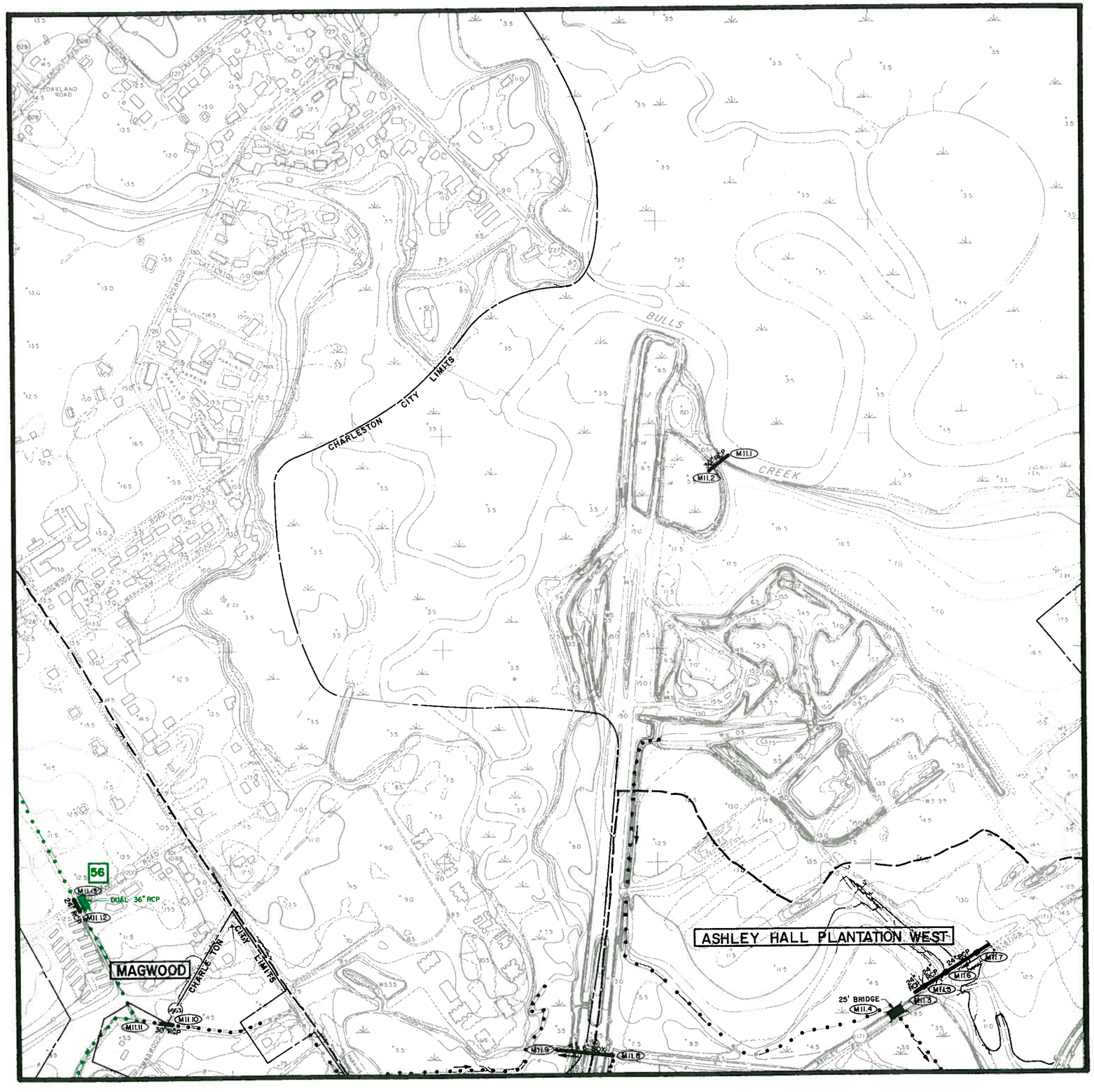
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BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

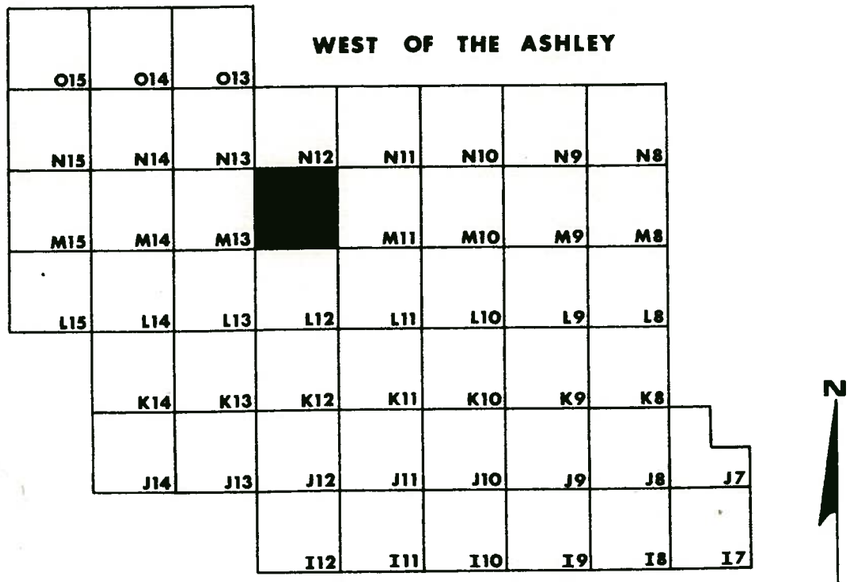
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP M12

recommended improvements
CITY OF CHARLESTON



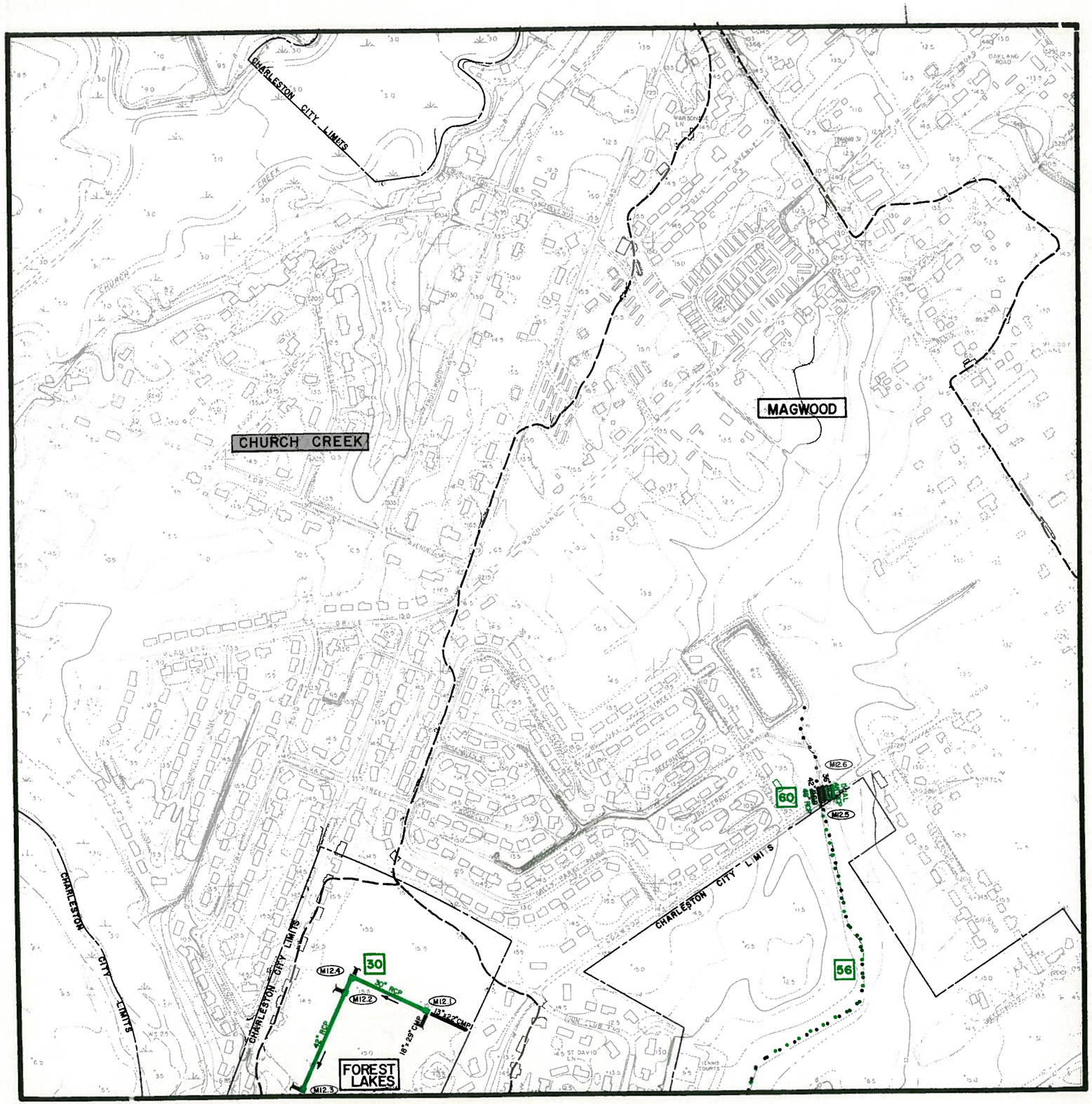
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

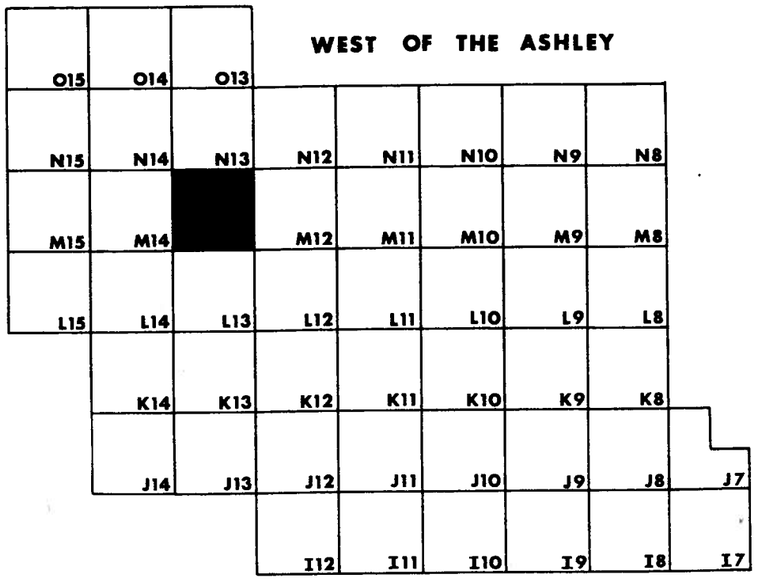
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP M13

recommended improvements
CITY OF CHARLESTON



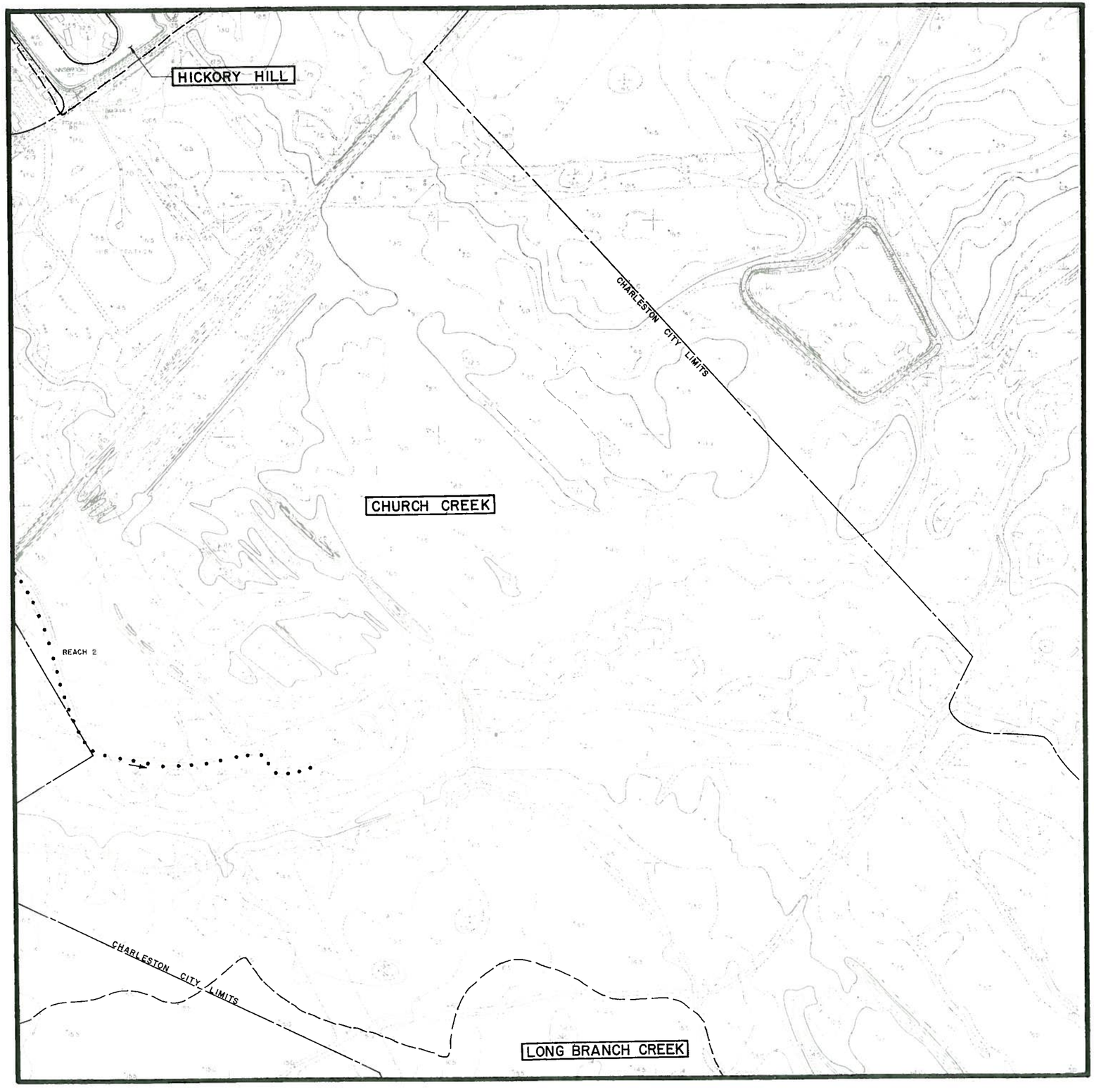
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

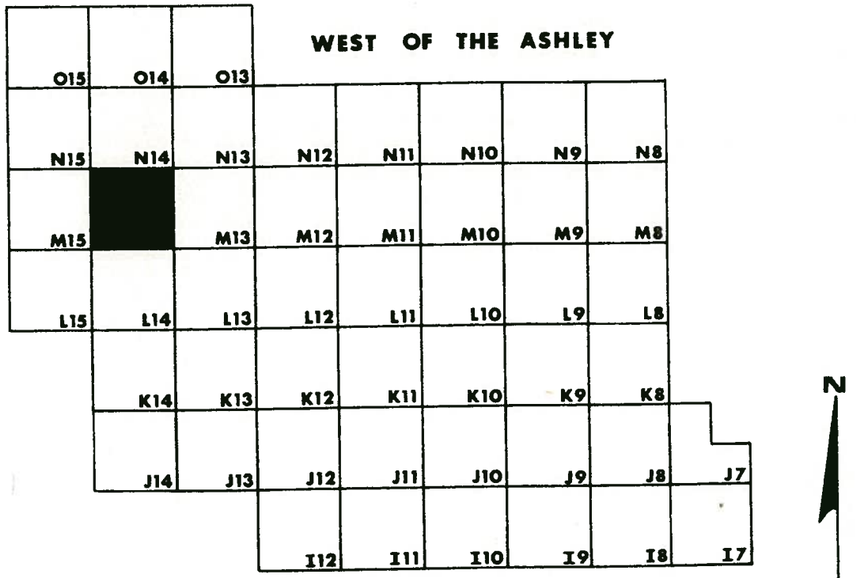
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP M14

recommended improvements
CITY OF CHARLESTON





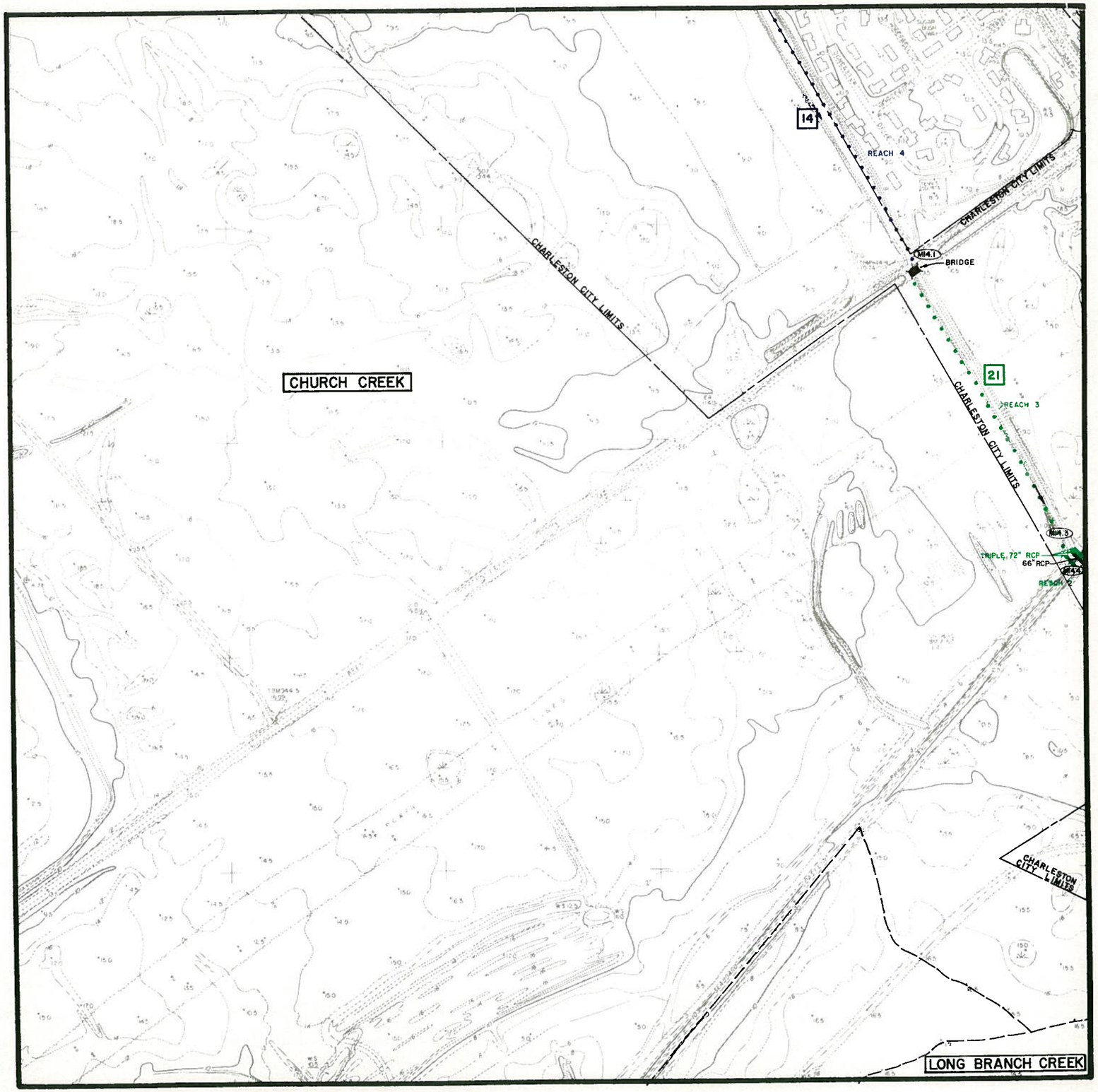
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

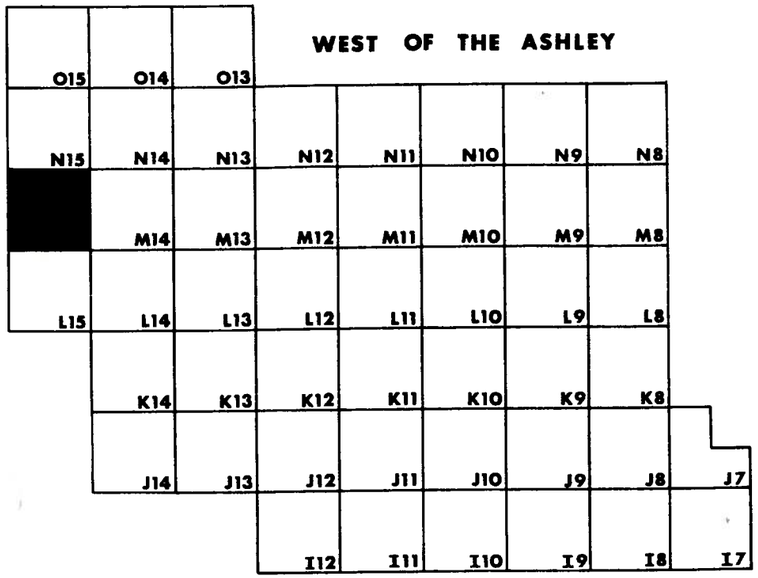
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP M15

recommended improvements
CITY OF CHARLESTON





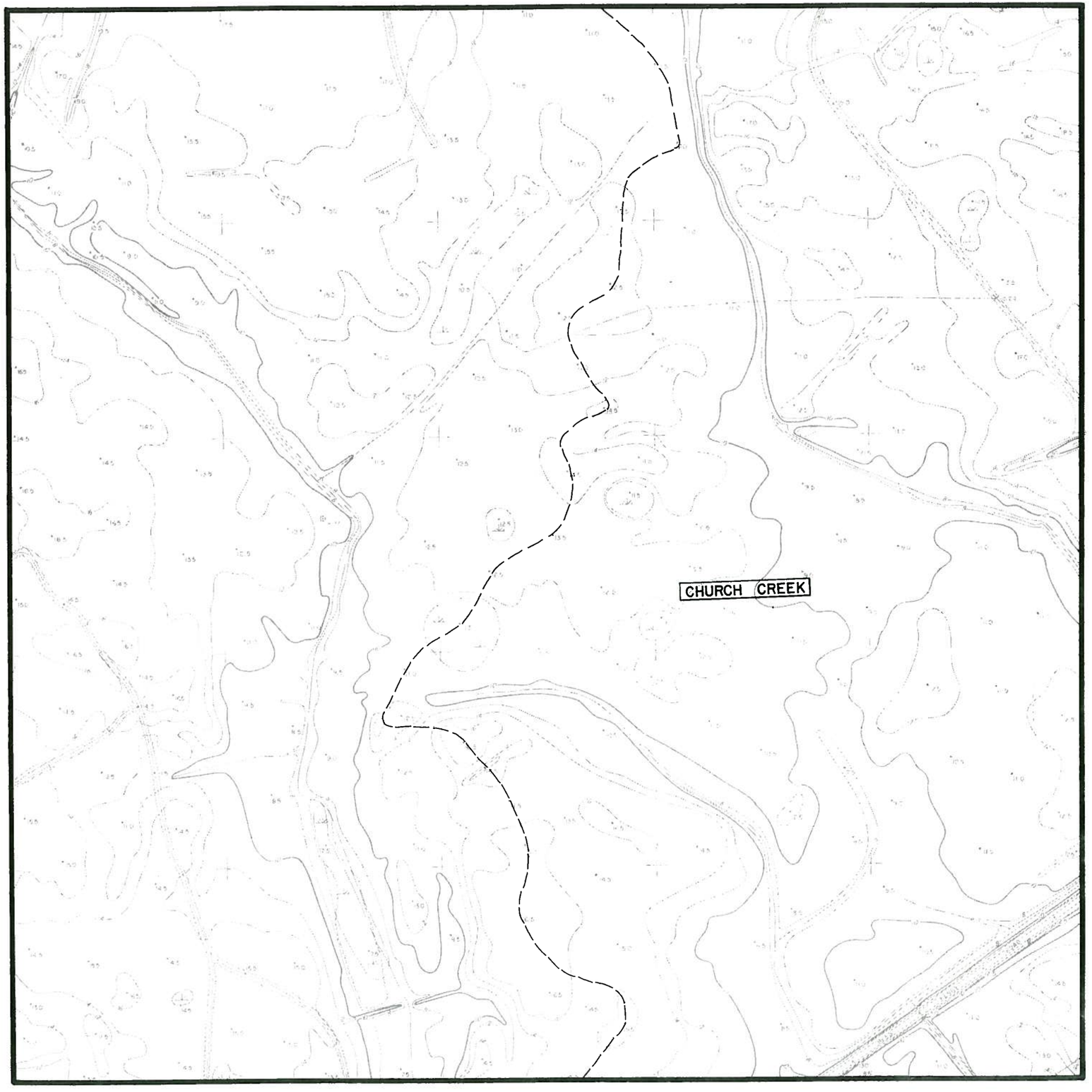
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

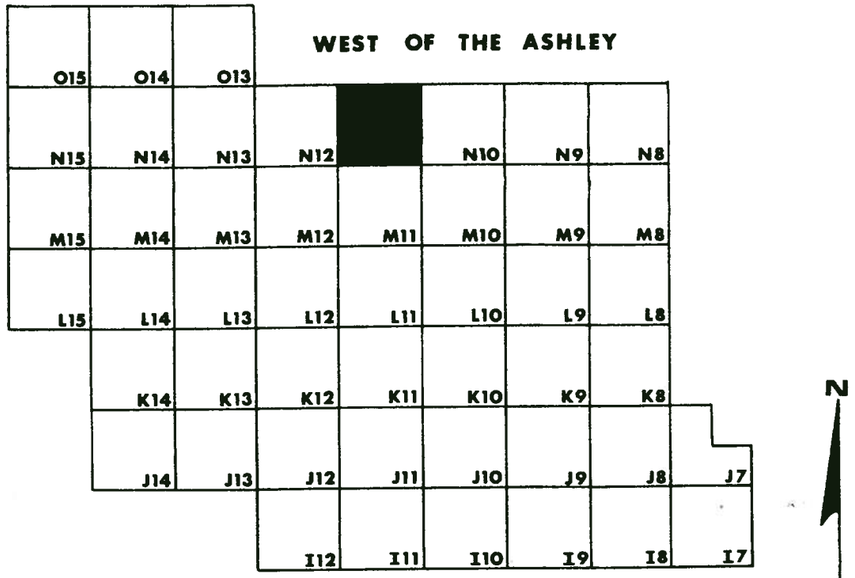
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP N11

recommended improvements
CITY OF CHARLESTON



PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

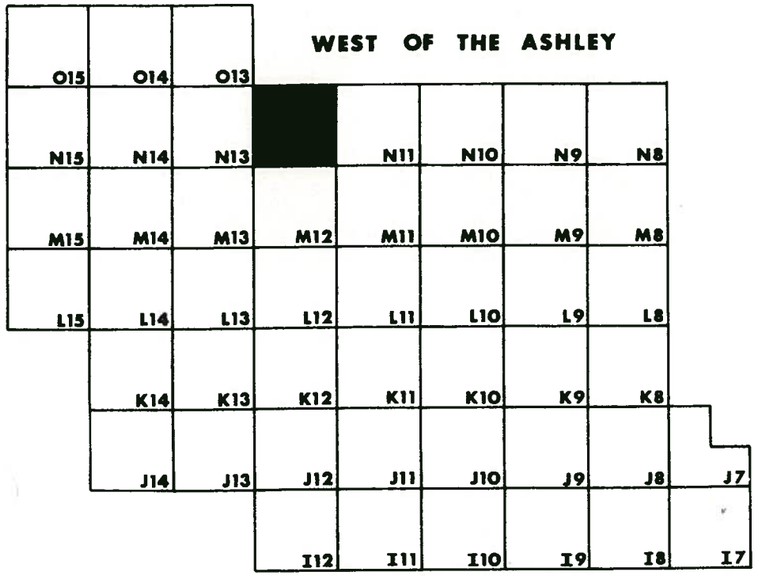
GRAPHIC SCALE 500 0 500 1000 1500 FEET

N



DRAINAGE SYSTEMS — MAP N12

recommended improvements
CITY OF CHARLESTON





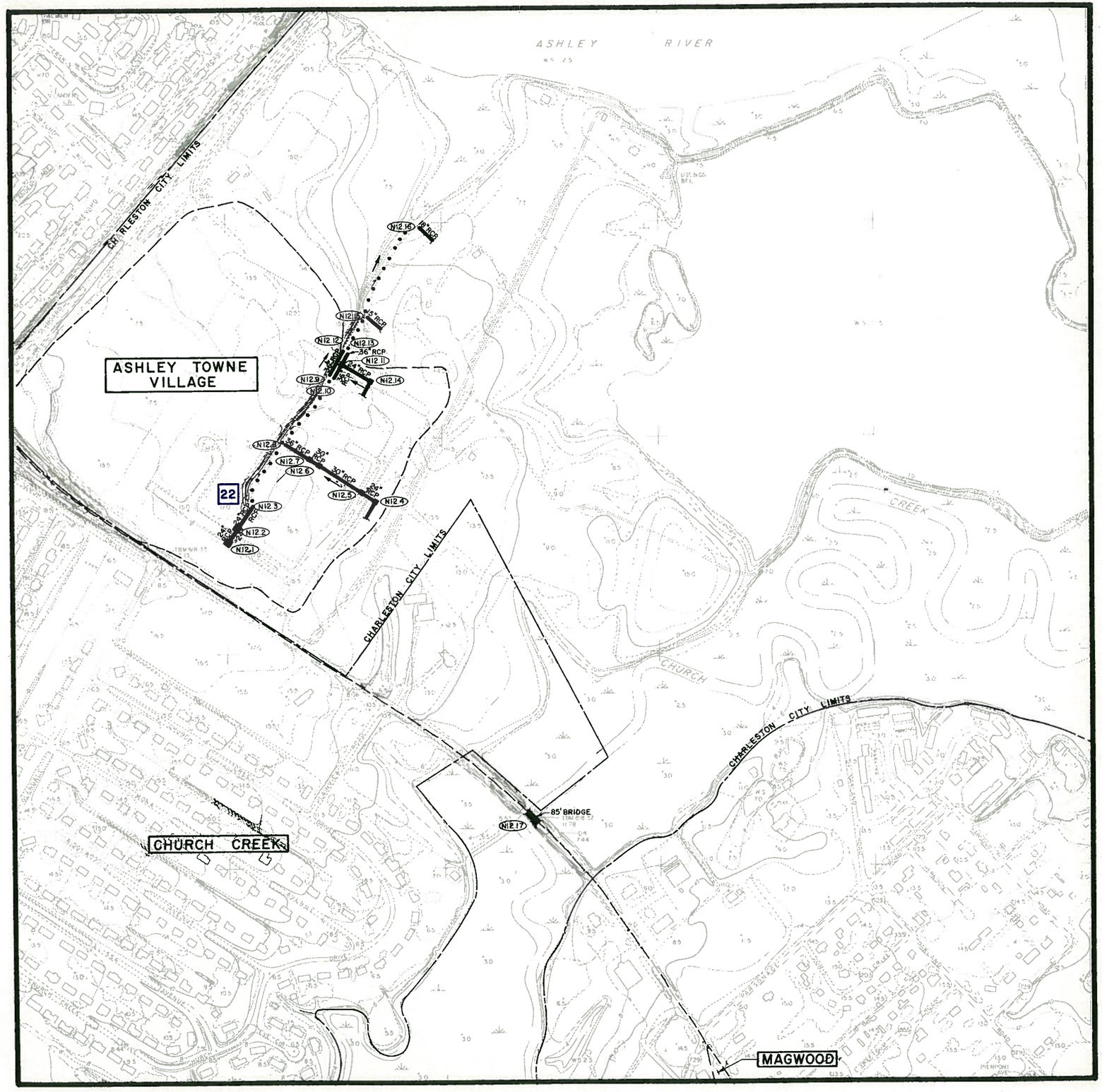
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

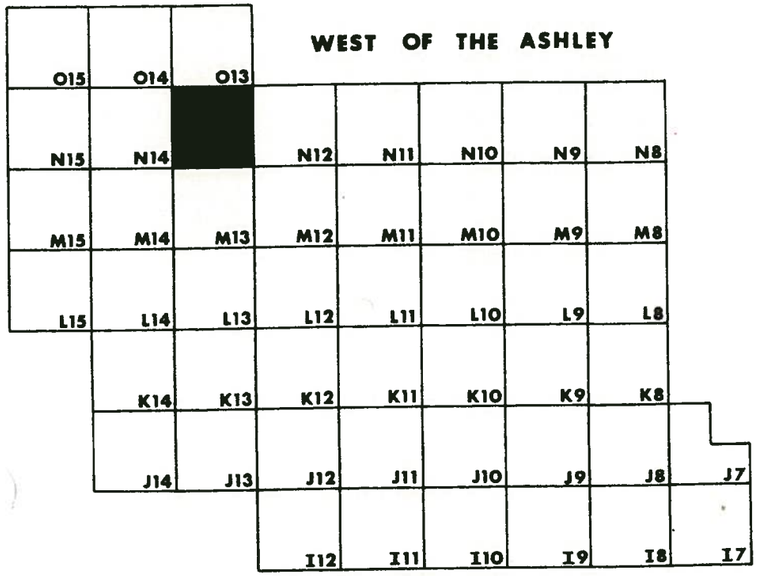
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP N13

recommended improvements
CITY OF CHARLESTON





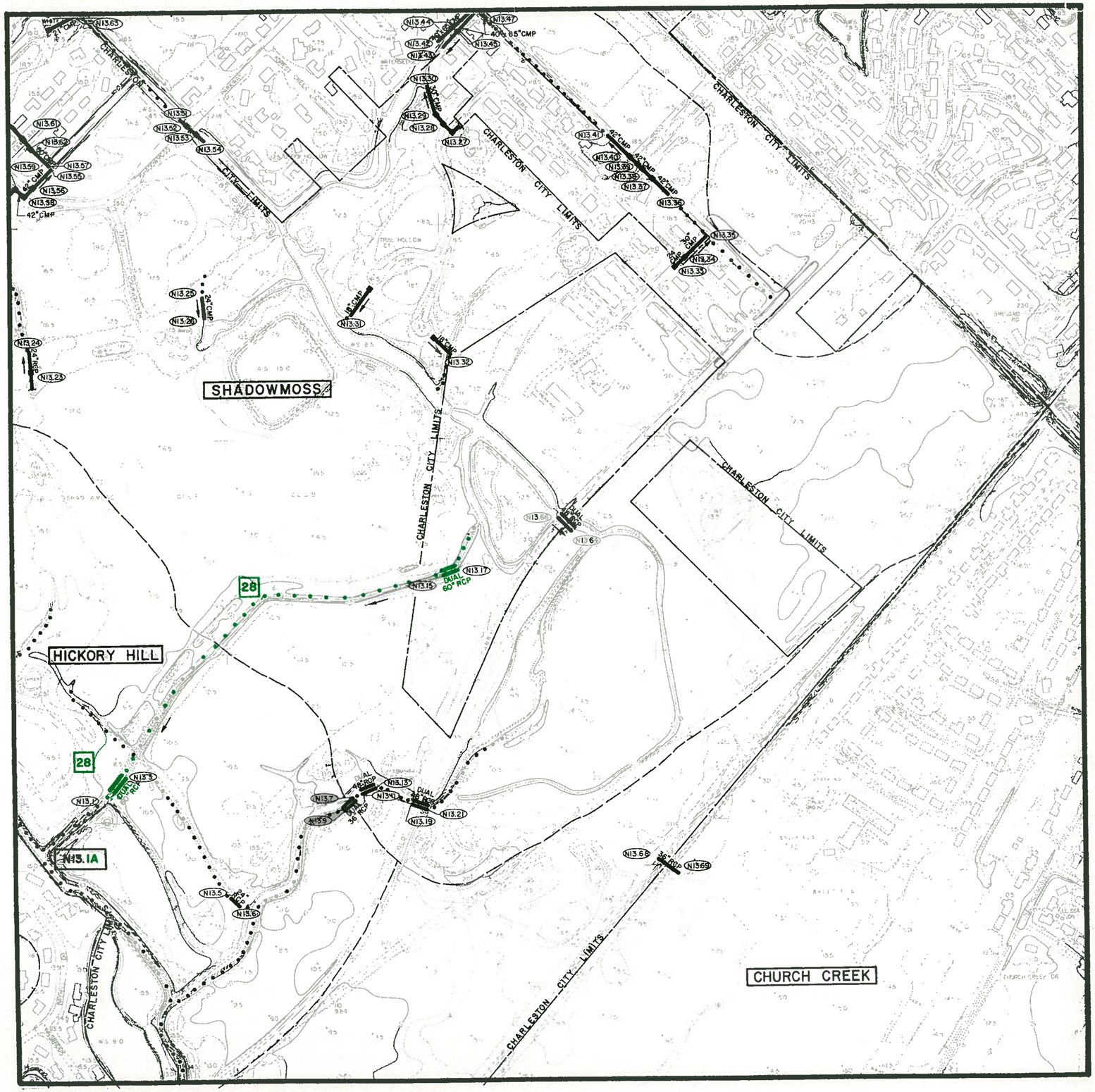
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

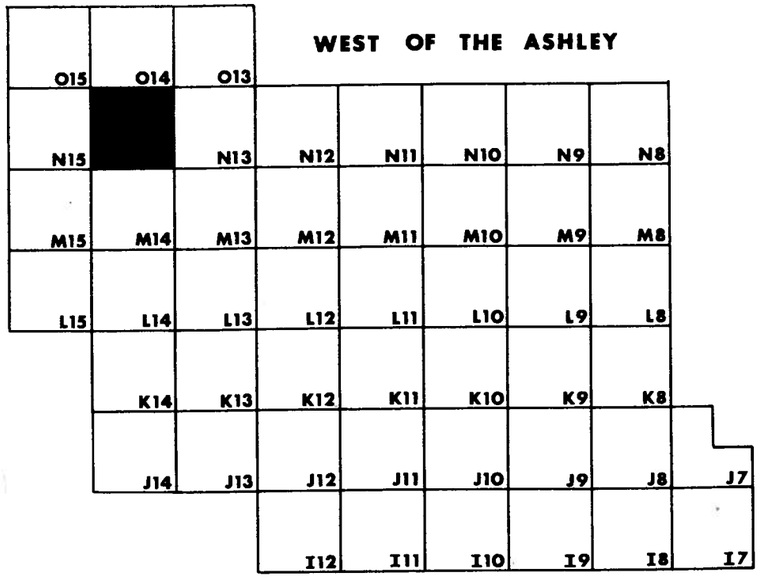
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- (P) — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP N14

recommended improvements
CITY OF CHARLESTON





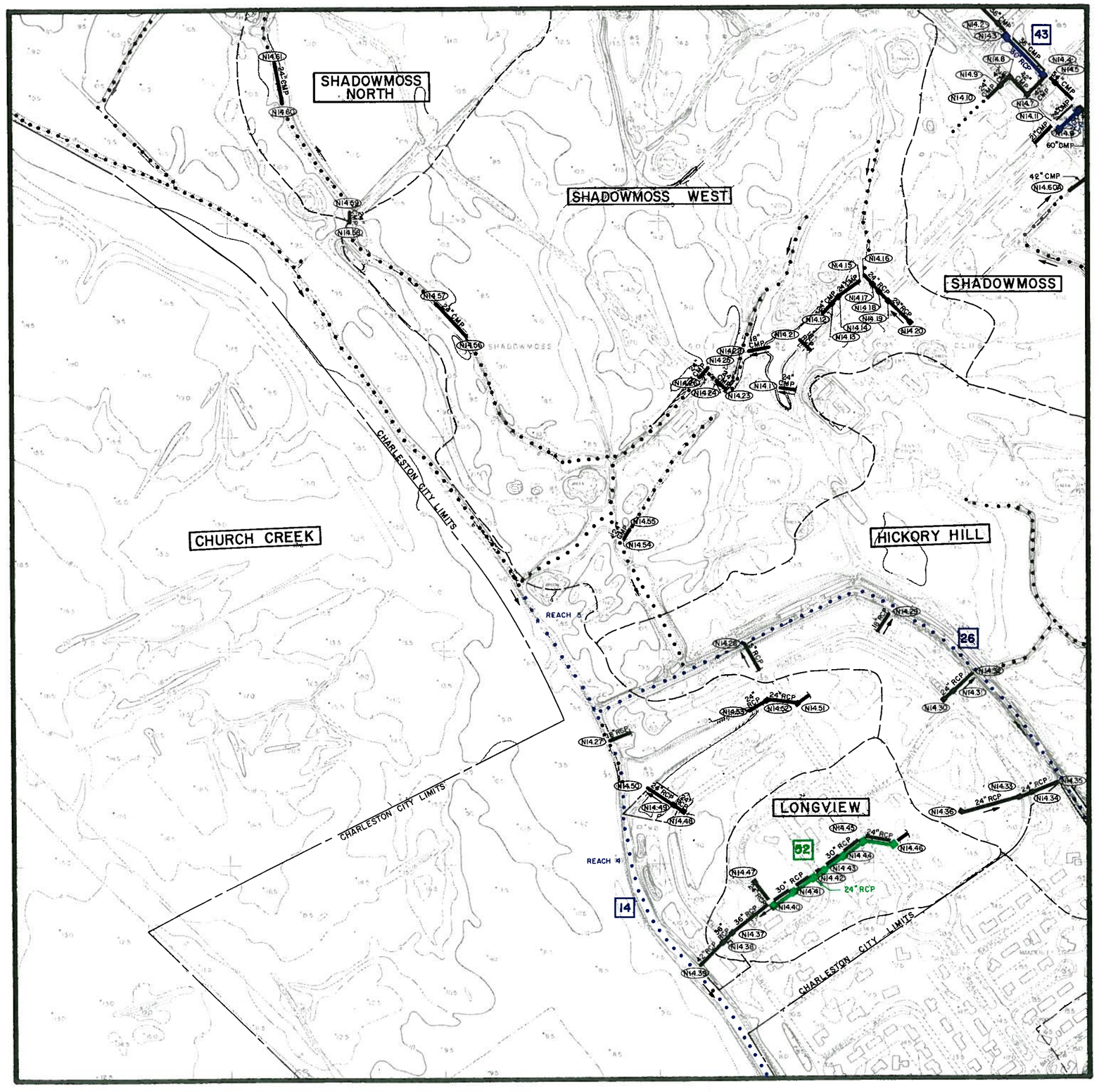
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

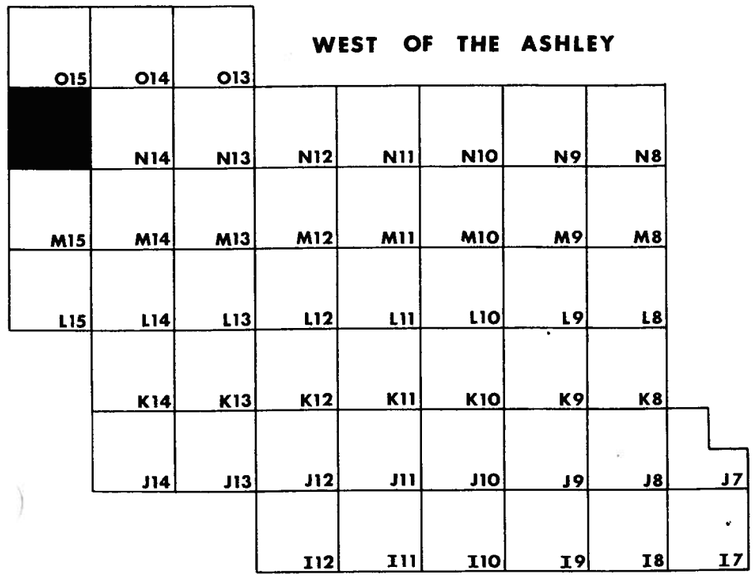
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP N15

recommended improvements
CITY OF CHARLESTON





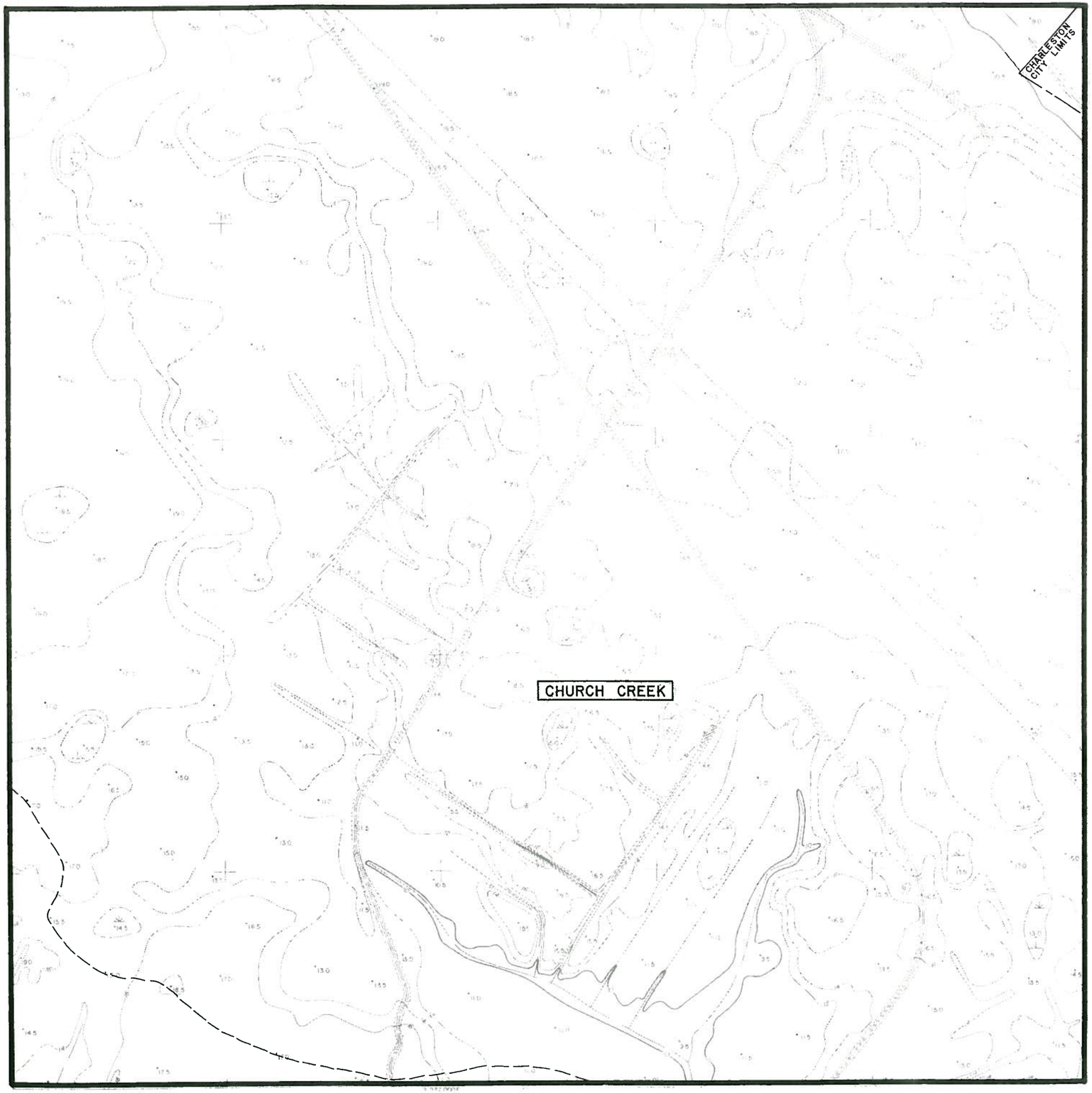
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

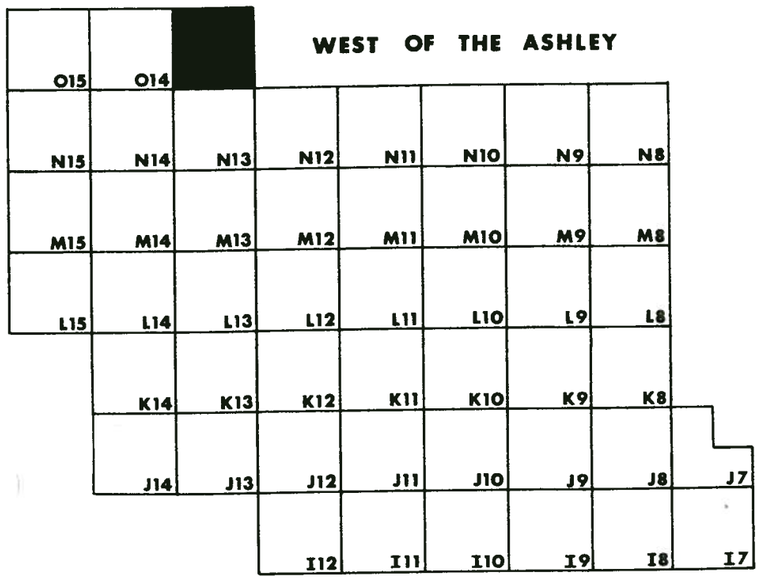
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE: 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP 013

recommended improvements
CITY OF CHARLESTON





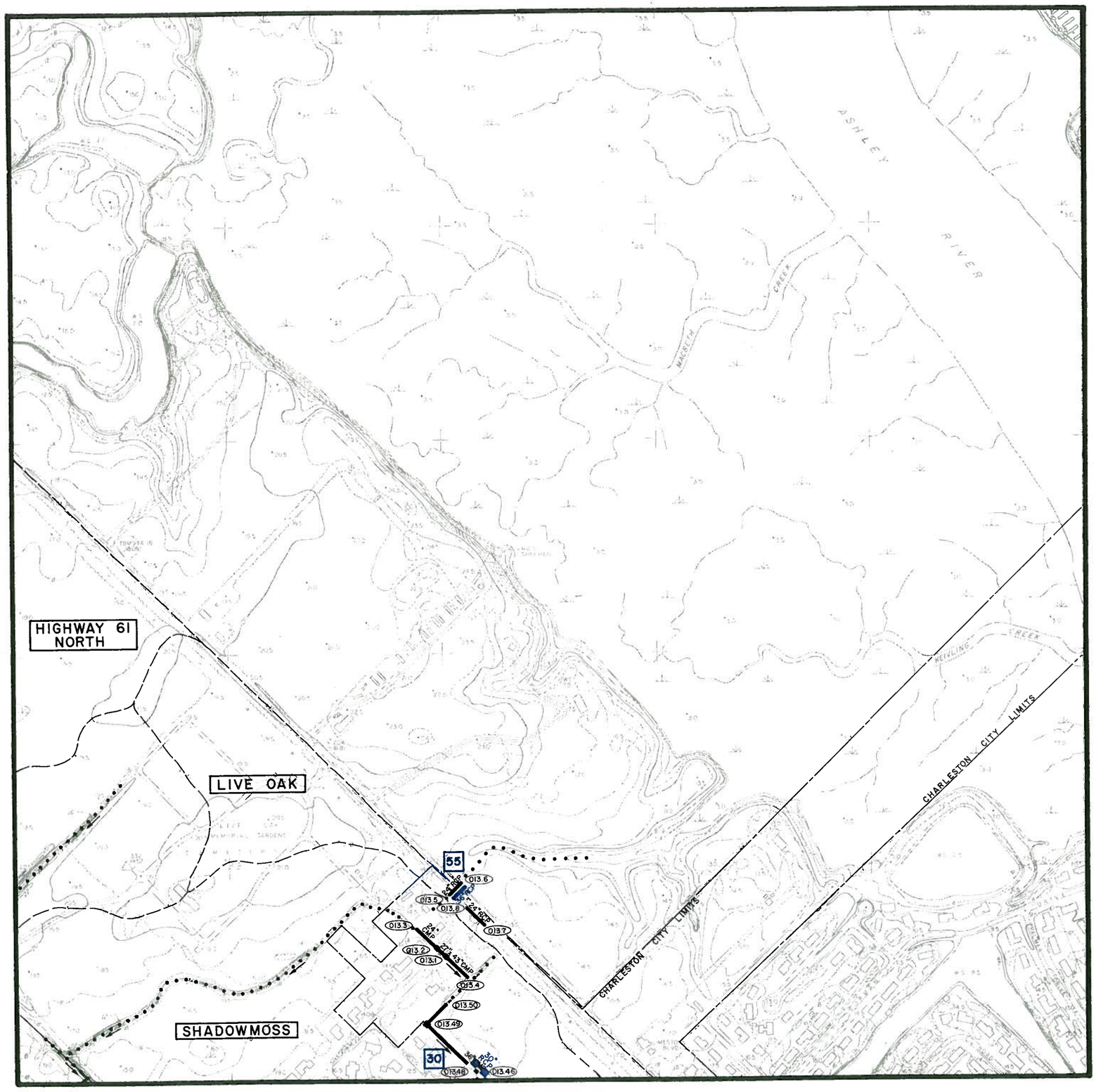
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

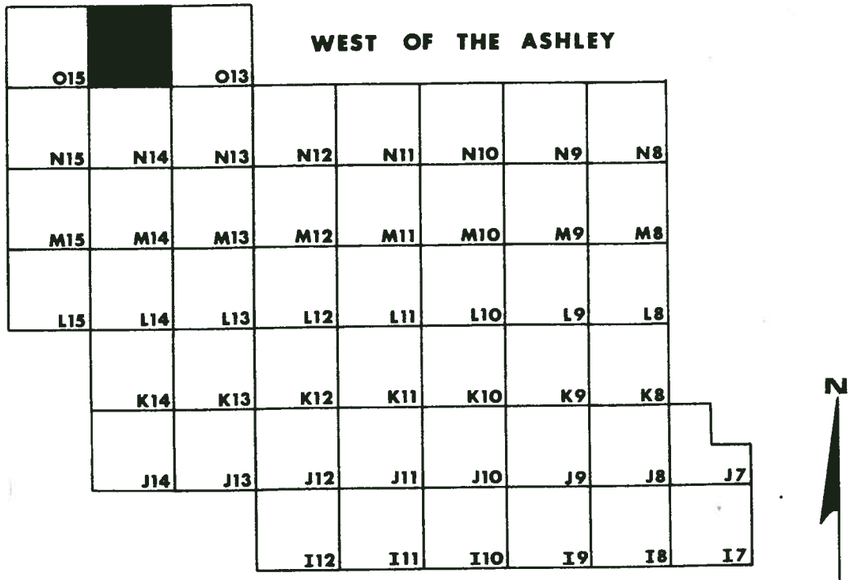
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP 014

recommended improvements
CITY OF CHARLESTON



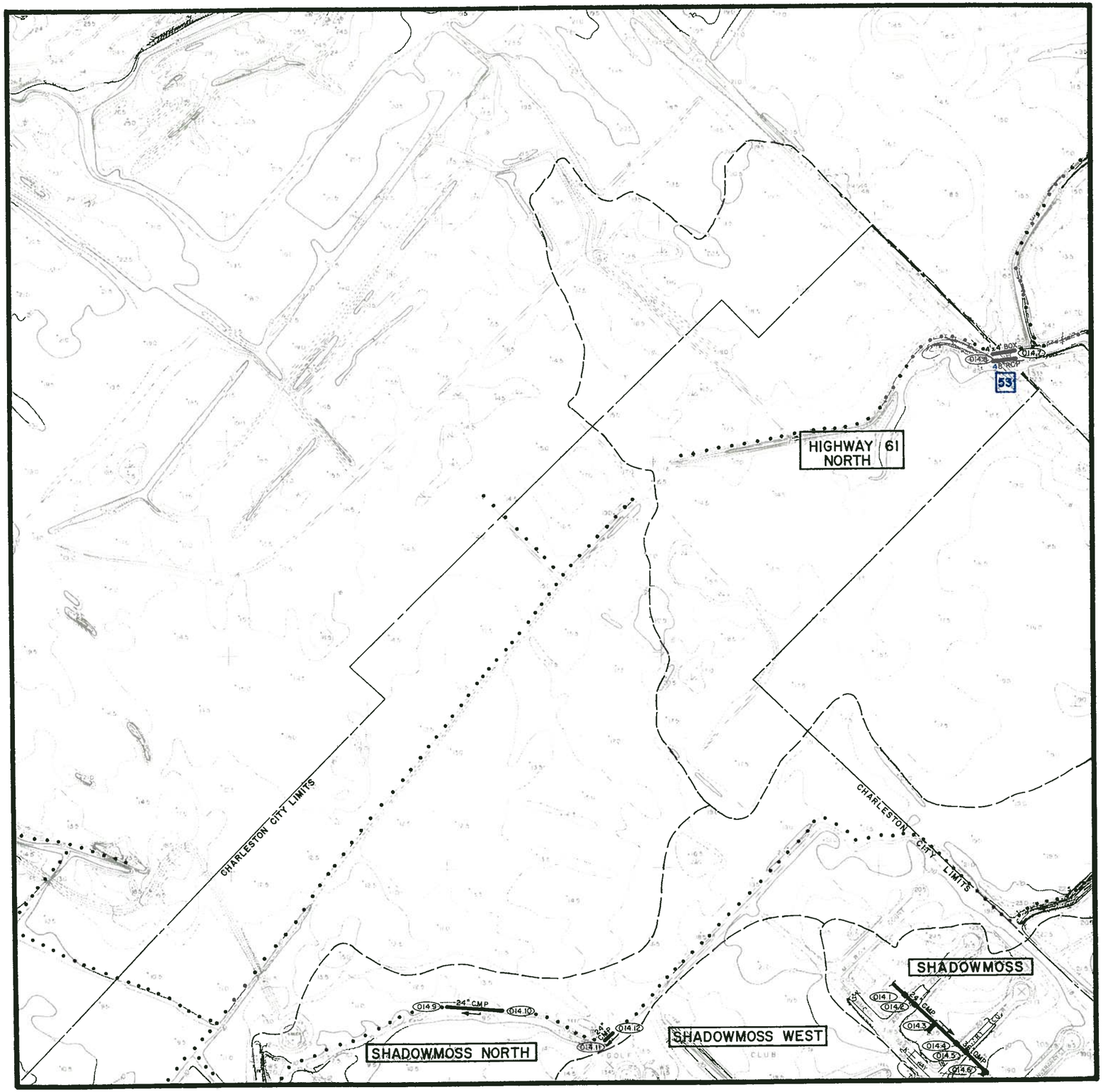
PROPOSED SYSTEM PRIORITIES

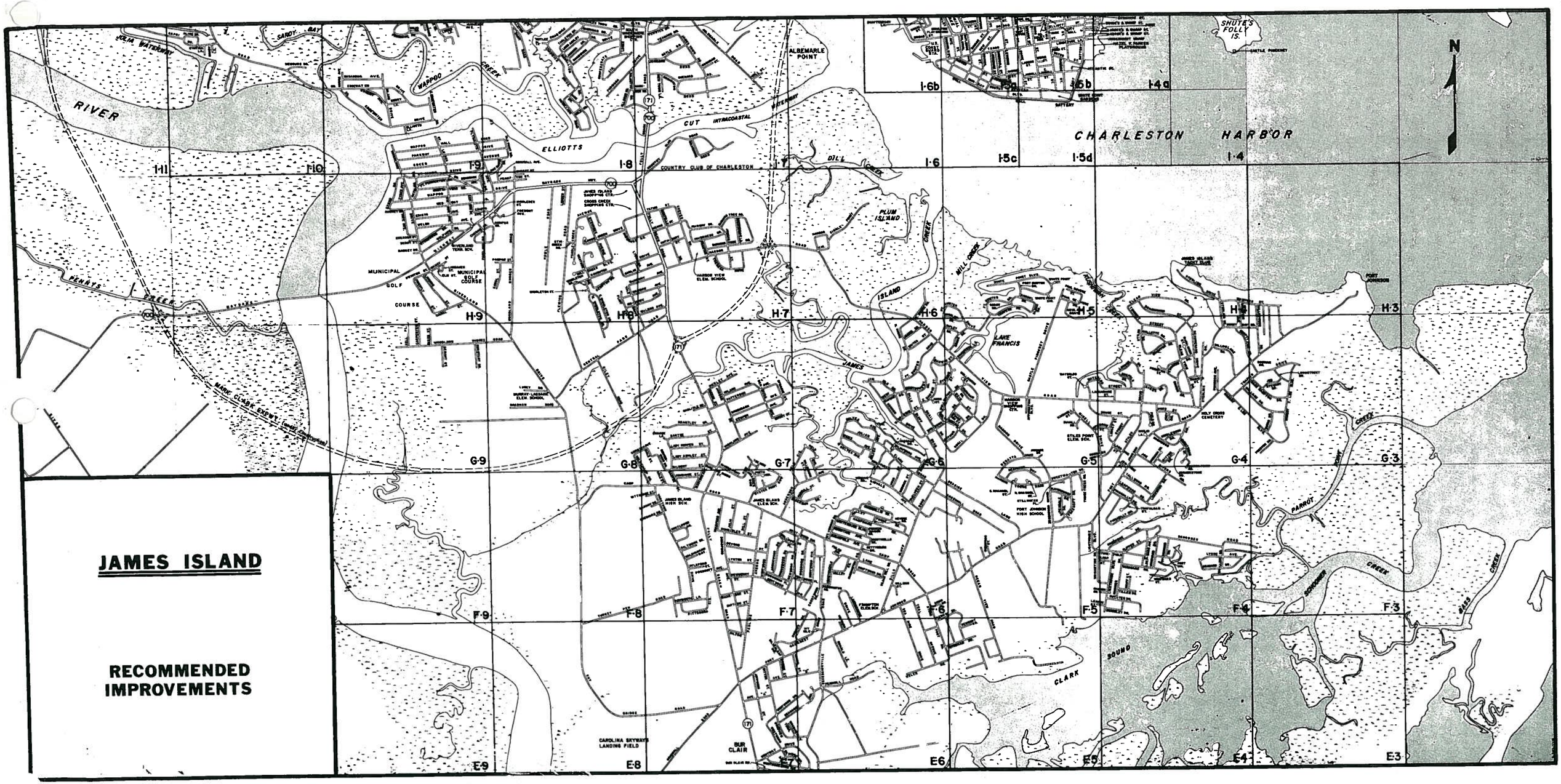
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

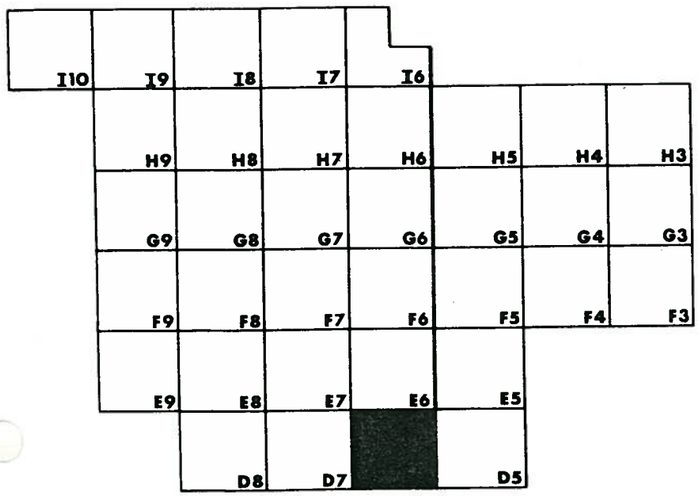



JAMES ISLAND
RECOMMENDED IMPROVEMENTS
CHARLESTON HARBOR
ELLIOTTS CUT INTRACOASTAL
ALBEMARLE POINT
SHUTE'S FOLLY IS.
SANDY BAY
WAPPOO CREEK
COUNTRY CLUB OF CHARLESTON
DILL CREEK
PLUM ISLAND
WILL CREEK
LAKE FRANCIS
JAMES ISLAND
PENNYS CREEK
MUNICIPAL GOLF COURSE
MARK CLARK EXPWY. (under construction)
CAROLINA SKYWAYS LANDING FIELD
SUR CLAIR
PARROT CREEK
SCHROEDER CREEK
CLARK SOUND
1-11
1-10
1-9
1-8
1-7
1-6
1-5c
1-5d
1-4
1-6b
1-4a
H-9
H-8
H-7
H-6
H-5
H-4
H-3
G-9
G-8
G-7
G-6
G-5
G-4
G-3
F-9
F-8
F-7
F-6
F-5
F-4
F-3
E-9
E-8
E-6
E-5
E-4
E-3

DRAINAGE SYSTEMS — MAP D6

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP D7

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND

I10	I9	I8	I7	I6			
	H9	H8	H7	H6	H5	H4	H3
	G9	G8	G7	G6	G5	G4	G3
	F9	F8	F7	F6	F5	F4	F3
	E9	E8	E7	E6	E5		
		D8		D6	D5		

N

PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

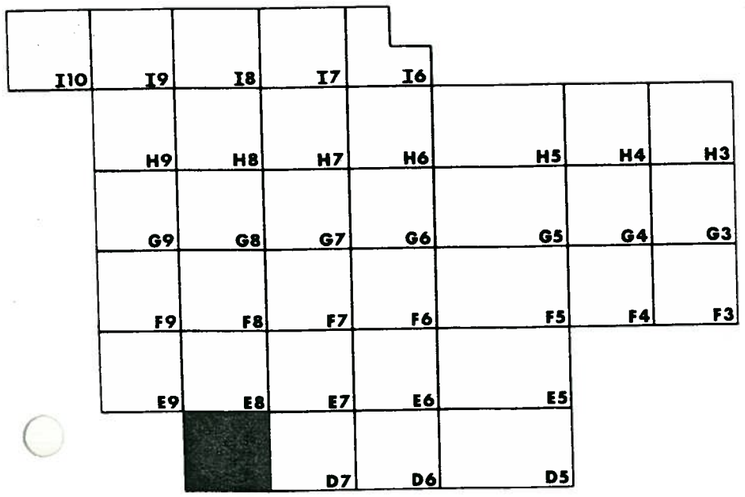
GRAPHIC SCALE 500 0 500 1000 FEET



DRAINAGE SYSTEMS — MAP D8

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

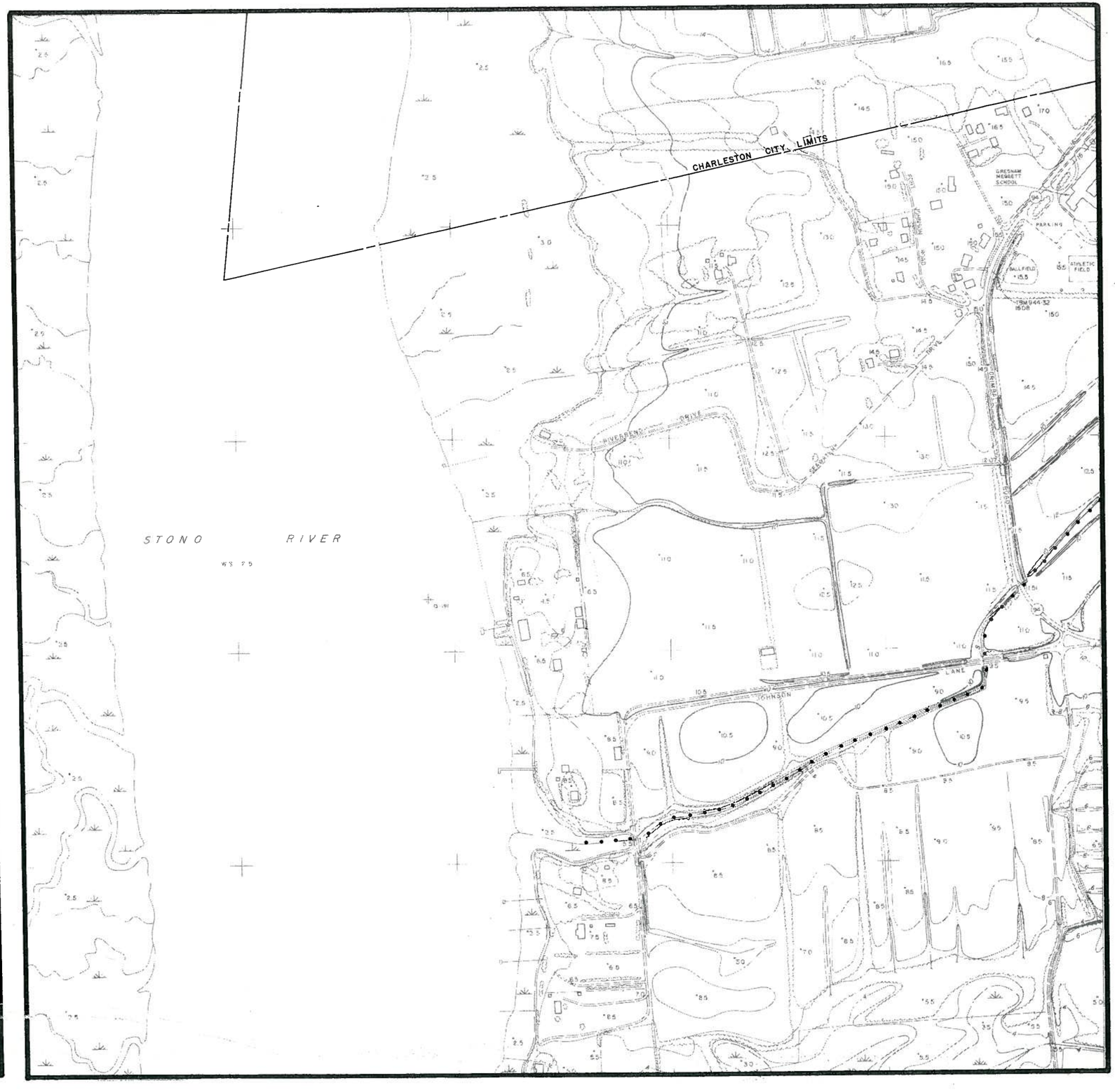
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

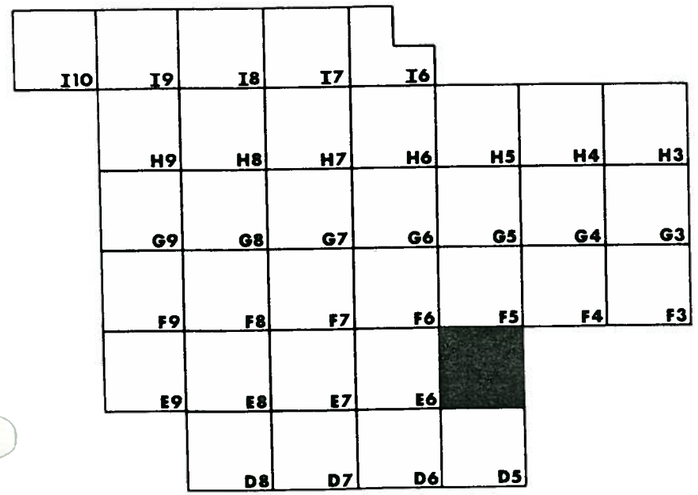
GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP E5

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

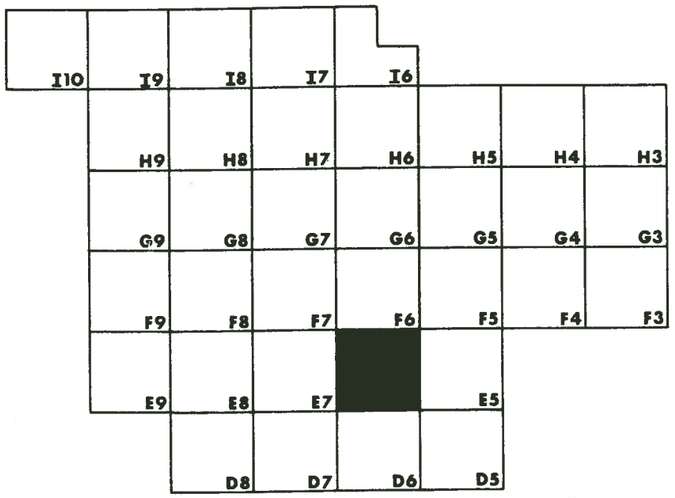
GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP E6

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

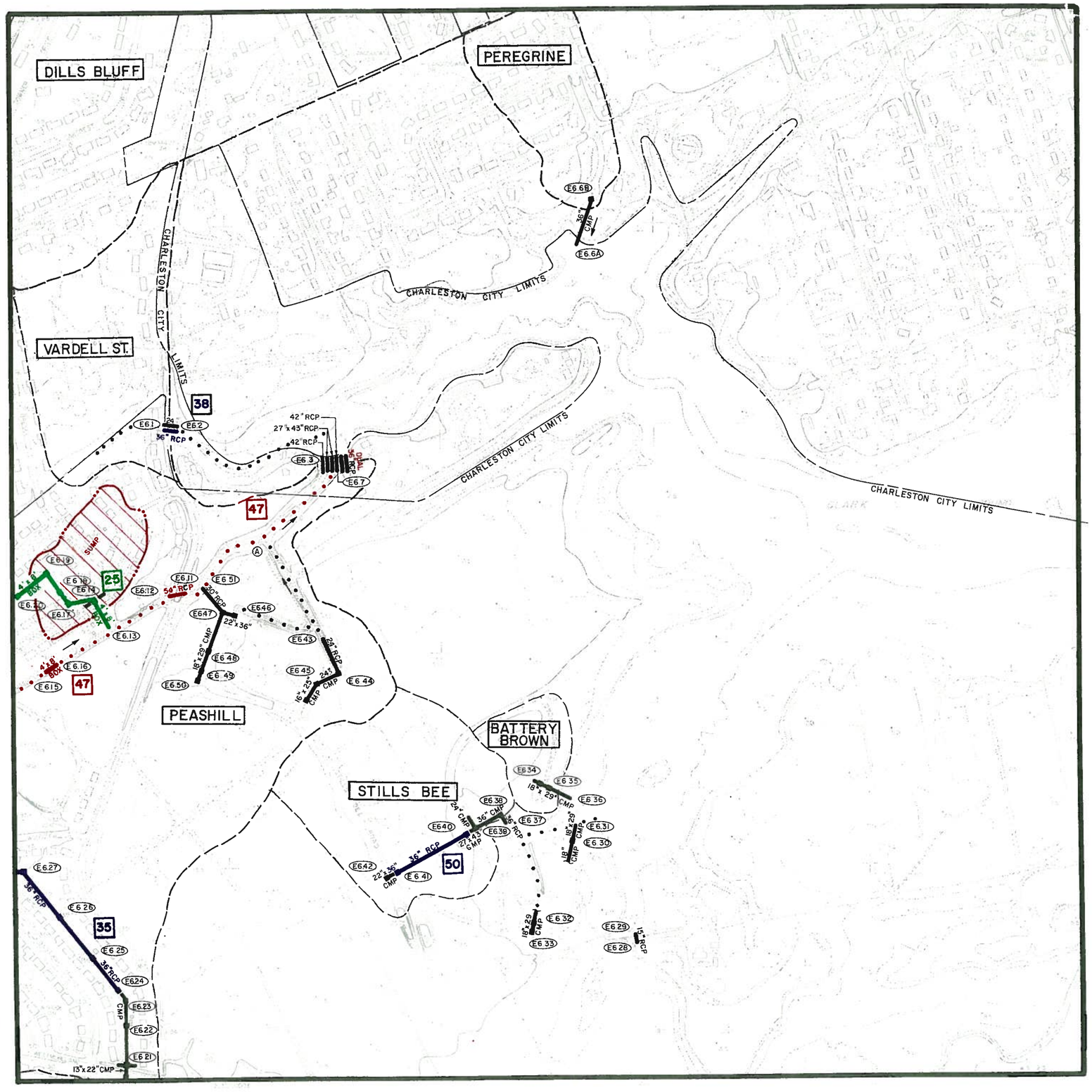
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

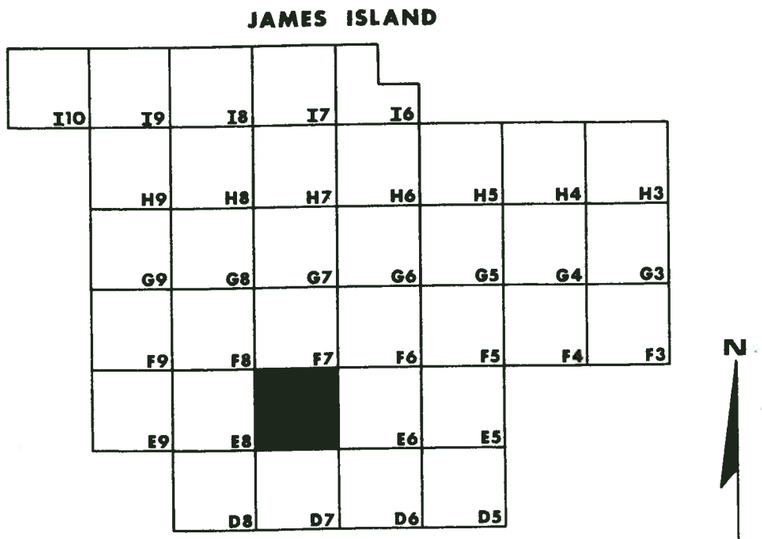
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP E7

recommended improvements
CITY OF CHARLESTON



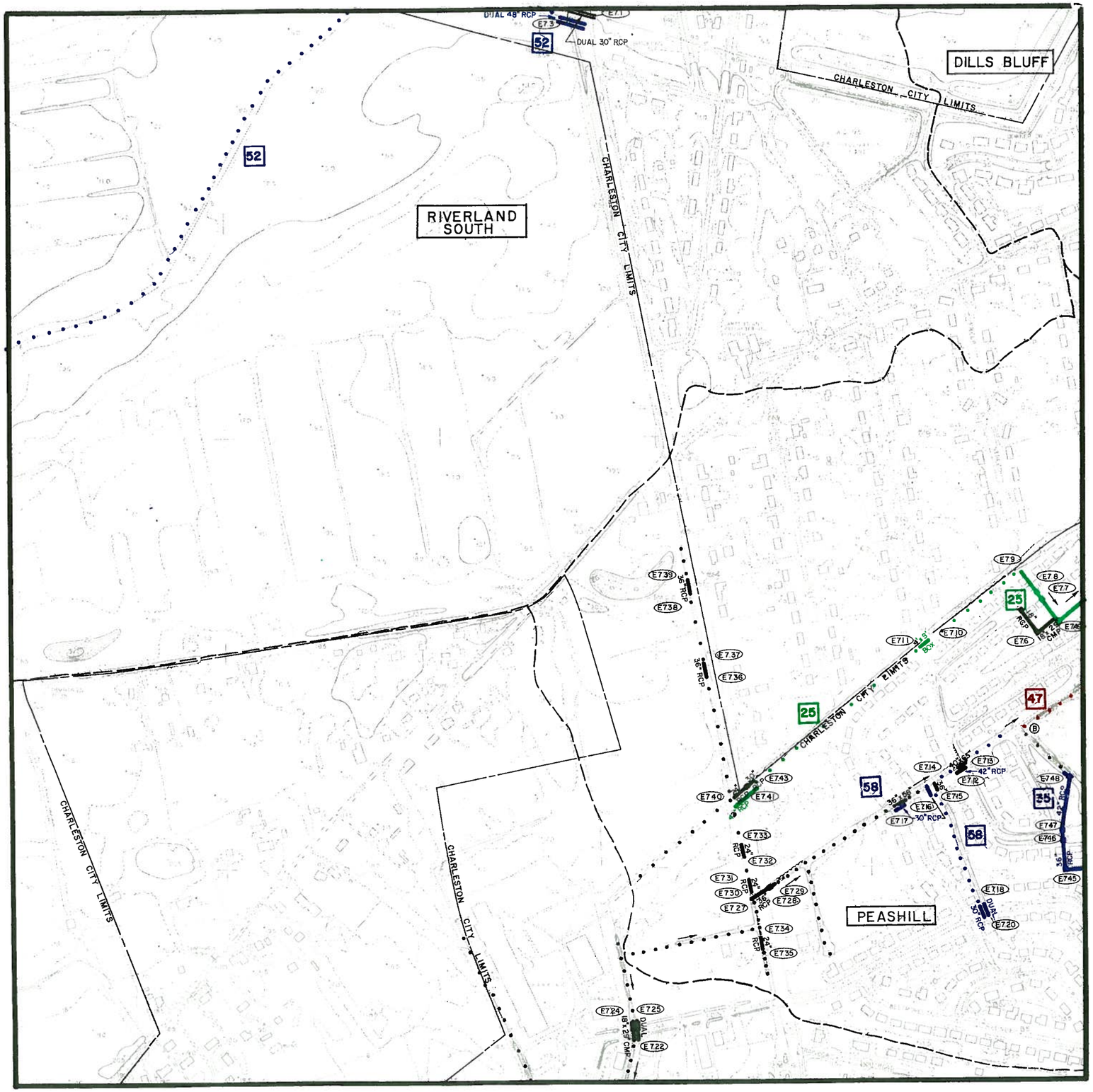
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

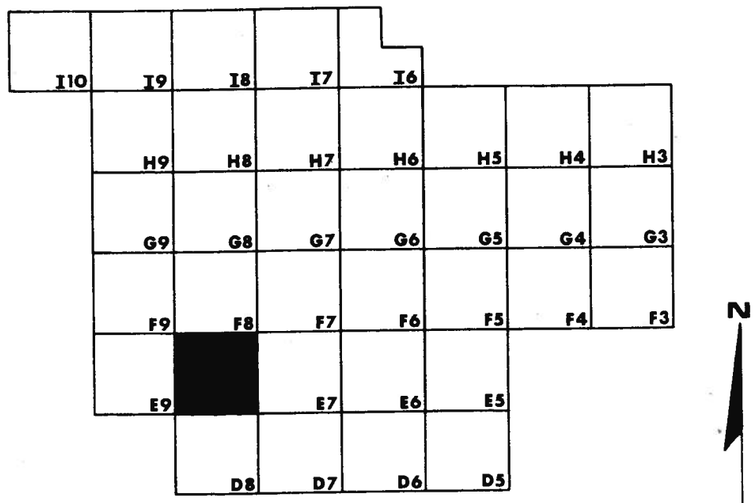
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DRAINAGE SYSTEMS | MAP E8

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

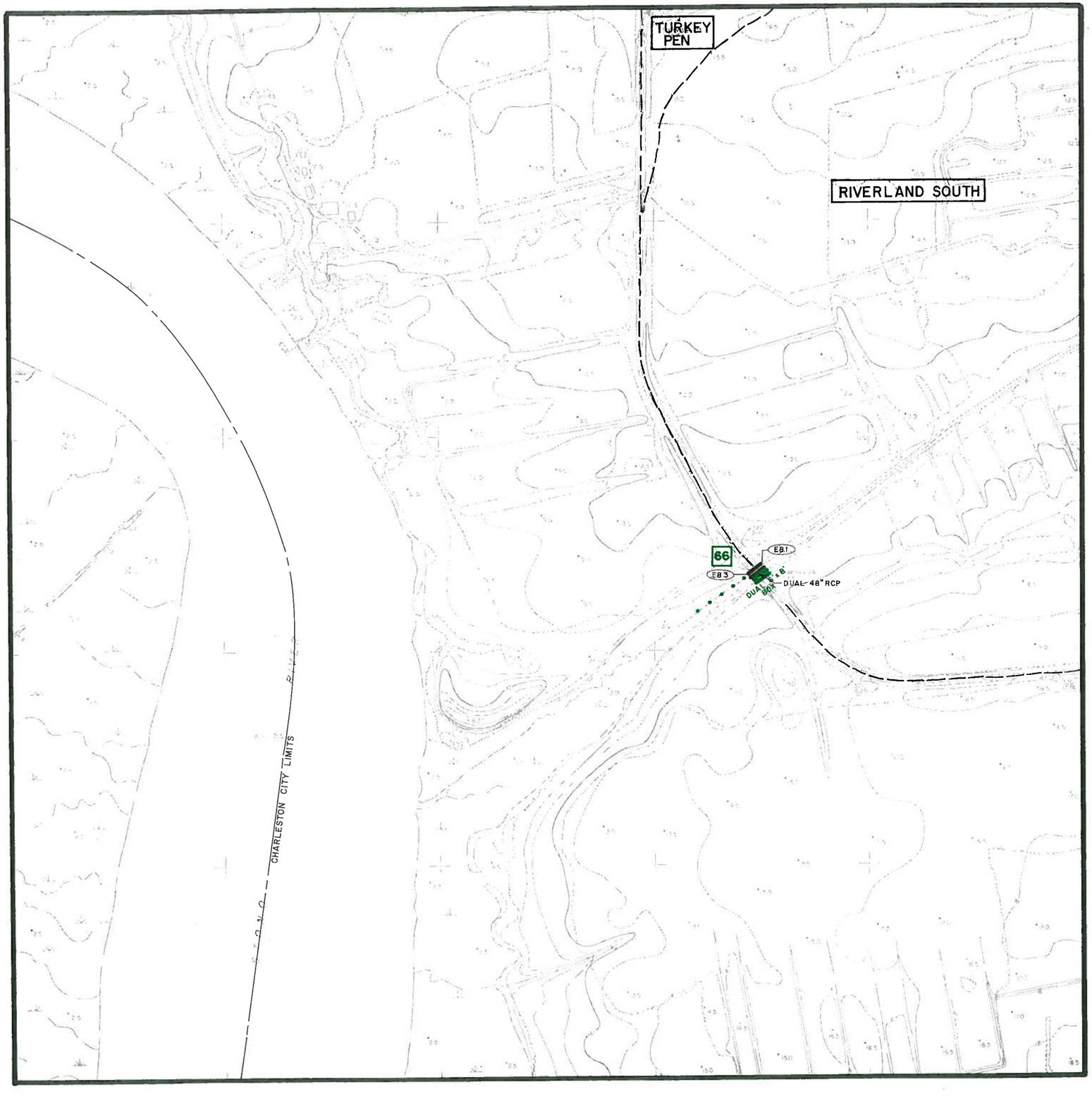
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

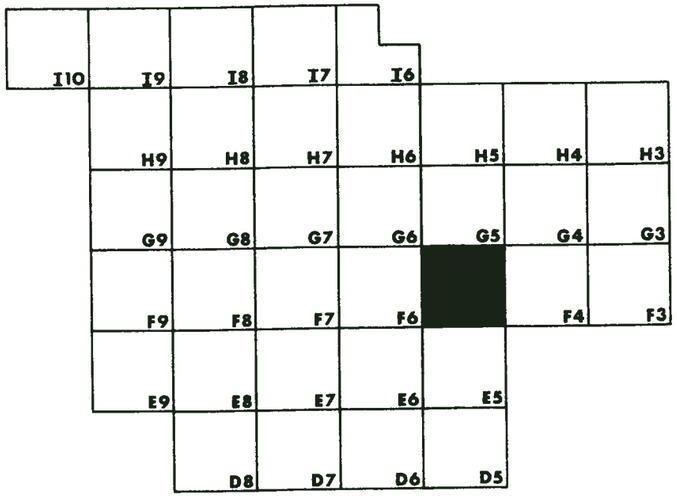
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DRAINAGE SYSTEMS | MAP F5

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

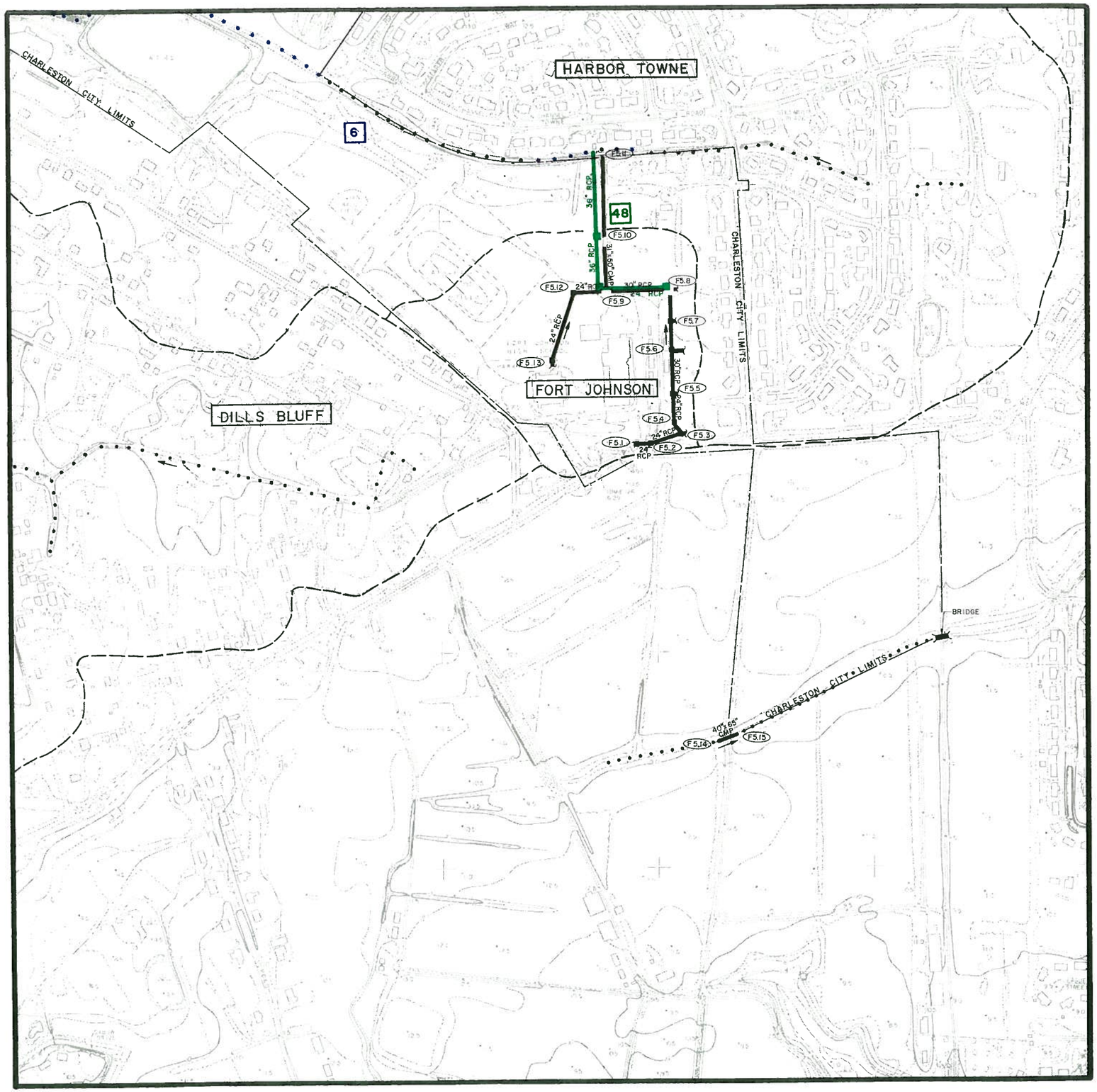
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

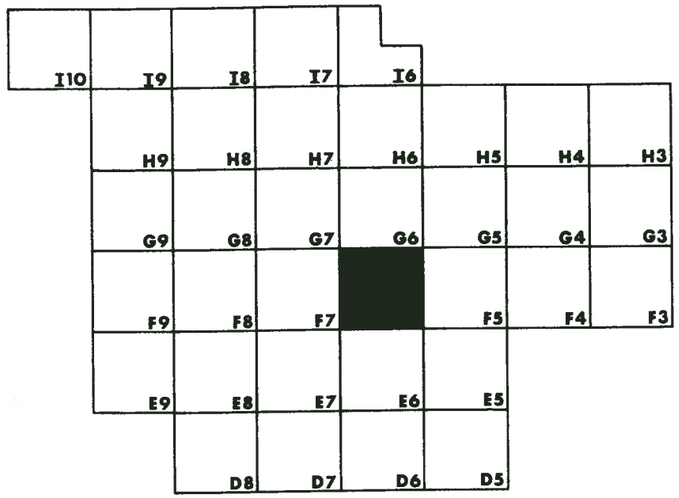
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DRAINAGE SYSTEMS — MAP F6

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

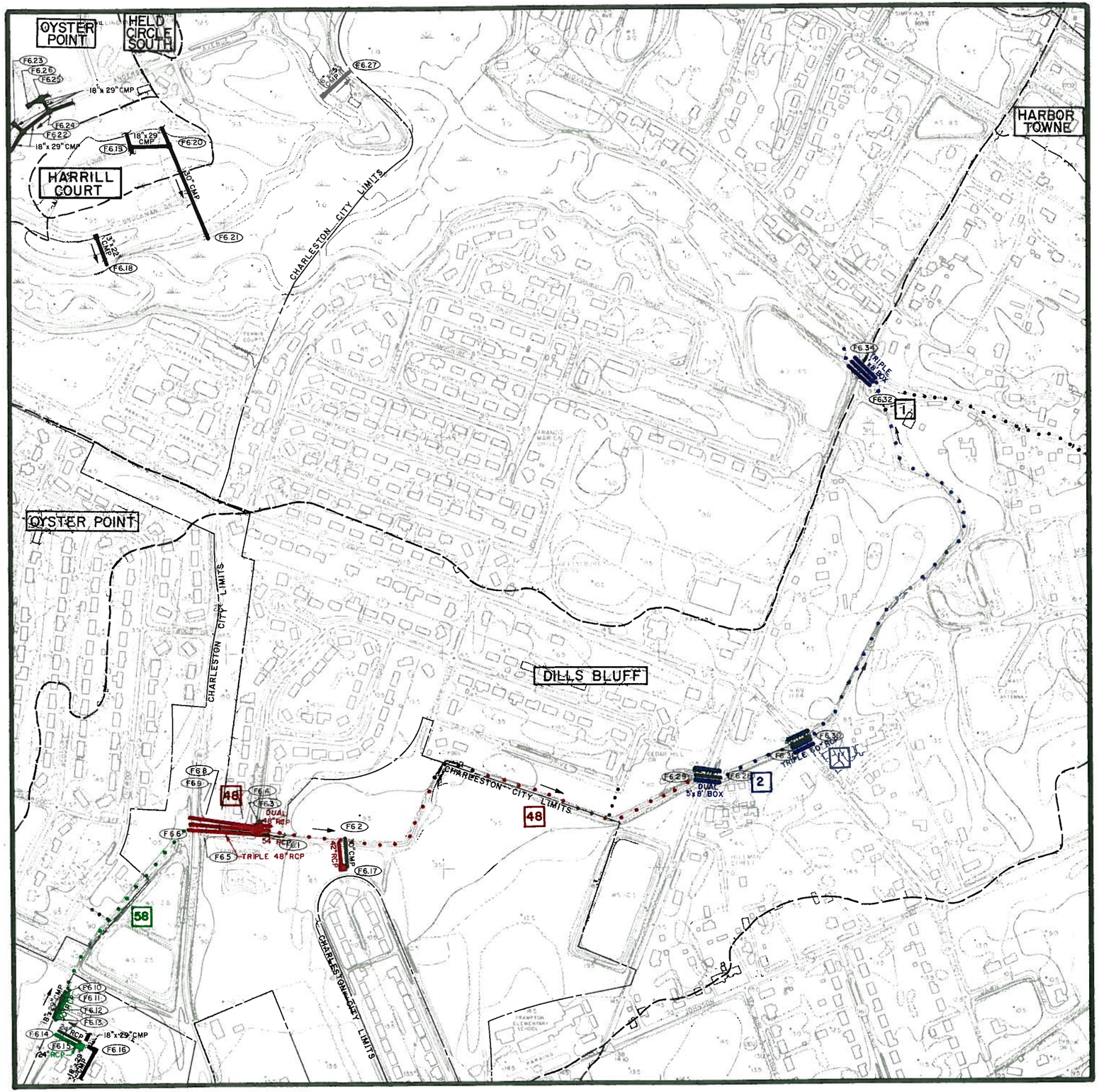
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

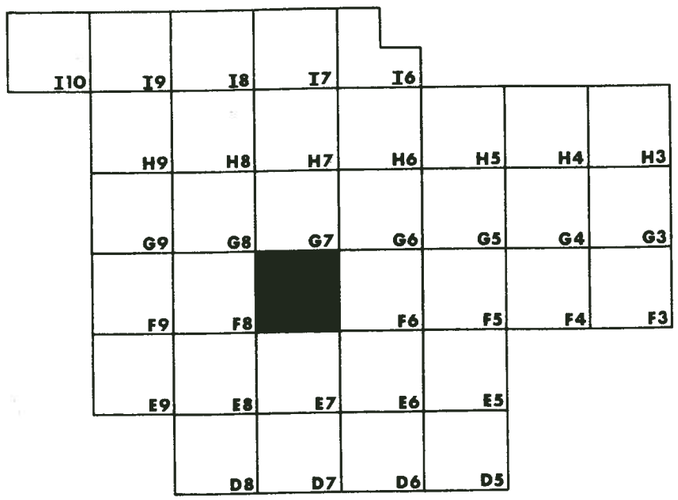
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DRAINAGE SYSTEMS | MAP F7

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

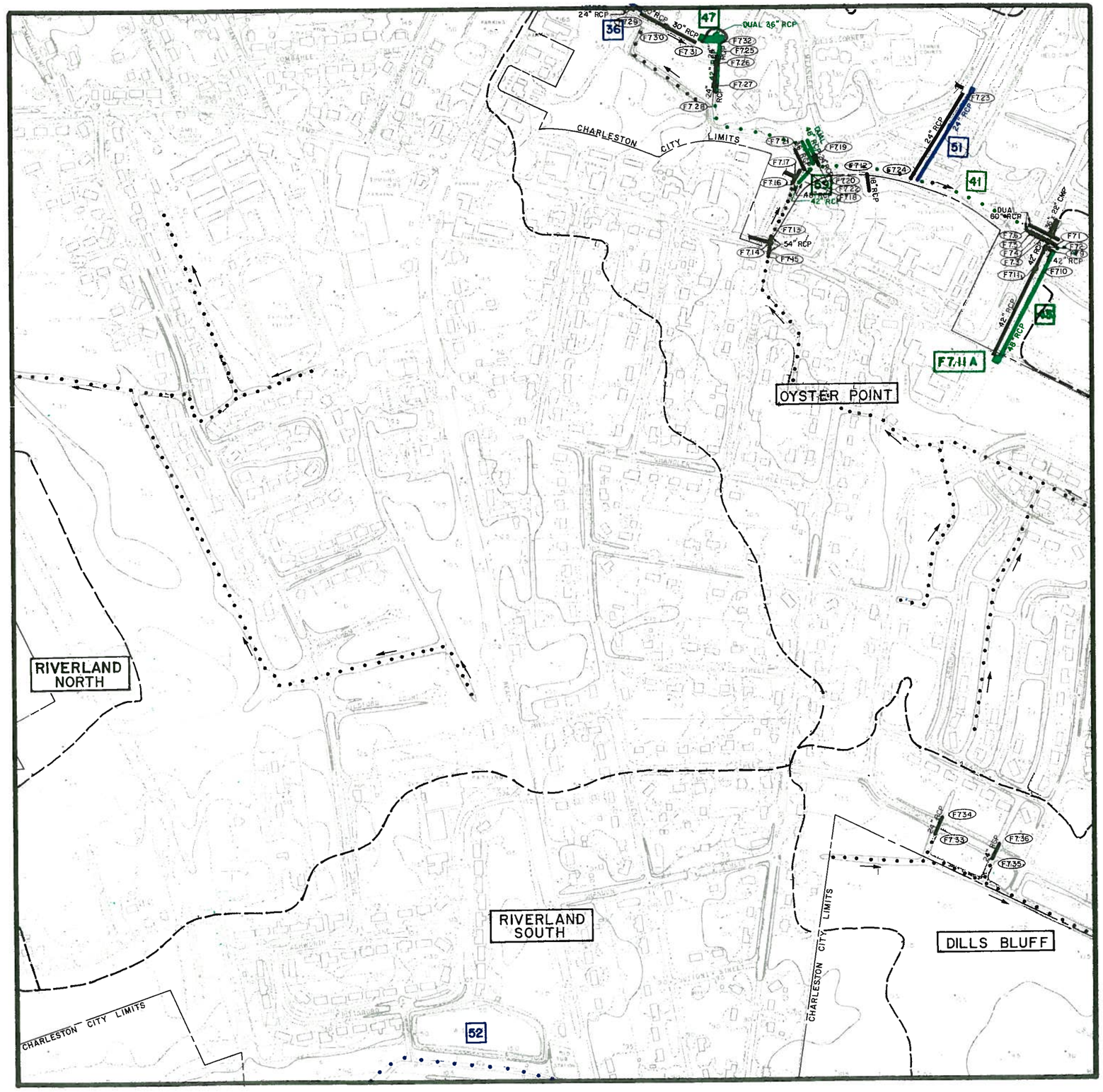
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

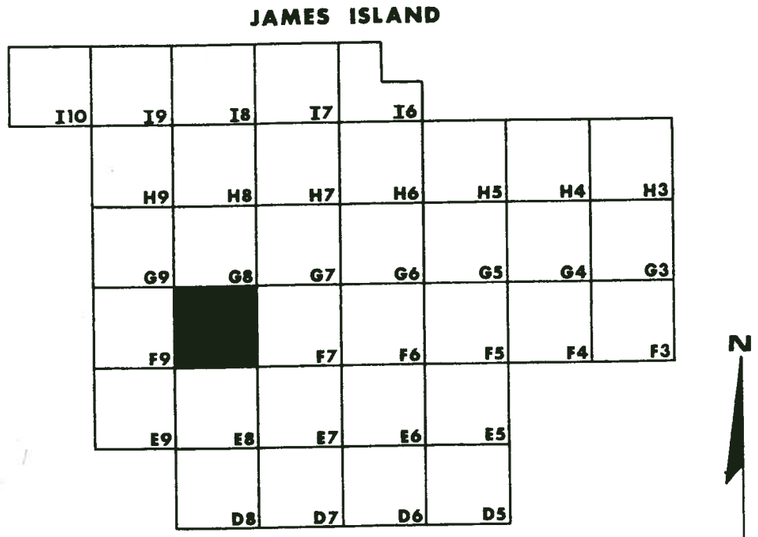
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP F8

recommended improvements
CITY OF CHARLESTON



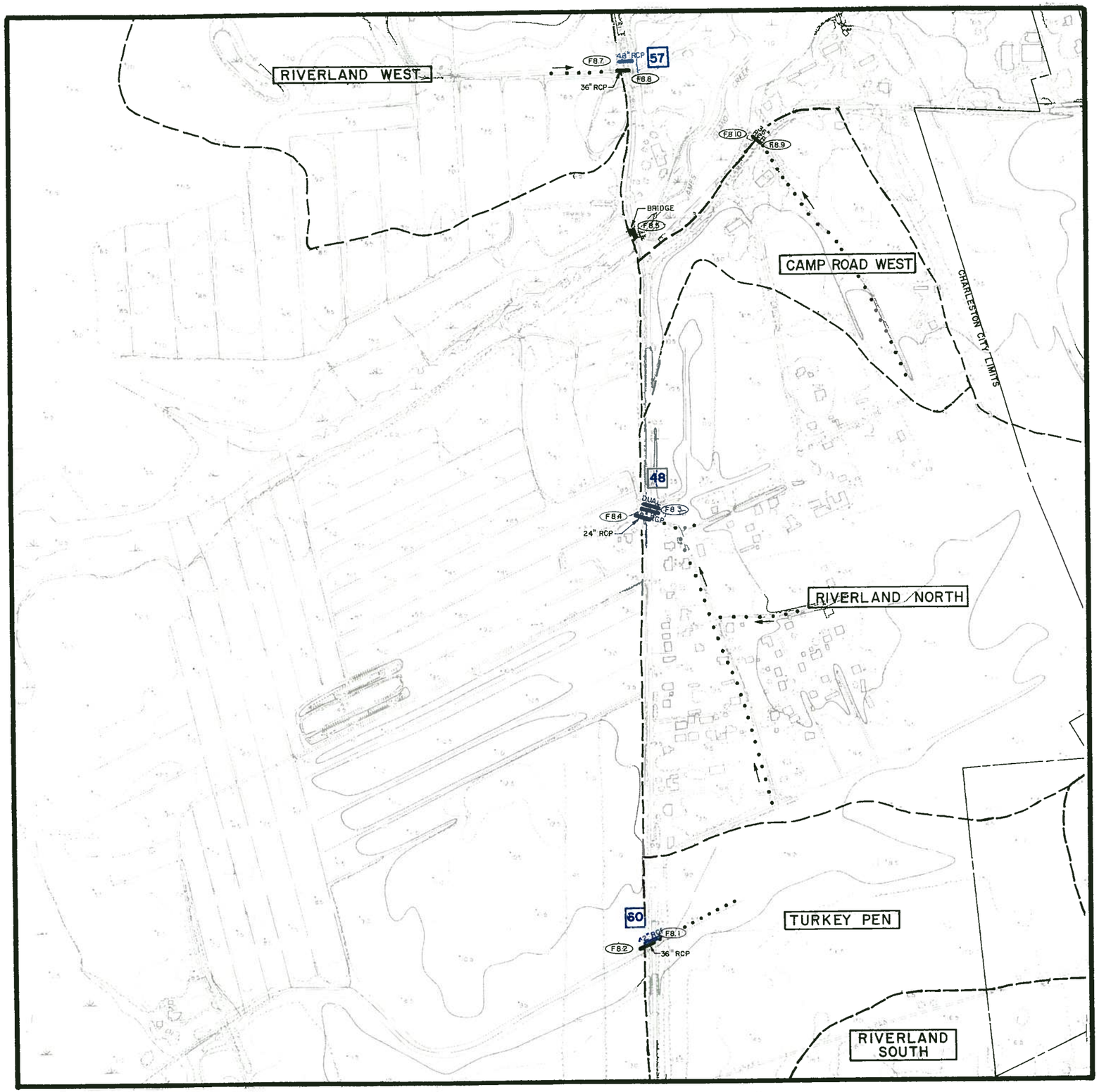
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

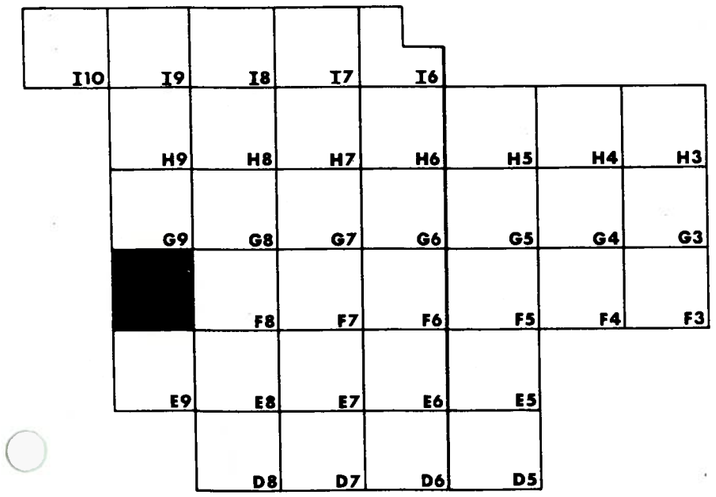
GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP F9

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



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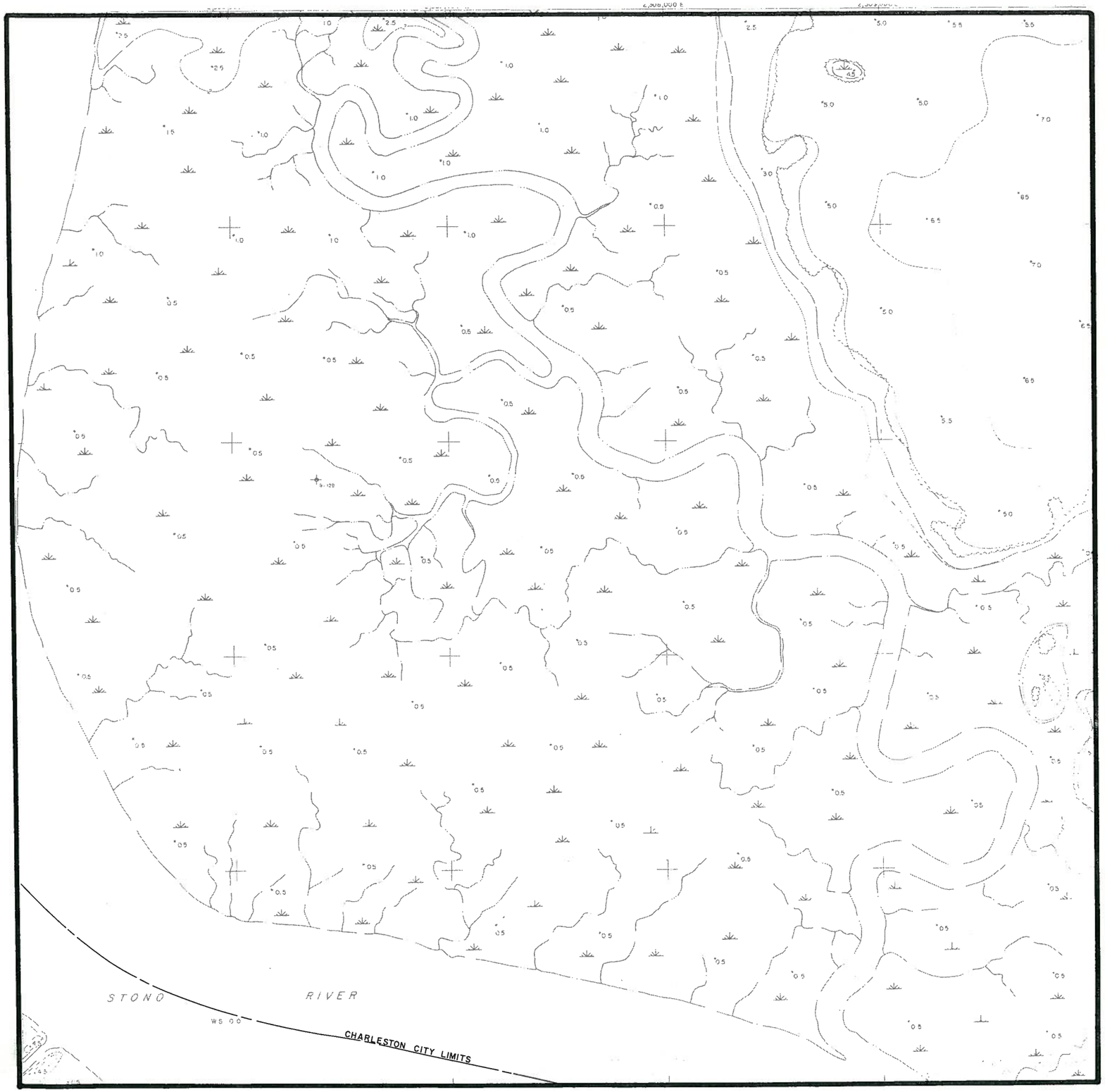
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP G4

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND

I10	I9	I8	I7	I6		
H9	H8	H7	H6	H5	H4	H3
G9	G8	G7	G6	G5		G3
F9	F8	F7	F6	F5	F4	F3
E9	E8	E7	E6	E5		
	D8	D7	D6	D5		

N

PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

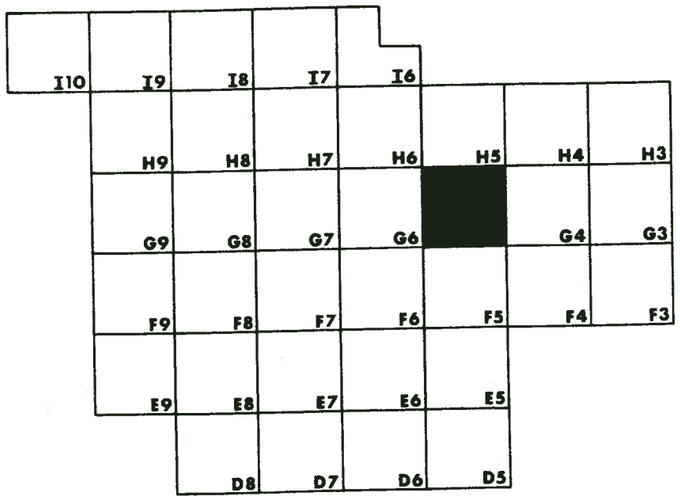
GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS | MAP G5

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

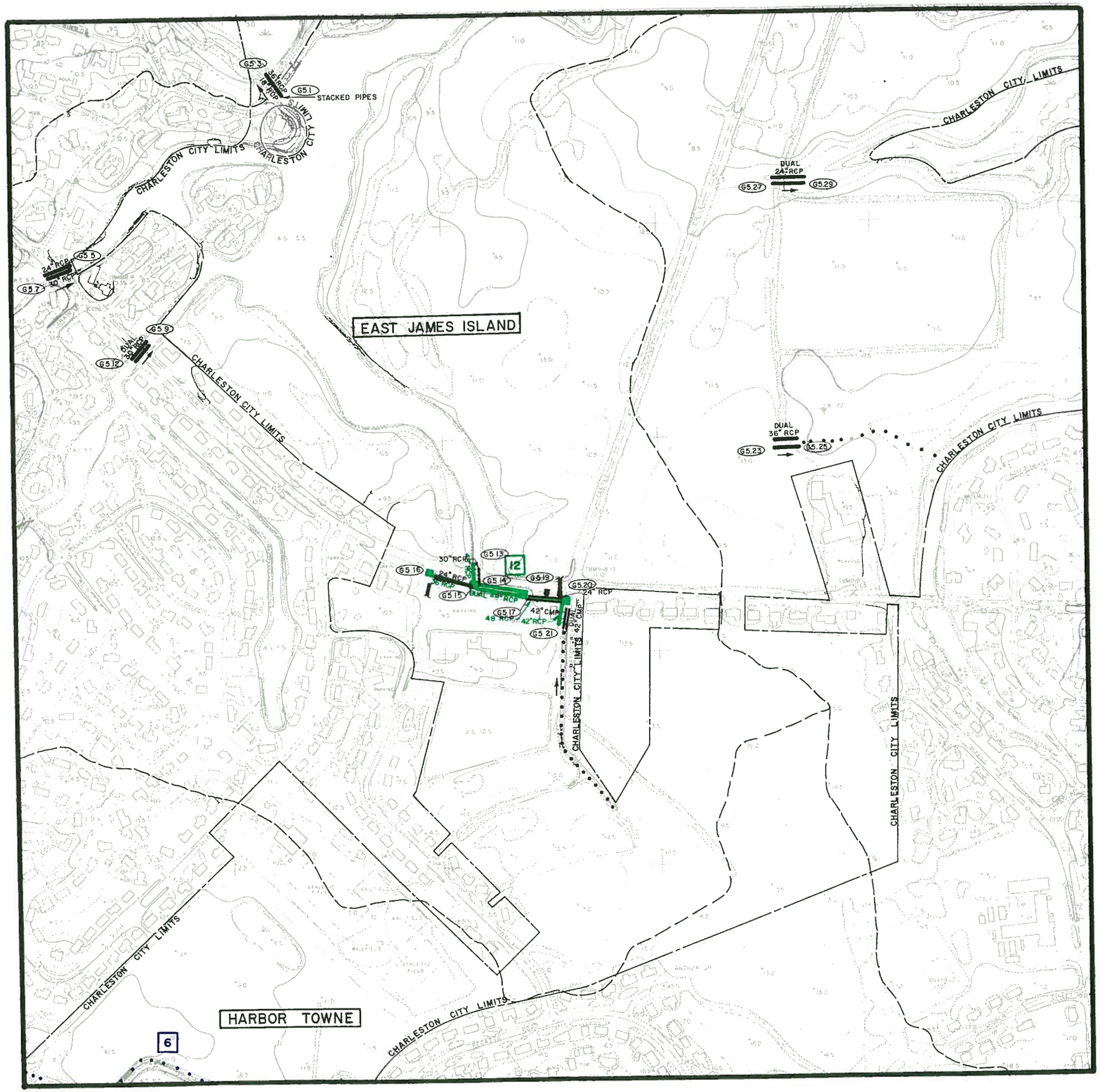
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

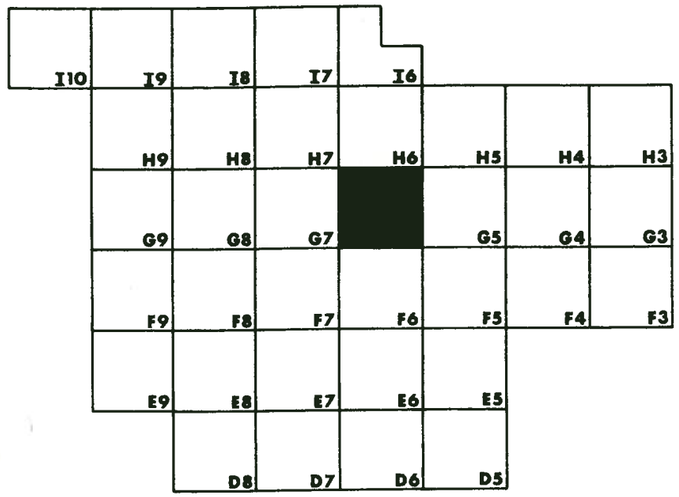
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DRAINAGE SYSTEMS | MAP G6

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

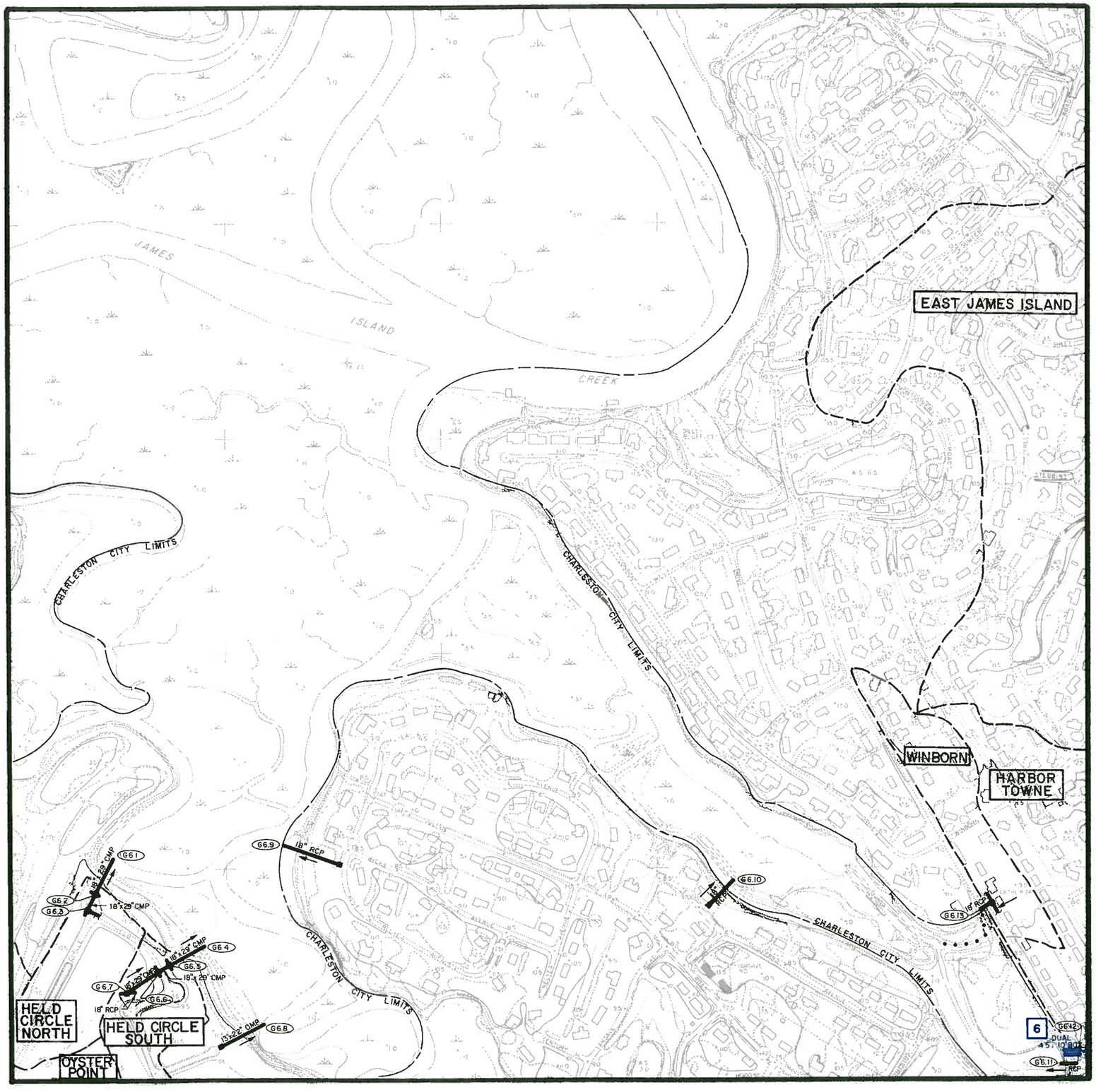
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- (P) — PUMPING STATION

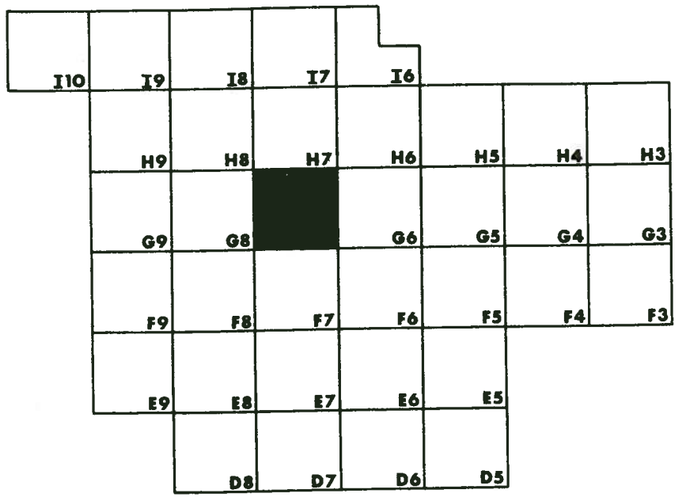
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DRAINAGE SYSTEMS — MAP G7

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

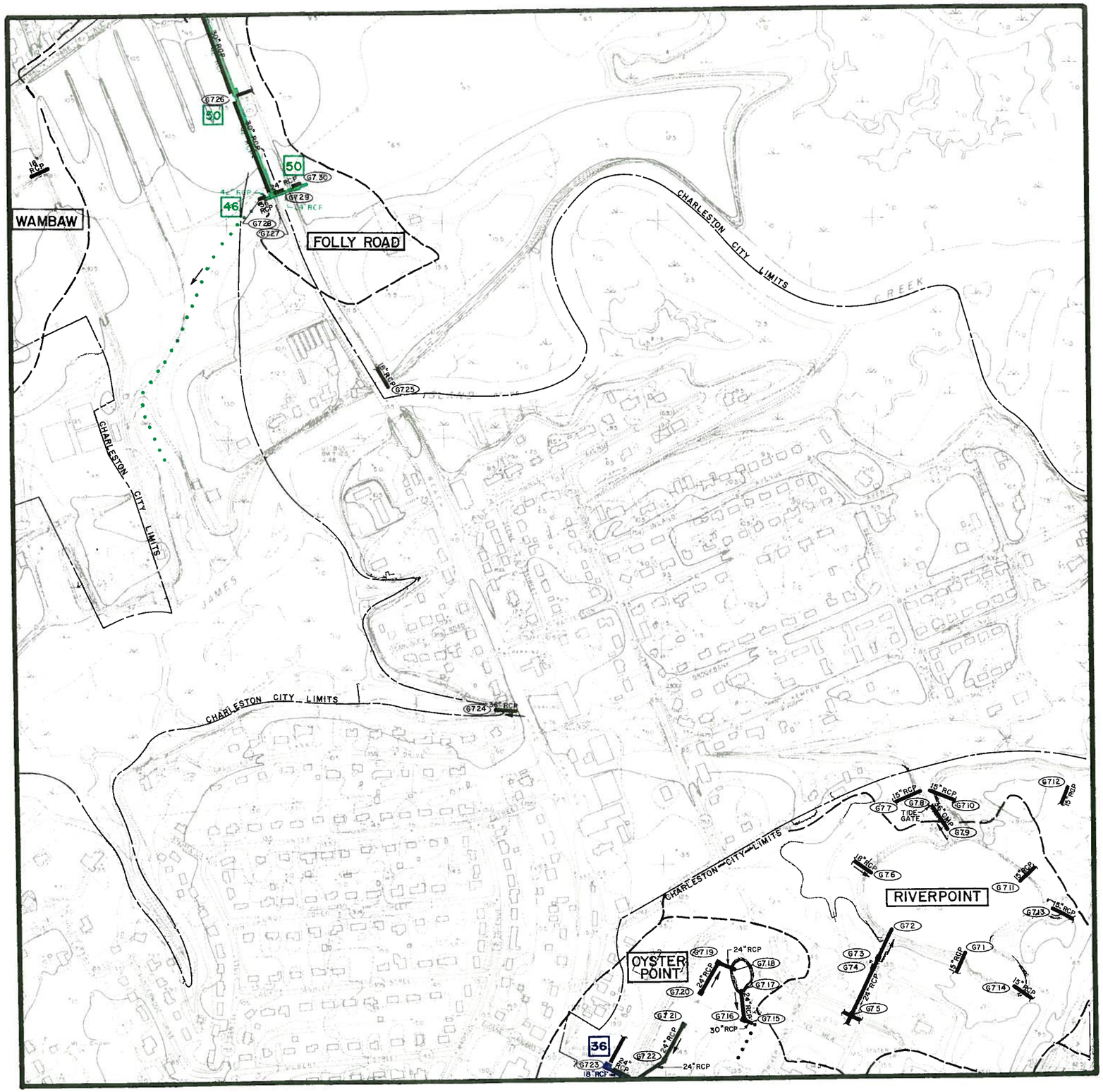
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

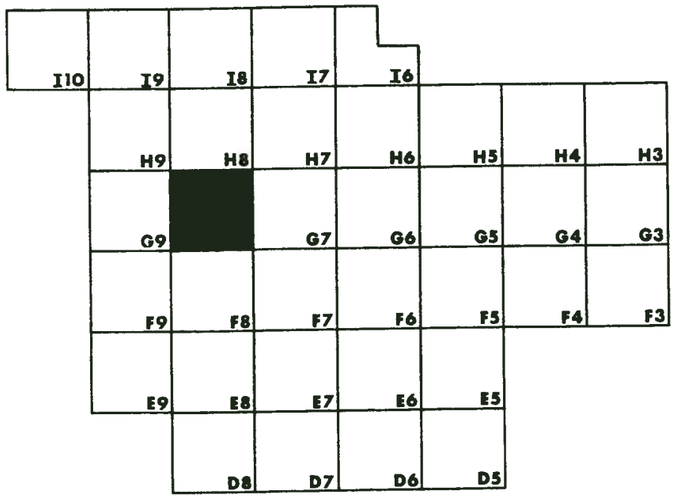
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DRAINAGE SYSTEMS — MAP G8

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

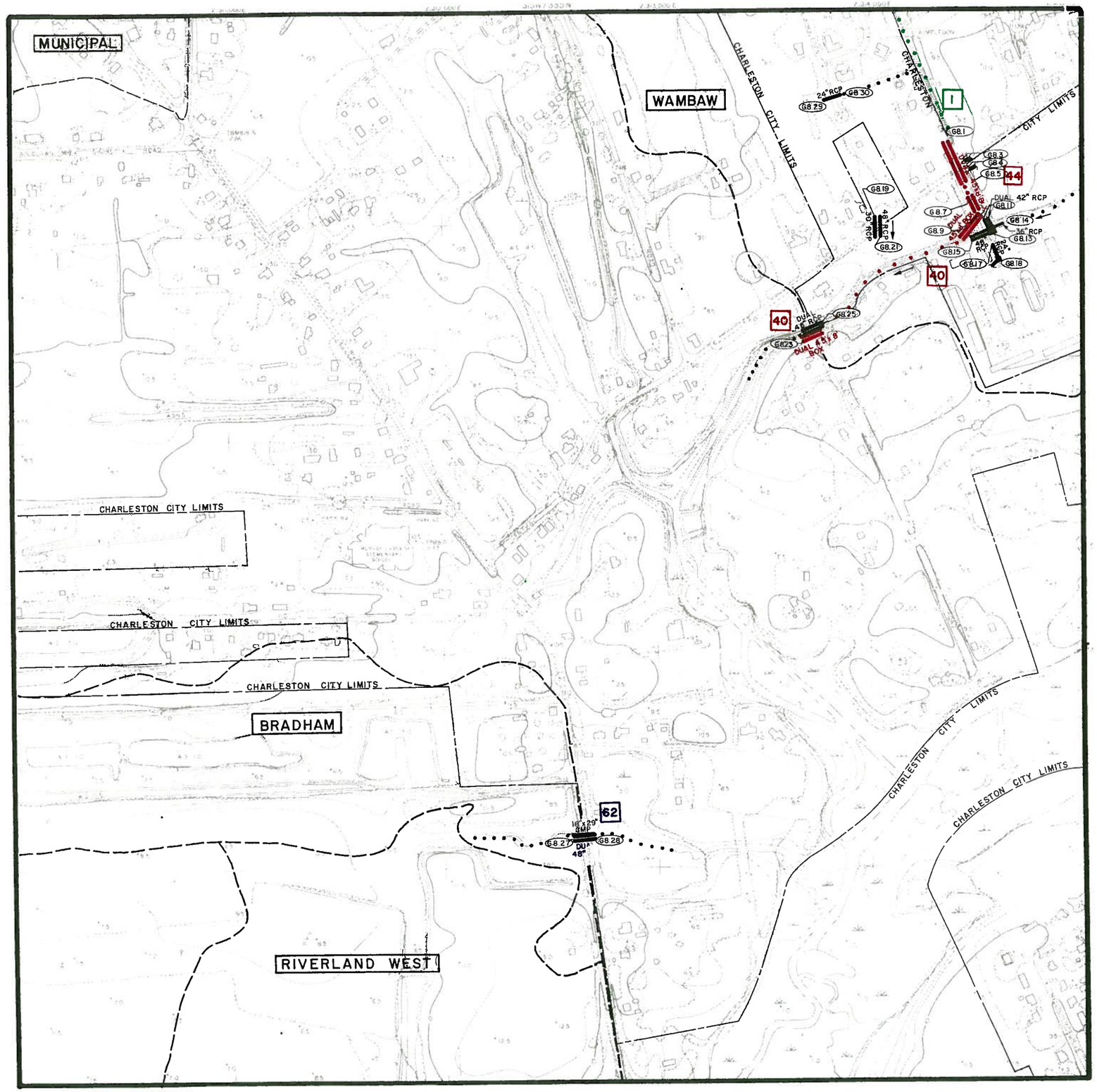
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

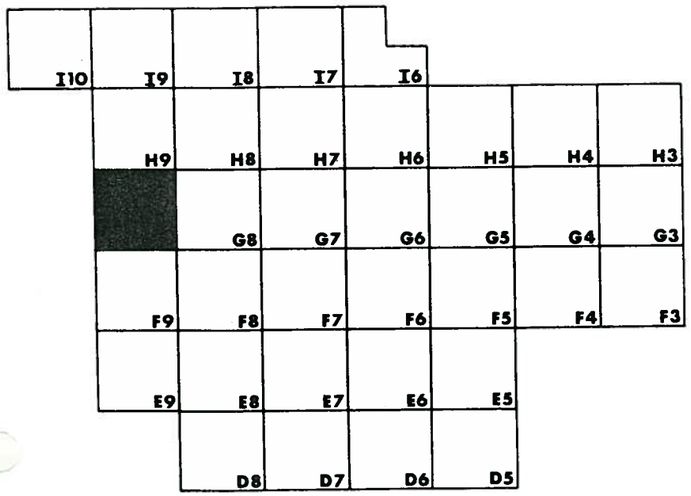
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DRAINAGE SYSTEMS | MAP G9

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



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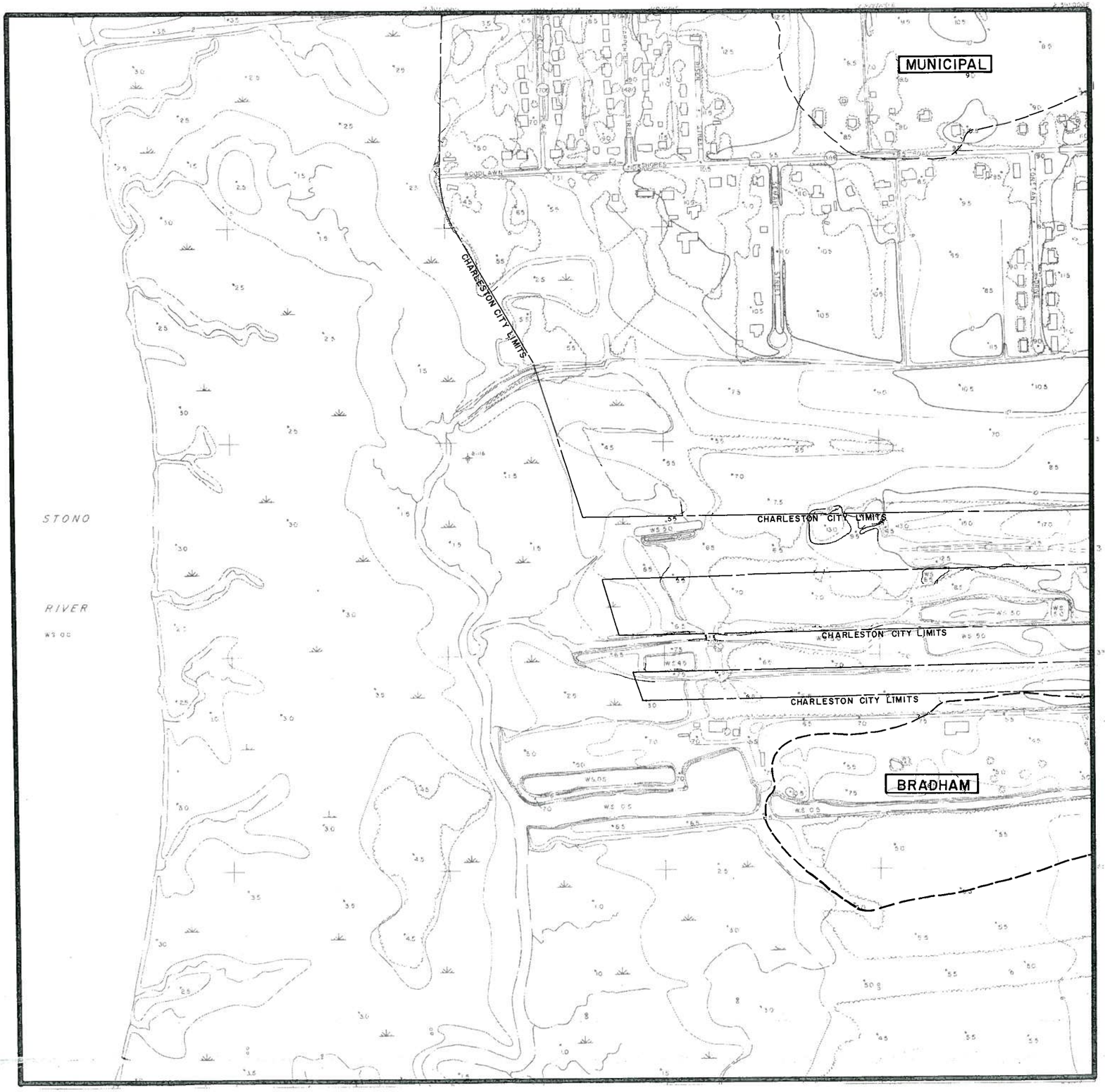
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

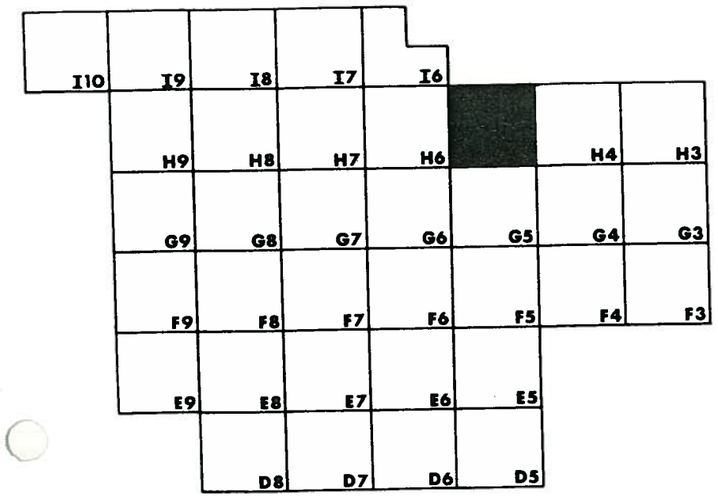
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DRAINAGE SYSTEMS — MAP H5

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



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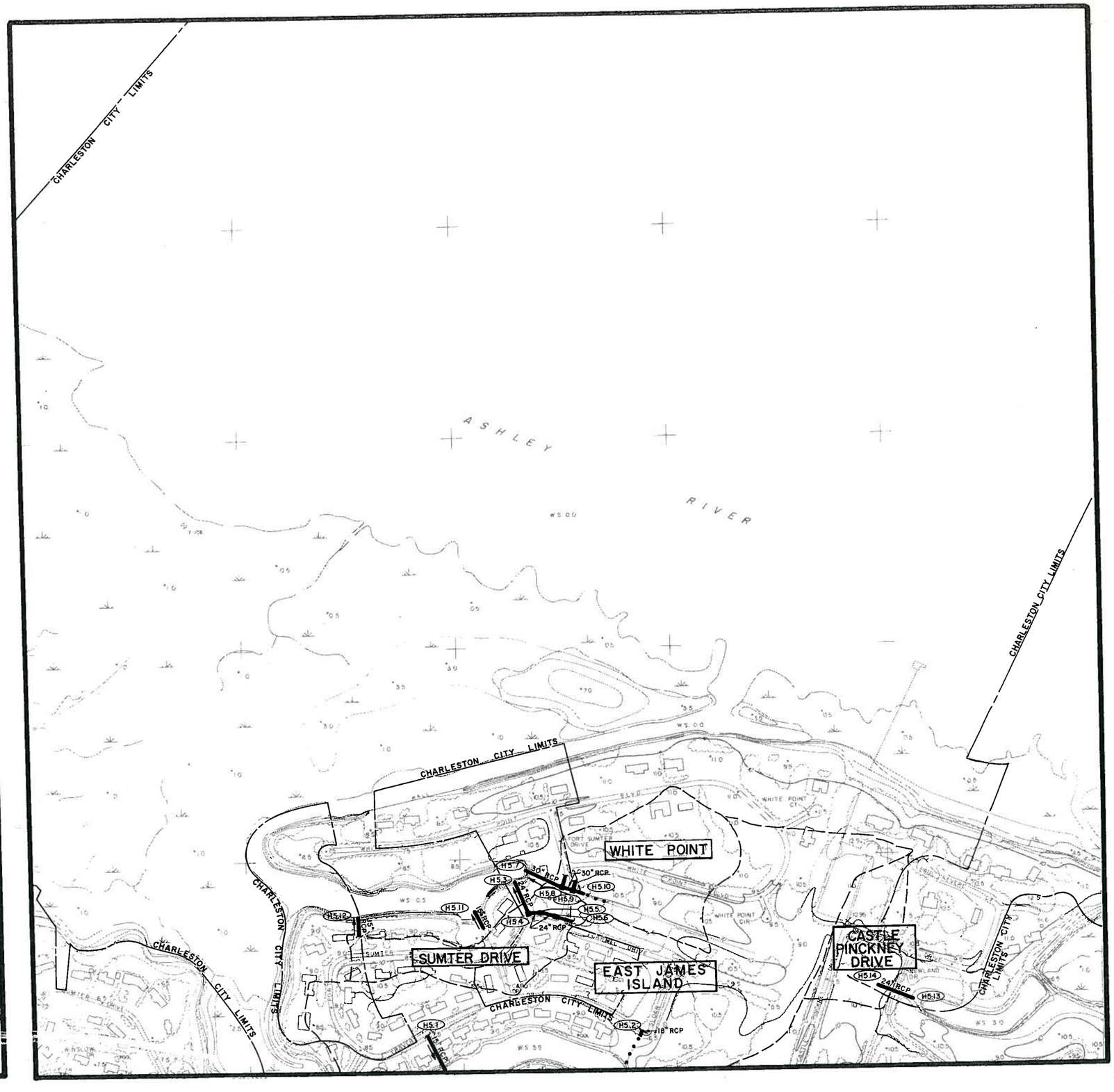
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

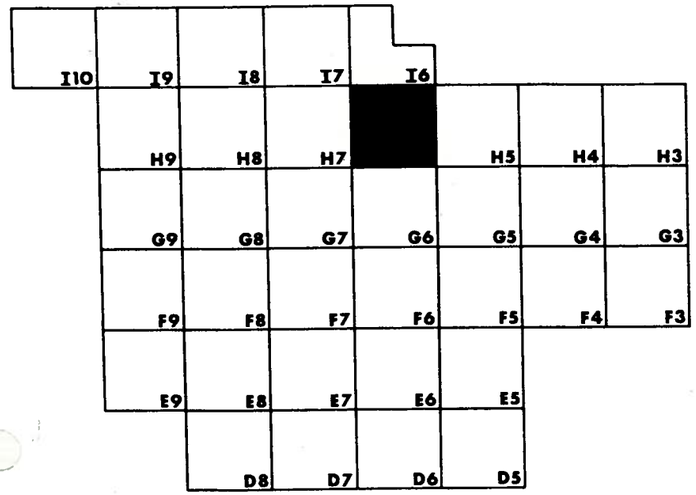
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DRAINAGE SYSTEMS — MAP H6

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



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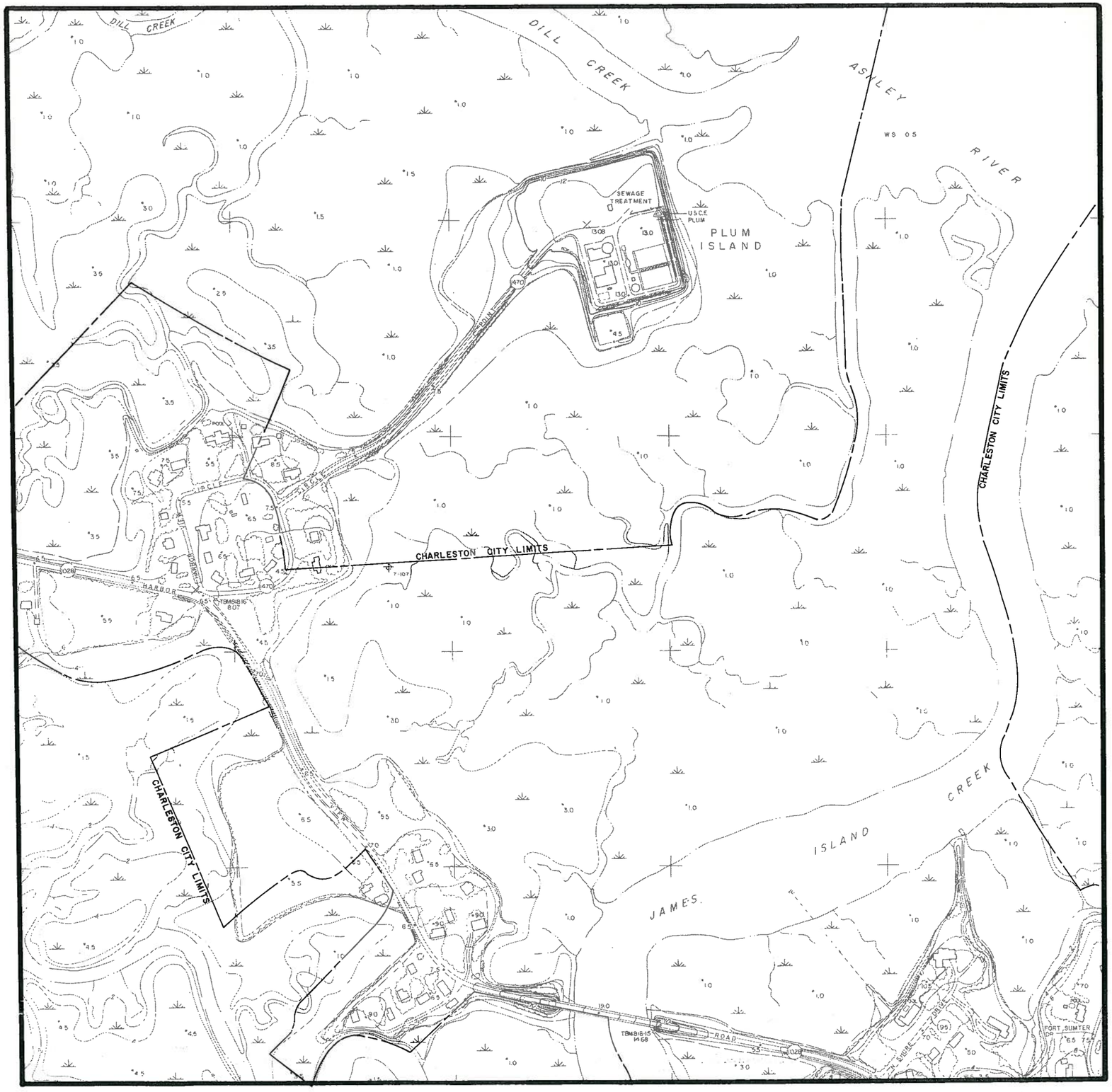
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

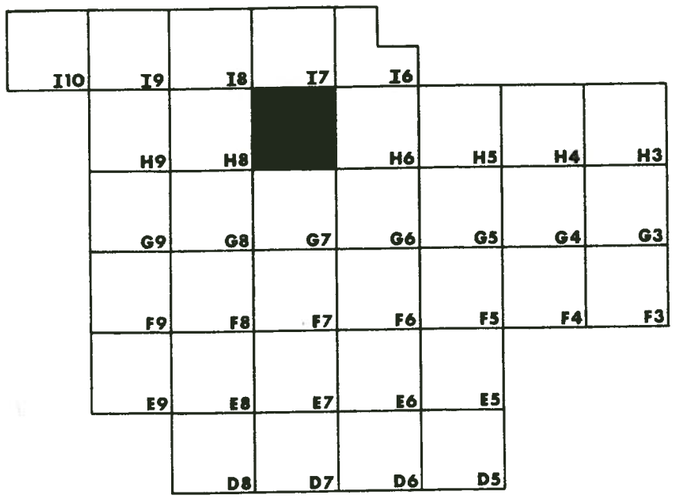
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DRAINAGE SYSTEMS — MAP H7

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



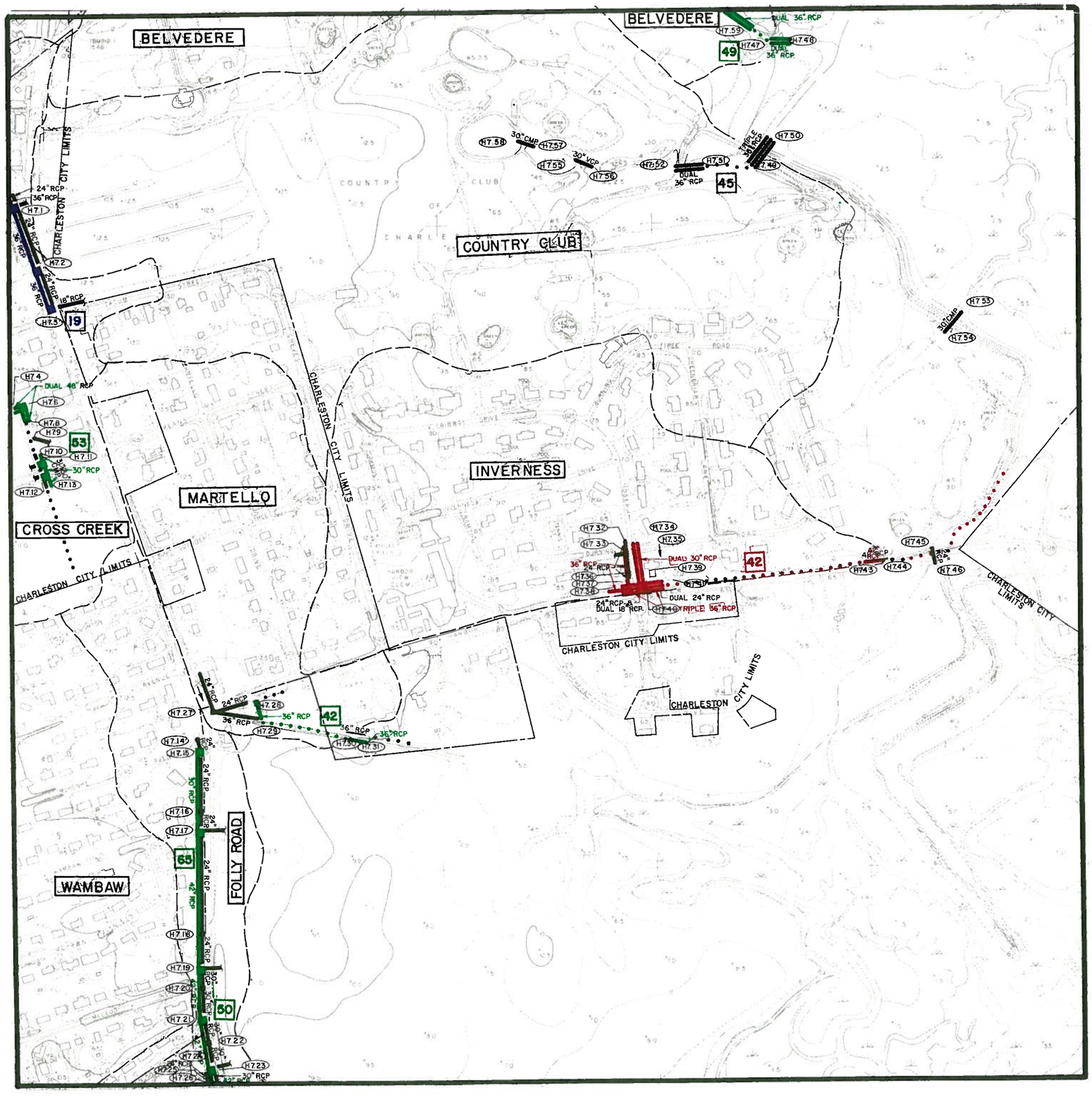
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

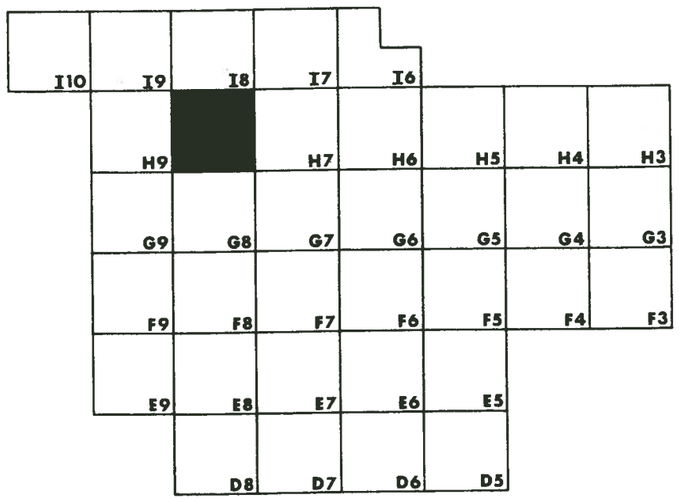
GRAPHIC SCALE 500 0 500 1000 1500 FEET



DRAINAGE SYSTEMS — MAP H8

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

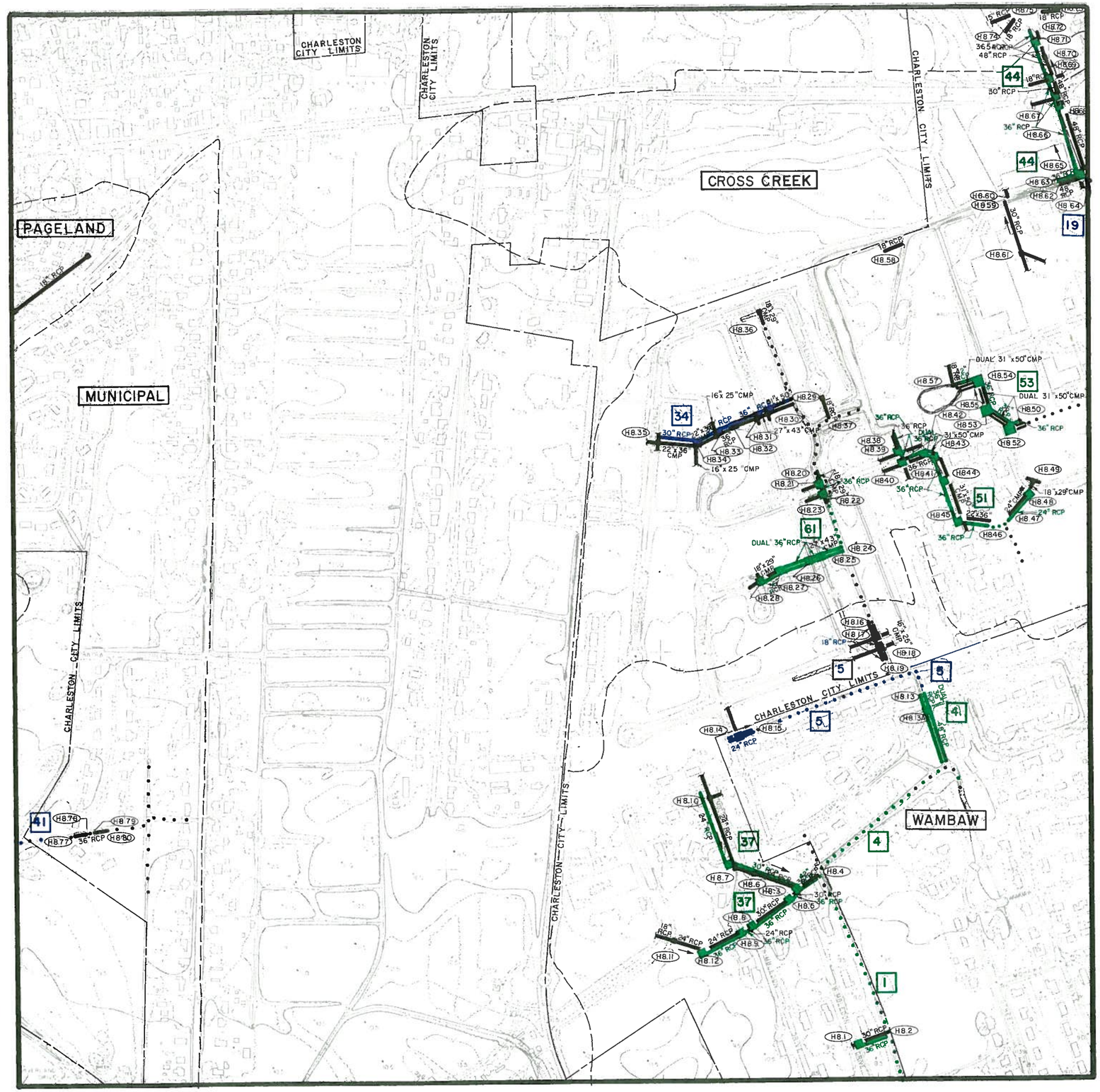
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

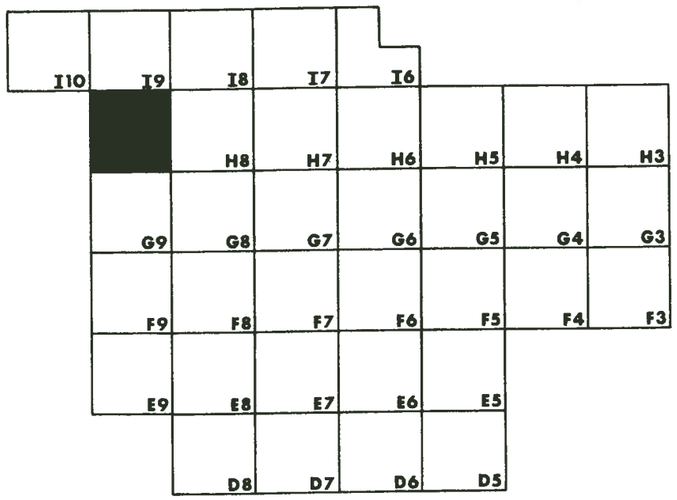
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DRAINAGE SYSTEMS — MAP H9

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



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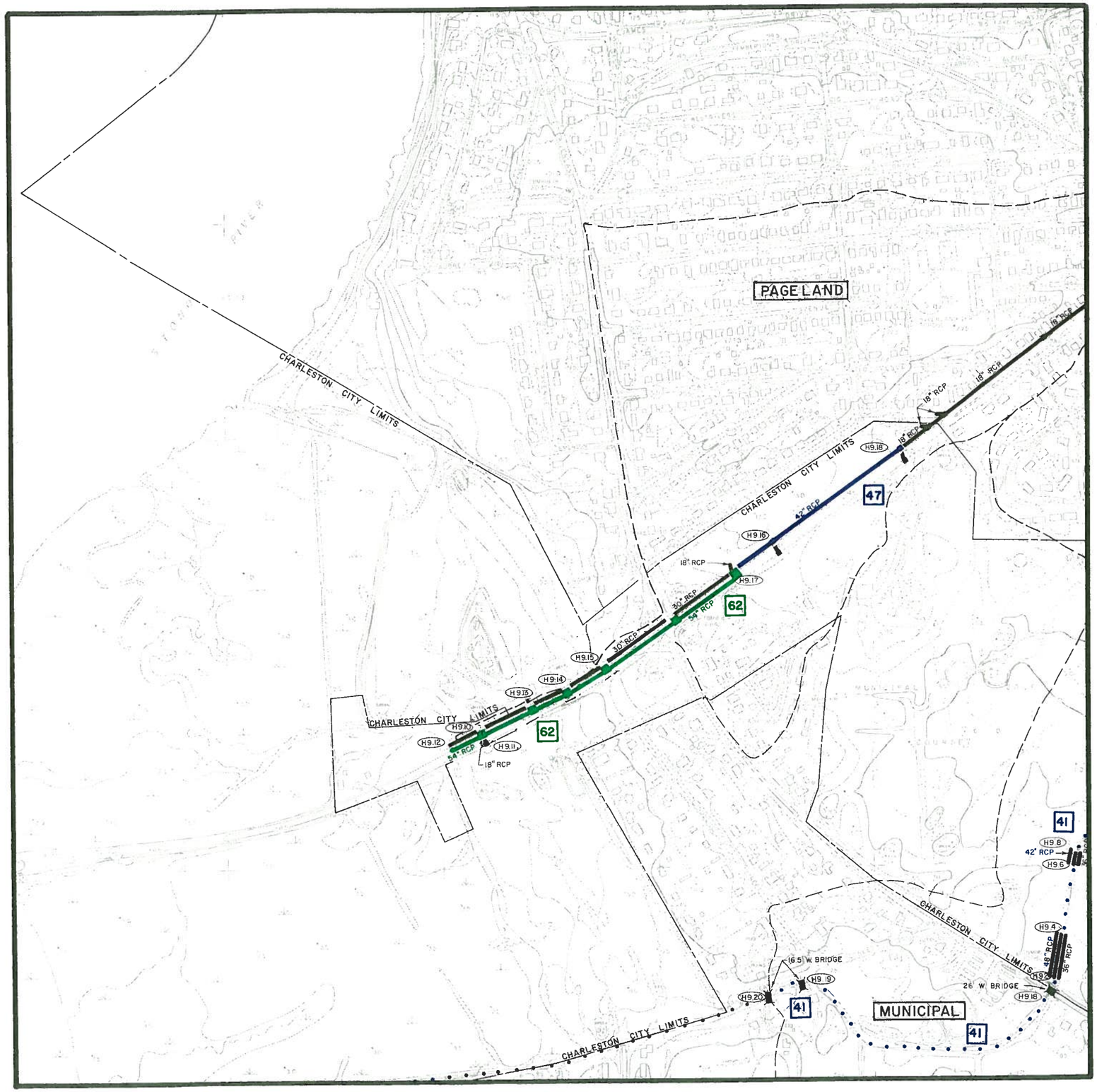
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

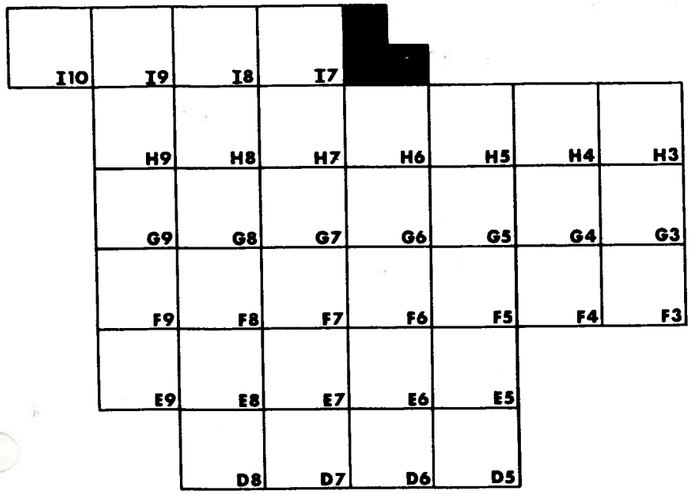
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DRAINAGE SYSTEMS | MAP I6

recommended improvements
CITY OF CHARLESTON

JAMES ISLAND



N

PROPOSED SYSTEM PRIORITIES

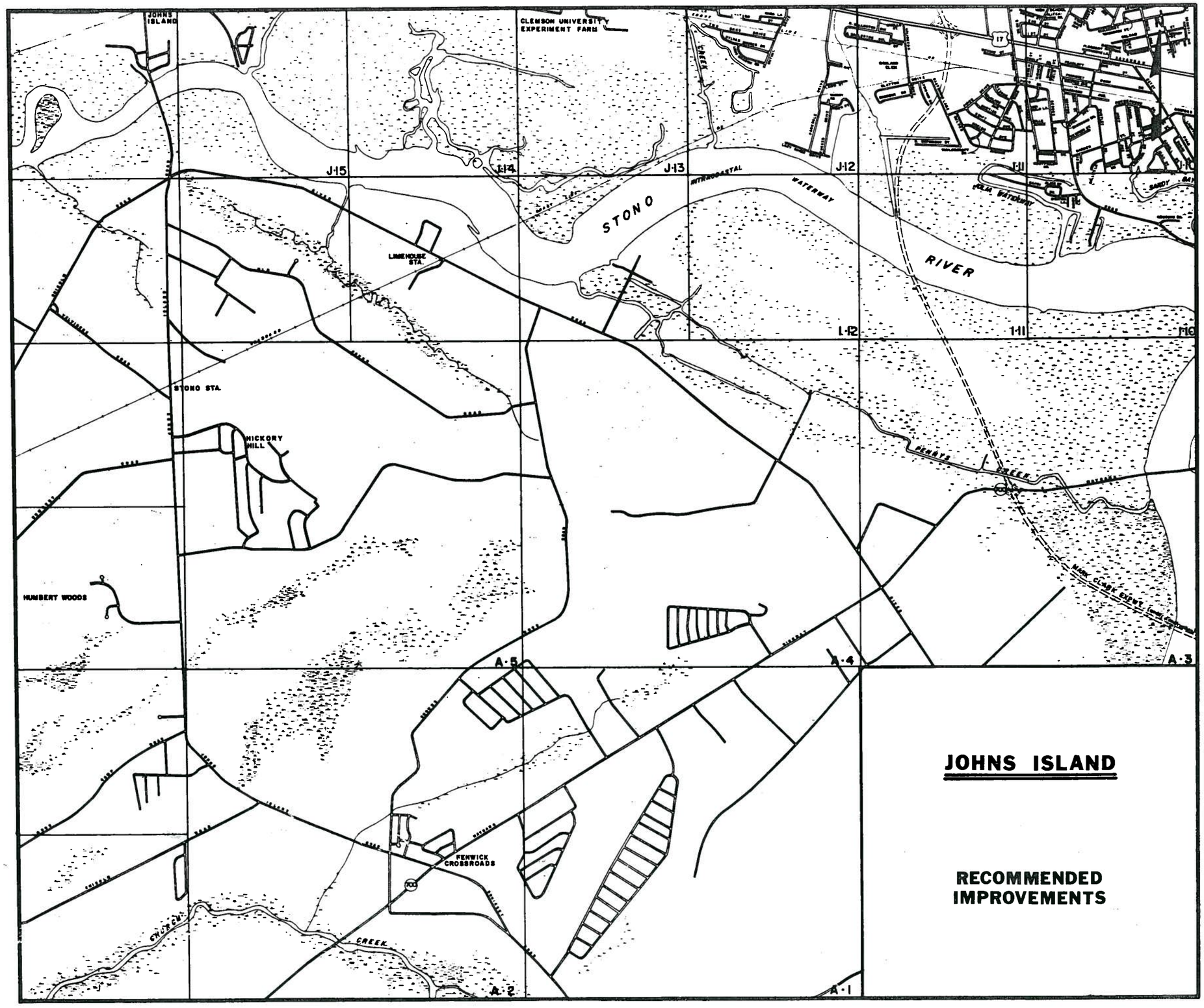
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET




JOHNS ISLAND
CLEMSON UNIVERSITY EXPERIMENT FARM
J-15
J-14
J-13
J-12
I-11
I-10
STONO
RIVER
LIMEHOUSE STA.
I-12
I-11
I-10
STONO STA.
HICKORY HILL
PENNYS CREEK
HUMBERT WOODS
A-5
A-4
A-3
PENWICK CROSSROADS
CREEK
A-2
A-1
JOHNS ISLAND
RECOMMENDED IMPROVEMENTS

DRAINAGE SYSTEMS — MAP A1

recommended improvements
CITY OF CHARLESTON

JOHNS ISLAND



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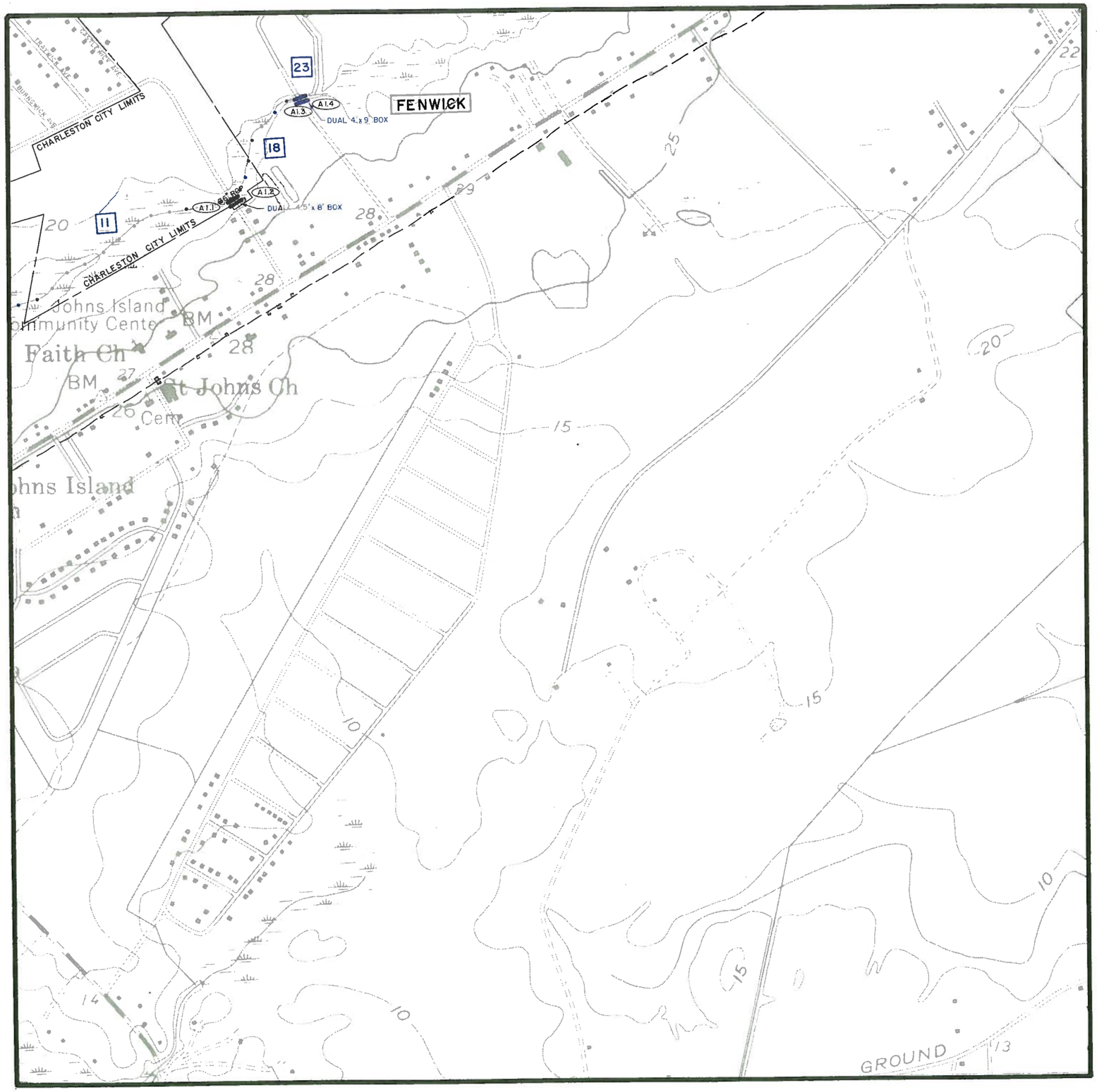
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

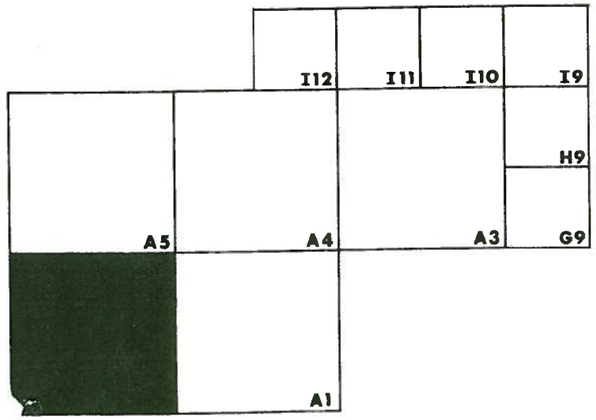
GRAPHIC SCALE 300 0 300 600 900 FEET



DRAINAGE SYSTEMS | MAP A2

recommended improvements
CITY OF CHARLESTON

JOHNS ISLAND



N

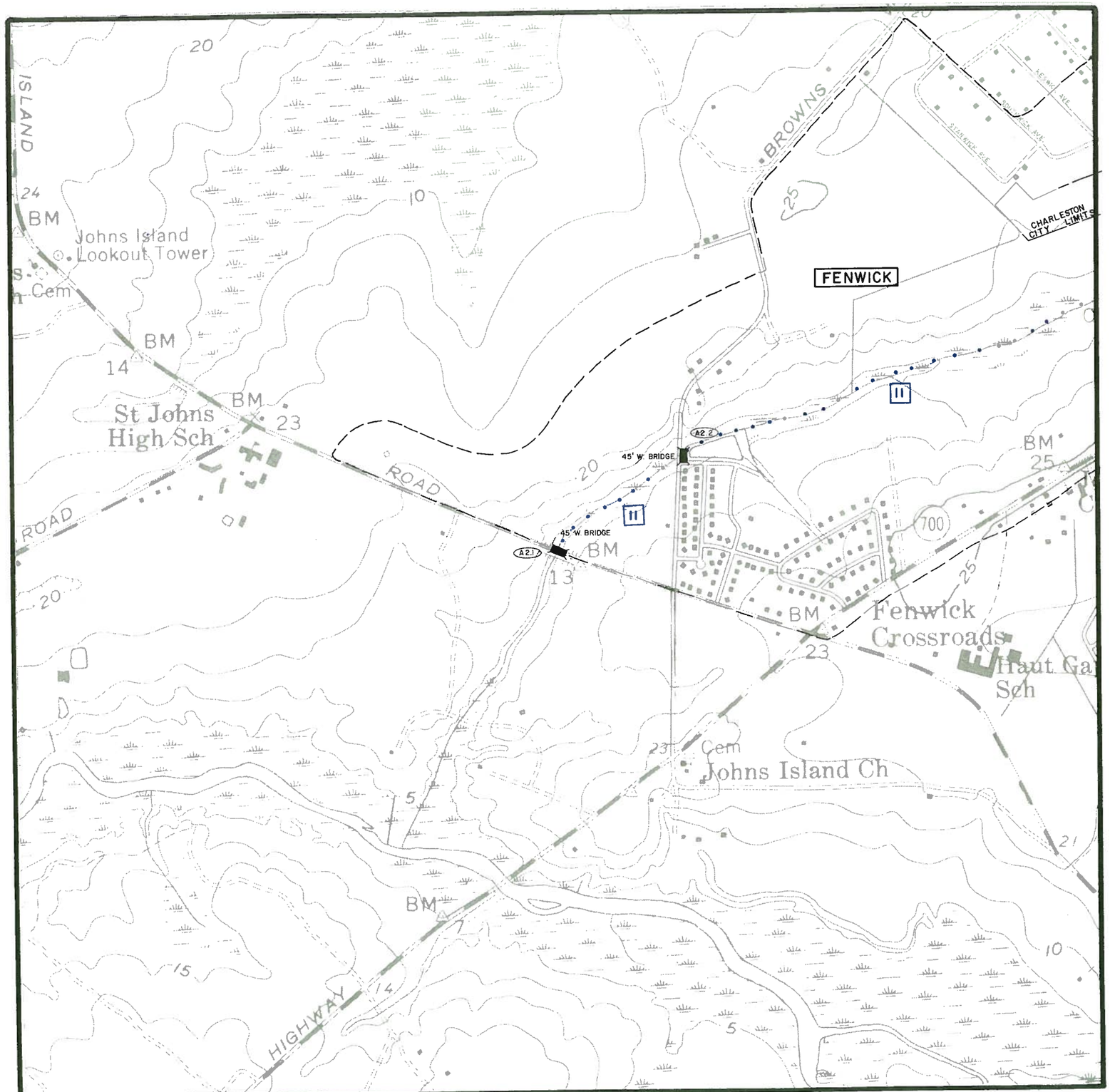
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

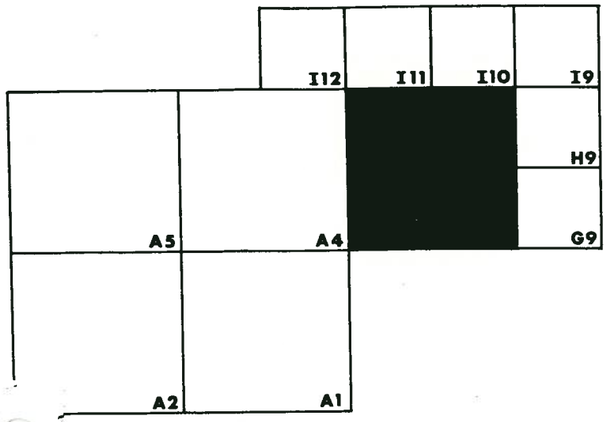
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DRAINAGE SYSTEMS | MAP A3

recommended improvements
CITY OF CHARLESTON

JOHNS ISLAND



PROPOSED SYSTEM PRIORITIES

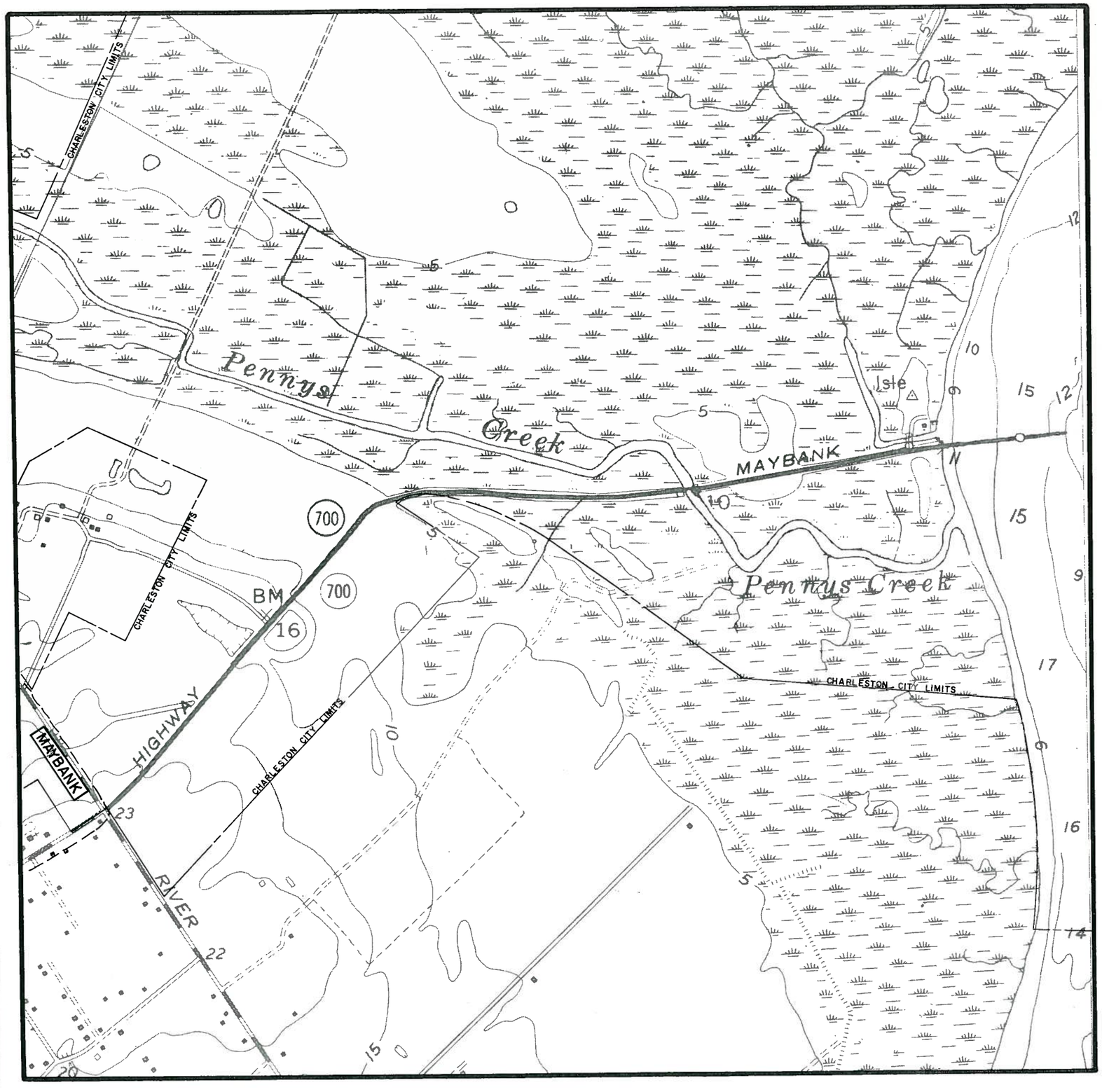
BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 300 0 300 600 900 FEET

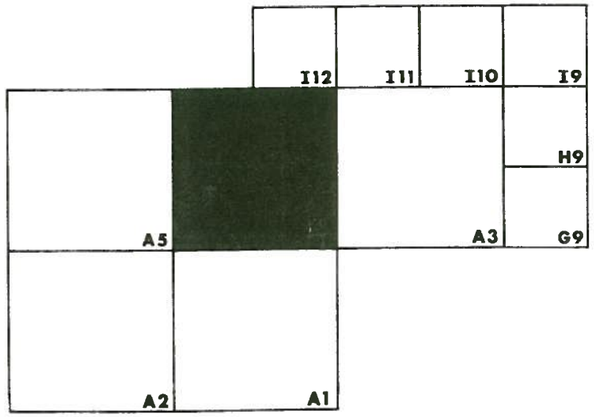
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DRAINAGE SYSTEMS — MAP A4

recommended improvements
CITY OF CHARLESTON

JOHNS ISLAND



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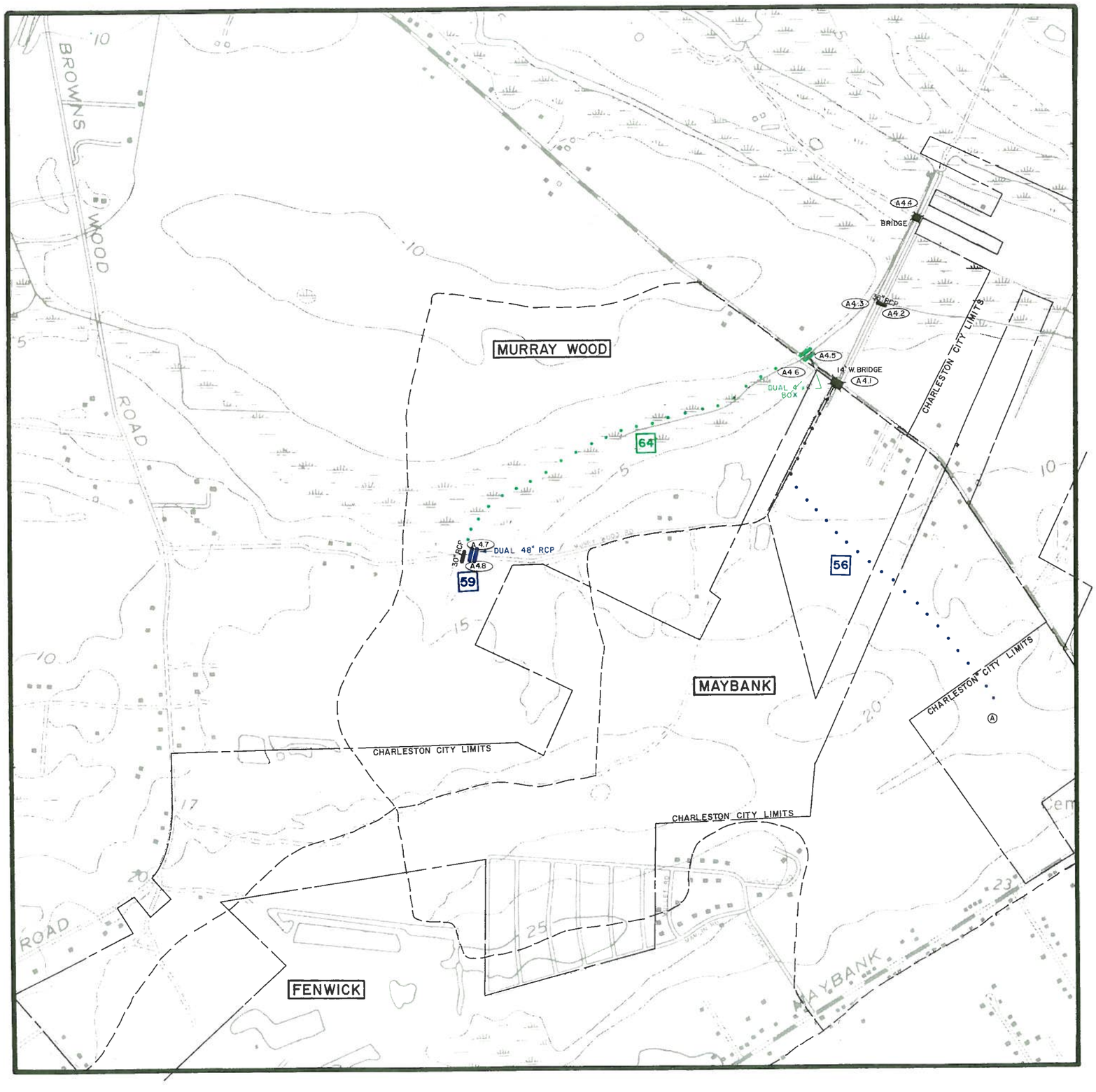
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- (P) — PUMPING STATION

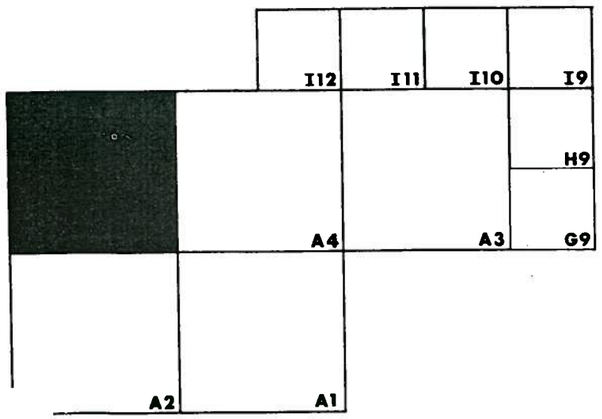
GRAPHIC SCALE 0 300 600 900 FEET



DRAINAGE SYSTEMS — MAP A5

recommended improvements
CITY OF CHARLESTON

JOHNS ISLAND



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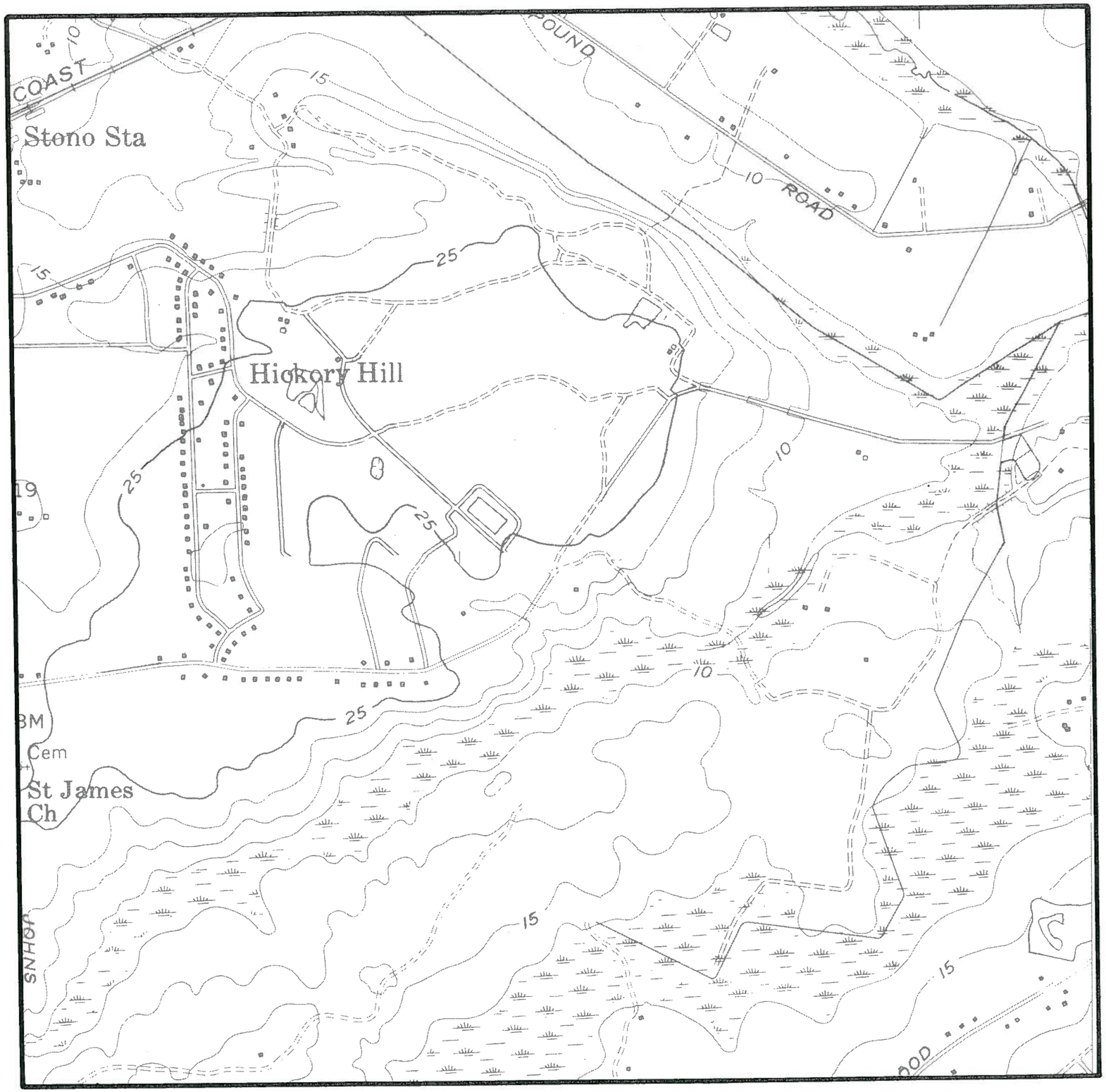
PROPOSED SYSTEM PRIORITIES

BLACK	EXISTING SYSTEMS TO REMAIN OPERATIONAL
RED	FIRST PRIORITY
GREEN	SECOND PRIORITY
BLUE	THIRD PRIORITY

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 300 0 300 600 900 FEET



SECTION V

CONSTRUCTION PROGRAM

Implementation of the recommended improvements developed in Section IV will meet the design goal of alleviating surface flooding during rainfall intensities with ten year frequency of occurrence or less in the Peninsular City area and 5 year frequency for the remainder of the study area. The cost of the improvements as developed has been estimated on 1984 construction prices and includes allowances for construction contingencies, engineering fees, and administrative and legal fees. For clarity and convenience, the recommended improvements have been placed into projects, which in turn have been subdivided into high, medium, or low priority. In addition, the recommended projects have been presented in two separate lists, one for the Peninsular City area and one for the remainder of the study area. The projects delineated within these lists may be phased over an indefinite period of years as dictated by the availability of funds.

The projects with their designated priority numbers have been shown on the map sector sheets in Section IV. The high, medium and low priority projects have been further differentiated on the maps through the use of colors red, green and blue respectively.

The priorities selected for the projects reflect the use of a number of general criteria as guides. The highest priority has, for instance, been assigned to those projects which will provide the earliest relief to those areas in which the existing facilities are most deficient and in which flooding is most frequent and severe. Wherever possible, higher priority has also been assigned to those projects which will provide the greatest and most wide-spread relief relative to their cost. The rankings have, in addition, been influenced to a degree by the present status of development within specific areas as well as the potential impact of stormwater related conditions on future development. Finally, for those systems consisting of more than one project, highest priority has been assigned to segments located furthest downstream.

Although the above described criteria are logical and valid for the purposes intended, their use does not result in priority rankings with mathematical level accuracy. It must be recognized therefore, that the adopted rankings have, necessarily, involved the exercise of judgment and in some instances have been arbitrary. For this reason, the schedules as presented, should be considered as a guide rather than a fixed commitment. The order may change somewhat as additional information becomes available or in response to future events. Changes in the order can be expected as a result of funding limitations; delays in obtaining approvals, permits or easements; property acquisition difficulties, etc. Such changes, however, are not expected to be dramatic and should be less pronounced in the high priority category than in the lower categories.

On the basis of the foregoing, it is recommended that the City initiate and pursue a program to implement the recommended improvements in the approximate order listed with the construction of all the high priority category projects established as the minimum 20 year goal. It is further recommended that the City continue its efforts to establish

standards for use in the design and construction of drainage systems and to formalize procedures for the review and approval of such design and construction. These measures are essential to ensure that new works are of adequate capacity and constructed in a manner which will minimize future maintenance and hydraulic problems. It is proposed that the design criteria and materials recommendations, as presented herein, provide the basis for the standards.

HIGH PRIORITY

PENINSULAR AREA

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
✓1.	Calhoun Street East	Pump Station #4 & J5.194A to P.S.	$ 3,320,450
2.	Market Street	Pump Station #6	$ 1,599,300
3.	Spring Street	Pump Station #9 J6.106 to P.S. J6.109A to P.S.	$ 4,001,400
4.	Fishburne Street	Pump Station #7 to J6.1	$ 301,950
5.	Spring Street & Fishburne Street	Pump Station #7 & J6.18 to P.S. J6.4 to J6.5 K6c.32 to J6.4 K6c.23 to P.S.	$ 3,985,050
6.	Marina	J6.7 to J6.6	$ 224,900
7.	Calhoun Street West	Pump Station #5 J6.31 to P.S. J6.36 to J6.33 & J6.33 to P.S.	$ 4,220,850
8.	Colonial Lake, Rutledge Avenue & Beaufain Street	Pump Station #1 & I5.91 to P.S. & J6.2 to P.S.	$ 3,641,000
9.	Cooper Street & Jackson Street Jackson Street	Pump Station #2 K5a.22 to P.S. K5a.11 to K5a.9	$ 1,967,200
10.	Peachtree Street	L7.1E to L7.1	$ 463,050
11.	Reid Street	Pump Station #3 K5c.18 to Pump Station #3	$ 2,434,850
12.	V. A. Hospital	Pump Station #8	$ 1,087,600
✓13.	Calhoun Street East	J5.193 to J5.194A	$ 448,700
✓14.	Calhoun Street East	J5.179 to J5.193	$ 637,700

HIGH PRIORITY (continued)

PENINSULAR AREA

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
15.	Market Street	J5.36 to Pump Station #6	$ 1,242,300
16.	Fishburne Street	K6c.15 to K6c.32	$ 912,250
17.	Fishburne Street	K6c.23 to Pump Station #7	$ 524,650
18.	Peachtree Street	L7.1C to L7.1D	$ 549,200
19.	Fishburne Street	K6c.6 to K6c.15	$ 296,900
20.	Newmarket Creek	Reach 1 to Reach 4	$ 223,250
21.	Fishburne Street	K6c.4 to K6c.6	$ 392,700
22.	Market Steet	J5.133 to J5.36	$ 603,500
23.	Spring Street	J6.22 to J6.18	$ 243,150
24.	Peachtree Street	L7.1A to L7.1B	$ 431,900
25.	Spring Street	J6.14 to J6.14A	$ 265,100
26.	Spring Street	J6.110 to J6.109A	$ 788,200
27.	Spring Street	K6.25 to J6.110	$ 563,550
28.	Simons Street	K6.20 to K7.19	$ 55,800
29.	Huger Street	K6b.3 to K6b.8A	$ 649,250
30.	Calhoun Street West	J6.61 to J6.29	$ 463,800
31.	Huger Street	K6b.9 to K6b.14 K6b.17 to K6b.23	$ 510,700
32.	Calhoun Street West	J6.37 to J6.36	$ 244,800
33.	Grove Street	K7.17 to K7.15A	$ 995,950
34.	Grove Street	K6a.1 to K7.17	$ 744,650
35.	Limehouse Street	J5.70 to Pump Station #1	$ 852,700

HIGH PRIORITY (continued)

PENINSULAR AREA

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
36.	Meeting Street	J5.8 to J5.70	$ 788,350
37.	Limehouse Street	J5.80 to J5.70	$ 786,500
38.	Cooper Street	K5a.41 to K5a.22.1	$ 620,400
39.	Grove Street	K6a.2 to K6a.1	$ 422,400
40.	Calhoun Street East	J5.157 to Pump Station #4	$ 421,550
41.	Meeting Street North	L6.11 to K6b.25	$ 1,136,650
42.	Calhoun Street West	J6.60 to J6.29	$ 343,750
43.	Meeting Street North	L6.4 to L6.11	$ 876,250
44.	Simons Street	L6.3 to L6.3A	$ 343,300
45.	Meeting Street North	L6.17A to L6.11	$ 954,350
✓46.	Calhoun Street East	J5.184 to J5.179	$ 542,200
✓47.	Calhoun Street East	J5.40A to J5.184	$ 635,200
48.	Calhoun Street West	J6.54 to J6.37	$ 607,650
49.	Reid Street	K5.18 to Pump Station #3	$ 399,050
50.	Calhoun Street West	J6.56 to J6.36	$ 191,700
51.	Reid Street	K5c.21 to K5c.18	$ 228,450
52.	Rutledge Avenue	I5.86 to I5.88	$ 208,250
53.	Tenth Avenue	L7.5A to L7.5B	$ 291,300
54.	Cooper Street	K5c.2A to K5a.41	$ 948,000
55.	Tenth Avenue	L7.3A to L7.6	$ 98,600
56.	Cooper Street	K5a.46 to K5a.41 K5a.52 to K5a.51 K5a.39 to K5a.40	$ 564,750

MEDIUM PRIORITY

PENINSULAR AREA

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
1.	Calhoun Street East	Pump Station #4	$1,065,500
2.	Market Street	Pump Station #6	$ 180,900
3.	Spring Street	Pump Station #9	$1,552,800
4.	Fishburne Street & Spring Street	Pump Station #7	$ 403,950
5.	Calhoun Street West	Pump Station #5	$1,142,650
6.	Colonial Lake, Rutledge Avenue & Beaufain Street	Pump Station #1	$ 779,450
7.	Cooper Street & Jackson Street	Pump Station #2	$ 223,200
8.	Reid Street	Pump Station #3	$ 804,000
9.	Calhoun Street East	J5.150 to J5.157	$ 393,050
10.	Spring Street	K6.5 to K6c.22	$ 667,550
11.	Spring Street	K6.1 to K6c.23	$ 364,750
12.	Beaufain	J6.3 to J6.2	$ 241,500
13.	Beaufain	J5.86 to J6.2	$ 291,100
14.	Beaufain	J5.87 to J5.84 J6.4 to J6.2	$ 176,300
15.	Grove Street	K6a.5 to K6a.1	$1,055,150
16.	Meeting Street	J5.46 to J5.11	$ 227,300
17.	Meeting Street	J5.39 to J5.8	$ 182,150
18.	Jackson Street	K5a.3 to K5a.11	$ 244,150
19.	Jackson Street	K6b.18 to K5a.3	$ 187,600
20.	Calhoun Street East	J5.45A to J5.40A	$ 737,350
21.	Meeting Street	J5.79 to J5.46	$ 281,100

MEDIUM PRIORITY (continued)

PENINSULAR AREA

PRIORITY NO.	DRAINAGE SYSTEM WATERSHED	LOCATION	ESTIMATED COST
22.	Spring Street	J6.114 to J6.110	$ 667,650
23.	Spring Street	J6.40 to J6.111	$ 298,950
24.	Spring Street	J6.47 to K6.25	$ 315,800
25.	Spring Street	J6.124 to J6.47	$ 542,150
26.	Limehouse Street	I5.73A to I5.73B	$ 734,650
27.	Spring Street	K5c.52 to K6.25	$ 743,100
28.	Limehouse Street	J5.89 to J5.80	$ 456,550
29.	Fishburne Street	K6c.1 to K6c.6	$ 638,150
30.	Limehouse Street	I5.71 to I5.68	$ 242,200
31.	Limehouse Street	J5.115 to J5.89	$ 304,400
32.	Calhoun Street West	J5.96 to J6.37	$ 233,400
33.	Calhoun Street West	J5.106 to J6.37	$ 396,950
34.	V. A. Hospital	Pump Station #8	$ 162,400
35.	Calhoun Street West	J5.120 to J5.106	$ 397,750
36.	Calhoun Street West	J5.103 to J5.100	$ 179,800
37.	Fishburne Street	K6c.17 to K6c.15	$ 349,250
38.	Society Street	J5.134A to Pump Station #1	$ 472,200
39.	Society Street	J5.140 to J5.134A	$ 591,400
40.	West Battery	Catch Basin to I61	$ 6,500
41.	Grove Street	K7.10 to K7.1	$ 546,450
42.	Rutledge Avenue	I5.85 to I5.82	$ 187,500
43.	V. A. Hospital	J6.77 to Pump Station #8	$ 344,900

MEDIUM PRIORITY (continued)

PENINSULAR AREA

PRIORITY NO.	DRAINAGE SYSTEM WATERSHED	LOCATION	ESTIMATED COST
44.	Cooper Street	K6.18 to K5c.2A	$ 583,400
45.	Huger Street	K6b.1 to K6b.3 K6b.6 to K6b.3	$ 404,350
46.	Reid Street	K5c.28 to K5c.21	$ 408,350
47.	Water Street & Church Street	I5.36 to I5.30 I5.47 to I5.47.A	$ 276,550
48.	Queen Street	J5.2 to J4.1A J4.1A to J4.1	$ 203,850
49.	Cooper Street	K6.14 to K5c.2A	$ 109,950
50.	Queen Street	J5.5 to J5.2	$ 223,450
51.	Morrison Drive North	L6.59 to L6.55	$ 432,500
52.	Congress Street	K6c.34 to K6c.34A	$ 133,000
53.	King Street	I5.58 to I5.55	$ 168,400
54.	Pinckney Street	J5.55A to J5.19	$ 244,600
55.	Dunneman South	K7.40 to K7.34	$ 145,650
56.	Hasell Street	J5.50 to J5.55A	$ 334,900
57.	V. A. Hospital	J6.86 to Pump Station #8	$ 145,800
58.	Doscher Avenue	M6.22 to M6.2	$ 526,800
59.	Austin Avenue	N6.13 to N6.13B N6.13A to N6.13B N6.13B to N7.9	$ 272,200
60.	Austin Avenue	N6.1 to N6.13	$ 353,600

1

LOW PRIORITY

PENINSULAR AREA

PRIORITY NO.	DRAINAGE SYSTEM WATERSHED	LOCATION	ESTIMATED COST
1.	Calhoun Street East	Pump Station #4	$1,065,500
2.	Market Street	Pump Station #6	$ 180,900
3.	Spring Street	Pump Station #9	$1,552,800
4.	Fishburne Street & Spring Street	Pump Station #7	$ 403,950
5.	Calhoun Street West	Pump Station #5	$1,142,650
6.	Colonial Lake, Rutledge Avenue & Beaufain Street	Pump Station #1	$ 779,450
7.	Cooper Street & Jackson Street	Pump Station #2	$ 223,200
8.	Reid Street	Pump Station #3	$ 804,000
9.	Cooper Street	K6b.29 to K6.14 K6.9 to K6.14	$ 454,000
10.	Jackson Street	K5a.4 to K5a.3 K5a.8 to K5a.7	$ 157,450
11.	Meeting Street	I5.52 to I5.48	$ 270,200
12.	Meeting Street	I5.6 to I5.52	$ 426,500
13.	V. A. Hospital	J6.94 to J6.86	$ 108,150
14.	V. A. Hospital	J6.103 to J6.101	$ 63,650
15.	Colonial Lake	I6.4 to I6.2	$ 48,150
16.	Milford Street	M6.88 to M5.1	$ 384,500
17.	Reid Street	K5.18A to K5.19	$ 131,650
18.	Port Area III	K5.15 to Outfall	$ 72,150
19.	Port Area II	K5.10 to Outfall	$ 131,650
20.	Heriot Street	L6.22 to L6.28A	$ 227,100
21.	Port Area I	K5.8 to K5.5	$ 275,500

LOW PRIORITY (continued)

PENINSULAR AREA

PRIORITY NO.	DRAINAGE SYSTEM WATERSHED	LOCATION	ESTIMATED COST
22.	Marina	J6.11 to J6.9	$ 68,650
23.	East Bay North	K5a.27 to K5a.20	$ 321,850
24.	Heriot Street	L6.20 to L6.22	$ 230,200
25.	Citadel South	K7d.11 to K7d.1	$ 326,650
26.	Citadel North	K7.23 to K7.31	$ 256,950
27.	North Romney	L6.36 to L6.48	$ 156,550
28.	Limehouse Street	I5.77 to I5.76	$ 171,850
29.	Pinckney Street	J4.11 to J4.11A	$ 91,050
30.	Calhoun Street East	J5.192 to J5.193 J5.197 to J5.194A	$ 262,200
31.	Marina	J6.16 to J6.13	$ 71,650
32.	Runey Street	K6b.28 to K6b.27	$ 45,700
33.	V. A. Hospital	J6.99 to J6.86	$ 106,600
34.	Algonquin	M6.93 to L6.35	$ 185,250
35.	Elgin Street	M6.81 to M6.72	$ 232,300
36.	Elgin Street	M6.64 to M6.70	$ 175,500
37.	King Street	I5.64 to I5.58	$ 151,050
38.	Jackson Street	K5a.14 to K5a.11	$ 72,300
39.	Heriot Street	L6.27 to L6.22	$ 58,100
40.	Church Street	I5.42A to I5.42	$ 14,850
41.	Reid Street	K5.2 to K5.1	$ 41,600
42.	Milford West	M6.30 to M6.37	$ 77,900
43.	Greenleaf	M5.7 to M5.6	$ 34,100
44.	Braswell	M6.41 to M7.55	$ 49,100

HIGH PRIORITY PROJECTS

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	PROJECT COST
1.	K-Mart	Vorhees Canal	$ 279,100
2.	K-Mart	J10.34 to J9.53	$ 237,300
3.	K-Mart	J10.92A to J10.34	$ 920,400
4.	Byrnes Downs	J8.24 to J8.21	$ 36,250
5.	Byrnes Downs	J8.26A to J8.24	$ 940,900
6.	St. Andrews Shopping Cntr.	J9.9 to J9.10	$ 50,400
7.	St. Andrews Shopping Cntr.	J9.69 to J9.9	$ 286,700
8.	Ashley Hall Road	L10.17 to L10.17A	$ 600,000
9.	Gamecock Road	M9.40 to M9.37	$ 294,050
10.	St. Andrews Shopping Cntr.	J9.108 to J9.69	$ 499,850
11.	Fifth Avenue	K9.4A to K9.5A & K9.5A to K8.5	$ 557,200
12.	K-Mart	J10.71 to J10.92A	$ 241,950
13.	Forest Acres	Pump Station (First Phase)	$ 2,065,500
14.	Citadel Mall Channel	Reach 6 to Reach 3	$ 1,144,750
15.	Citadel Mall Channel	Reach 8 to Reach 6	$ 1,190,950
16.	Citadel Mall Channel	Reach 9 to Reach 8	$ 1,165,350
17.	Citadel Mall Channel	Reach 10 to Reach 9	$ 889,150
18.	Citadel Mall Channel	Reach 11 to Reach 10	$ 578,750
19.	Citadel Mall Channel	Reach 11	$ 681,150
20.	Sherwood Forest West	K10.19 to K10.23	$ 187,500
21.	Sherwood Forest East	K10.3 to K10.6	$ 48,200

HIGH PRIORITY PROJECTS

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	PROJECT COST
22.	Windemere East	I8.14 to I8.7	$ 473,250
23.	Forest Acres	K9.16A to Pump Station	$ 211,100
24.	South Windemere	I8.3 to I8.5	$ 18,500
25.	Windemere East	J8.46A to I8.14	$ 214,800
26.	Stono Park	J10.15 to J10.19A	$ 199,500
27.	Skylark Drive	J11.81 to K11.72	$ 584,650
28.	Mueller Drive	M8.1 to M8.9	$ 91,800
29.	Windemere East	J8.48A to J8.46A	$ 374,250
30.	Ashley Hall Road	L10.101 to L10.17	$ 184,500
31.	Ashley Hall Road	L10.58 to L10.61	$ 46,050
32.	St. Andrews Shopping Cntr.	J9.106 to J9.108	$ 51,050
33.	Skylark Drive	J11.11 to J11.81	$ 249,250
34.	South Windemere	I7.32 to I8.3	$ 123,950
35.	Southgate	L8.18 to L8.4	$ 79,750
36.	St. Andrews Shopping Cntr.	J9.112 to J9.106	$ 217,250
37.	K-Mart	K10.2 to J10.71	$ 333,150
✓38.	Byrnes Downs	J8.13 to J8.13A	$ 195,750
✓39.	Byrnes Downs	J8.16 to J8.16A	$ 188,050
40.	Wambaw	G8.15 to G8.23	$ 124,150
41.	Gamecock	M9.52 to M9.40	$ 82,600
42.	Inverness	H7.38 to H7.44	$ 230,300
43.	Southgate	L8.37 to L8.10	$ 53,500
44.	Wambaw	G8.1 to G8.15	$ 351,200

HIGH PRIORITY PROJECTS

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	PROJECT COST
45.	Stono Park	J10.21 to J10.32	$ 454,650
46.	K-Mart	J10.64 to J10.69	$ 342,350
47.	Peashill	B to E6.3	$ 127,400
48.	Dills Bluff	F6.6 to F6.29	$ 334,250
49.	Forest Acres	Pump Station (Second Phase)	$ 1,081,500

MEDIUM PRIORITY

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
1.	Wambaw	H8.4 to G8.1	$ 129,000
2.	Riverfront Drive	L9.81 to L9.96	$ 353,900
3.	Dowden	L9.47 to C	$ 53,250
4.	Wambaw	H8.13 to H8.4	$ 121,100
5.	Forest Acres	K9.34A to K9.16A	$ 273,550
6.	Gamecock Road	M9.59 to M9.52	$ 115,700
7.	Ashley Hall Road	L10.11 to L10.17	$ 155,100
8.	Parkwood Estates South	J9.19 to J9.20	$ 9,100
9.	St. Andrews Shopping Cntr.	J9.126 to J9.106	$ 167,050
10.	K-Mart	J10.55 to J10.47	$ 208,550
11.	Dowden	L9.29 to C	$ 19,500
12.	East James Island	G5.21 to G5.13	$ 254,050
13.	Plantation	K9.27 to Junction	$ 192,700
14.	Nuffield Drive	M9.18 to M9.14	$ 82,250
15.	Rotherwood	J10.12 to J10.8	$ 163,750
16.	Parkwood Estates North	J9.21 to J9.25	$ 44,400
17.	Hazelwood Avenue	K11.2 to K11.11	$ 273,850
18.	Westwood	J8.8 to J8.7	$ 466,650
19.	Dowden	K9.43 to L9.29	$ 54,550
20.	K-Mart	J10.60 to J10.55	$ 479,800
21.	Church Creek	Reach 3 to Reach 2	$ 404,250
22.	Plantation	K9.11 to K9.8	$ 104,000
23.	Northbridge Village	M8.17	$ 50,700

MEDIUM PRIORITY (continued)

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
24.	St. Andrews Shopping Cntr.	J9.87 to J9.70	$ 172,750
25.	Peashill	E7.40 to E6.13	$ 505,550
26.	Crescent East	I7.12	$ 39,250
27.	Town Creek Drive	K9.60 to K9.59	$ 31,150
28.	Shadowmoss	N13.17 to N13.1A	$ 153,700
29.	Highway 17 South	J7.26 to J7.34 & J7.40 to J7.34, & J7.34 to J7.13	$ 444,400
30.	Forest Lakes	M12.1 to L12.4	$ 241,050
31.	Hazelwood Avenue	K11.19 to K11.14	$ 67,400
32.	Parkwood Estates North	J9.31 to J9.27	$ 31,800
33.	Harrison Acres South	J9.44 to J9.38	$ 146,800
34.	Colleton Drive	I8.33	$ 29,000
35.	Windemere West	I8.30	$ 22,450
36.	Gamecock	M9.46 to M9.40	$ 175,250
37.	Wambaw	H8.10 to H8.3 & H8.12 to H8.4	$ 194,900
38.	Stono Park	J10.63 to J10.21	$ 580,350
39.	Norview	L8.43 to L8.40	$ 37,650
40.	Dowden	L9.58 to L9.57	$ 8,050
41.	Oyster Point	F7.22 to F7.6	$ 54,050
42.	Martello	H7.28 to H7.31	$ 46,750
43.	Oyster Point	F7.11A to F7.9	$ 133,350
44.	Crosscreek	H8.62 to H8.72	$ 191,750
45.	St. Andrews Boulevard	J7.42 to J7.41	$ 12,000

MEDIUM PRIORITY (continued)

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
46.	Folly Road	G7.27 to G7.28	$ 85,300
47.	Oyster Point	F7.31 to F7.22	$ 128,650
48.	Fort Johnson	F5.8 to F5.11	$ 113,250
49.	Belvedere	I7.2A to H7.48	$ 132,250
50.	Folly Road	H7.19 to G7.27	$ 271,200
51.	Crosscreek	H8.48 to H8.38	$ 150,850
52.	Longview	N14.46 to N14.40	$ 66,900
53.	Crosscreek	H7.13 to H8.55	$ 161,250
54.	Charlestowne	L9.11 to L9.10	$ 22,500
55.	Magwood	L11.53A to L11.54	$1,032,600
56.	Magwood	M12.5 to L11.53A	$ 412,750
57.	Ashley Hall Plantation West	L10.97 to L10.98	$ 42,850
58.	Dills Bluff	F6.15 to F6.6	$ 222,900
59.	Oyster Point	F7.16 to F7.22	$ 15,800
60.	Magwood	M12.6 to M12.5	$ 159,450
61.	Crosscreek	H8.28 to H8.20	$ 152,250
62.	Pageland	H9.17 to H9.12	$ 375,700
63.	Albemarle Point	J7.39 to J7.47	$ 29,900
64.	Murry Wood	A4.7 to A4.5	$ 285,400
65.	Folly Road	H7.15 to H7.19	$ 303,100
66.	Riverland South	E8.1 to E8.3	$ 41,550

LOW PRIORITY

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
1.	Dills Bluff	F6.31 to F6.34	$ 357,100
2.	Dills Bluff	F6.29 to F6.31	$ 96,150
3.	Plantation	K9.24.1 to K9.5.2	$ 138,850
4.	Southgate	L9.8 to L8.24	$ 181,750
5.	Wambaw	H8.14 to H8.13A	$ 116,500
6.	Harbor Towne	F5.11 to G6.11	$ 415,050
7.	Dupont North	K11.37 to K11.36	$ 120,750
8.	Cresent South	I7.11	$ 18,250
9.	Royal Palm	M9.82 to L9.86	$ 21,800
10.	Ashley Hall Plantation West	L11.19 to L11.2	$ 146,850
11.	Fenwick	A2.1 to A1.1	$ 775,500
12.	Ashley Hall Plantation West	L10.72 to L11.19	$ 112,450
13.	Plantation	K9.16 to K9.18	$ 76,750
14.	Church Creek	Reach 4 to Reach 5	$ 255,900
15.	Dowden	L9.39 to L9.27	$ 174,050
16.	Millbrook	L10.66 to L10.65	$ 54,250
17.	Ashley Hall Road	L10.40 to L10.43	$ 131,000
18.	Fenwick	A1.3 to A1.1	$ 189,000
19.	Crosscreek	H7.3 to H8.63	$ 125,200
20.	Ashley Hall Road	L9.67 to L10.101	$ 357,400
21.	Highway 17 North	J7.21 to J7.14	$ 321,600
22.	Ashley Towne Village	N12.1 to N12.3	$ 16,150

LOW PRIORITY (continued)

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
23.	Fenwick	A1.4 to A1.3	$ 255,450
24.	Albemarle III	I7.4	$ 19,050
25.	Wappoo Shores	J10.10 to J10.11	$ 10,100
26.	Hickory Hill	N14.28	$ 94,200
27.	Ashley Hall Road	L11.52 to L10.79	$ 447,550
28.	Marvin	K9.48 to K9.52	$ 32,400
29.	Parkwood Heights	J9.18 to I9.6	$ 71,400
30.	Shadowmoss	013.48 to 013.46	$ 31,550
31.	Forest Acres	K9.14A to K9.16A	$ 309,000
32.	Buckingham Drive	M8.21	$ 10,050
33.	Orange Grove Creek	M8.16 to M8.12	$ 30,850
34.	Crosscreek	H8.35 to H8.29	$ 116,500
35.	Peashill	E6.24 to B	$ 221,400
36.	Oyster Point	G7.23 to F7.29	$ 56,650
37.	Parkshore South	L9.89 to M9.90	$ 36,650
38.	Vardell Street	E6.1 to E6.2	$ 10,600
39.	Mulmar North	L10.8 to L10.9	$ 6,800
40.	Wappoo Heights	I7.18 to I7.24	$ 125,550
41.	Municipal	H8.77 to H9.20	$ 121,750
42.	Poston	M8.75 to M8.77	$ 74,650
43.	Shadowmoss	N14.3 to N14.6	$ 61,250
44.	Ashley Hall Plantation East	M10.6 to M10.7	$ 13,700

LOW PRIORITY (continued)

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
45.	Country Club	H7.52 to H7.50	$ 102,850
46.	St. Andrews Shopping Cntr.	J9.68 to J9.63	$ 113,100
47.	Pageland	H9.18 to H9.17	$ 255,200
48.	Riverland North	F8.3 to F8.4	$ 24,750
49.	St. Andrews Shopping Cntr.	J9.111 to J9.108	$ 121,600
50.	Stills Bee	E6.41 to E6.40	$ 56,350
51.	Oyster Point	F7.23 to F7.24	$ 30,800
52.	Riverland South	E7.1 to E8.1	$ 436,550
53.	Highway 61 North	014.8 to 014.7	$ 31,350
54.	Forest Acres	K9.37A to K9.34A	$ 448,400
55.	Live Oak	013.5 to 013.6	$ 23,550
56.	Maybank	A to A4.1	$ 263,550
57.	Riverland West	F8.7 to F8.8	$ 12,750
58.	Peashill	E7.17 to E7.16 & E7.20 to E7.14 & E7.14 to B	$ 77,650
59.	Murry Wood	A4.8 to A4.7	$ 81,150
60.	Turkey Pen	F8.1 to F8.2	$ 9,700
61.	Clemson	J13.5 to J13.8	$ 80,550
62.	Bradham	G8.27 to G8.28	$ 46,700
63.	Albemarle II	I7.3	$ 22,600
64.	Ashley Hall Plantation West	L11.36 to L11.34 & L11.27 to L11.24	$ 83,200
65.	St. Andrews Shopping Cntr.	J9.80 to J9.77	$ 17,550
66.	Windsor	M8.53 to M8.57	$ 51,200

LOW PRIORITY (continued)

WEST ASHLEY, JAMES ISLAND, JOHNS ISLAND

DRAINAGE SYSTEM

PRIORITY NO.	WATERSHED	LOCATION	ESTIMATED COST
67.	Agriculture Station	K13.17 to K13.18	$ 42,100
68.	Citadel Mall West	K11.57 to K11.51	$ 108,850
69.	Citadel Mall East	K11.68 to K11.65	$ 39,200

SECTION VI

FLOODPLAIN MANAGEMENT PROGRAM

A Floodplain Management Program provides the directives to achieve flood protection for political areas by implementing construction of drainage facilities that adequately convey rainfall runoff at selected levels for current conditions and establishes guidelines and regulations required for new developments for conformity to drainage standards that are reasonably necessary to prevent injury to health, safety or other property. The contents of this report will give local officials the necessary data to evaluate present flood conditions and predict future drainage problems for proposed developments. The use of these evaluations with the required legislation should maximize the City's resources through sound land and water use practices. It is recommended that the City of Charleston take appropriate action to adopt a Floodplain Management Plan to regulate stormwater facility development within its boundaries.

Many communities have adopted such plans in an effort to protect their citizens from the hardships associated with flooding. The plan can be described as a process by which to evaluate the short and long-term impacts of accelerated surface water runoff from a particular area as a result of land development and to develop and implement methods to control the duration, volume, and velocity of stormwater runoff to achieve certain objectives. Once implemented, a floodplain management plan would seek to reduce the damaging effects of floods, preserve and enhance the natural values and provide for optimal use of the floodplain.

The topography of the Charleston City area is such that most of the land area is subject to inundation during periods of heavy rainfall. As a result, any plan which would eventually be passed should function not only to regulate these areas within the floodplain, but also those areas adjacent to it. A floodplain management program is based upon the magnitude of rainfall which is expected. Most plans assume that storms of small duration are to be handled by the stormwater drainage system, and that steps will be taken to protect health and property during storms of larger magnitude. This assumption should be made for the City of Charleston area.

To date, the City of Charleston has taken the first step in implementation of a Floodplain Management Plan when it agreed to conform to the National Flood Insurance Act of 1968 (Title XIII of Public Law 90-448, Public Law 93-234, Public Law 95-128) by passing Ordinance 1977-61 followed by Ordinance 1984-22. To participate in this program, the City agreed to regulate the development which takes place in the floodprone areas. The City also receives some assistance in regulation of floodprone area development from federal and state agencies such as the Army Corps of Engineers, South Carolina Coastal Council, and South Carolina Water Resources Commission, which monitors development that takes place in the coastal regions of South Carolina.

It is recommended that the City take one of two basic approaches to Floodplain Management:

1. The maximum rate of runoff is no greater after development than prior to development;

   or

2. The quantity, velocity, concentration and direction of runoff is managed or controlled in a manner which does not create a health hazard or damage to property greater than that which existed prior to development.

The selected approach may be implemented by one of two ways; (1) regulate development, (2) develop a separate floodplain management plan. By far the most effective of the two methods is a floodplain management plan which will require that all new developments address the problem of stormwater drainage prior to commencing development and comply with the Master Drainage Plan.

The procedures which are used to control the amount of stormwater runoff from a development varies. At the present time the most rational effective approach to floodplain management is to maintain the natural runoff characteristics prior to development. This can be accomplished either by augmenting the infiltration process or by physically controlling the release of increased stormwater runoff as a result of the development. Stormwater management techniques employed can be structural (relying on engineering design) or non-structural (based on land use planning). Both techniques should be utilized as complementary elements of a management plan. Some of the structural techniques for floodplain management are discussed in the following paragraphs and include:

1. Channel alterations.
2. On-site detention.
3. Floodproofing.

Channel Alterations

Channel alteration is the improvement of the water carrying capacity of a natural or artificial channel by enlargement, cleaning, bank stabilization or other means. This is generally the only feasible method of stormwater management which is applicable for developed floodplains. However, it is also the most costly for the City since all of the expense for improvements would be absorbed by the taxpayers. The existing stormwater drainage facilities within the City of Charleston are analyzed in Section IV of this report, and recommended improvements made for those systems which have inadequate capacity.

On-site Detention

The use of detention basins has received increased popularity in recent years. On-site detention is applicable for new developments where the outfall is inadequate and revisions to the outfall are not practical due to economical consideration.

For on-site detention, the developer provides an area to store runoff from the development, releasing the runoff at a rate which the downstream drainage facilities can accept. The storage area may be in the form of a lake or an open grassed area which can be used for recreational activities during periods of dry weather. The major advantages of on-site detention are the avoidance of capital cost for the improvement of downstream drainage facilities and that provisions for the management of stormwater runoff generated as a result of development becomes the responsibility of the land developer.

The amount of on-site storage which is provided depends upon the stipulations set by each county or municipality. A typical ordinance requires that the post development peak rate of discharge will not exceed the pre-developed peak rate of discharge from the site during a chosen year frequency storm event that would coincide with the municipalities design standards.

Without proper maintenance, detention basis can become ineffective after several years. Maintenance for detention basins should be clearly addressed in any stormwater management ordinance. The maintenance should address the public safety of the facility as well as the landscaping appearance and mosquito control.

Floodproofing

For those areas of the City which are currently developed, one method of providing protection from flooding is floodproofing. Floodproofing consist of adjustments to property, buildings, and building contents which are designed to reduce damages which results from flood waters. These measures are generally paid for by the property owner. City of Charleston Ordinance 1977-61, Section 7 and Ordinance 1984-22 currently provide for floodproofing requirements.

Recommendations

In order to better regulate the development of presently undeveloped areas of the City of Charleston, it is recommended that the following items be required for each new development:

1. All new stormwater drainage facilities shall be designed for a 5 year frequency storm event for all areas except the lower Peninsular City area which shall be designed for a 10 year frequency storm event.

2. The peak rate of discharge from a given site shall not exceed that of a 5 year frequency storm event.

3. Stormwater detention facilities shall be designed on a basis of providing adequate control for all storm frequencies of a

24 hour duration up to and including the 50 year frequency event. The detention volume required shall be that necessary to handle the runoff of a 50 year, 24 hour duration storm, less the volume discharged during the same duration at the 5 year storm event discharge rate for all areas of the City except the Peninsular City area, for which the discharge rate shall be that produced by a 10 year storm event.

4. All developments shall require that a Stormwater Management Plan to be submitted and approved by the City Engineer, prior to development.

5. The developer shall be required to make all downstream drainage improvements necessary to accommodate the runoff from the site, or provide adequate detention so that post development runoff does not exceed pre-development runoff.

6. Where runoff from a development does not adversely affect the capacity of the drainage system but future development of the watershed will result in overloading the drainage system, the developer shall pay a fee on a prorated basis to cover construction cost for upgrading or replacing the system as the need arises.

7. The responsibility and funding for maintenance should be designated by the City of Charleston. The maintenance of all detention basins shall be the responsibility of the land owner.

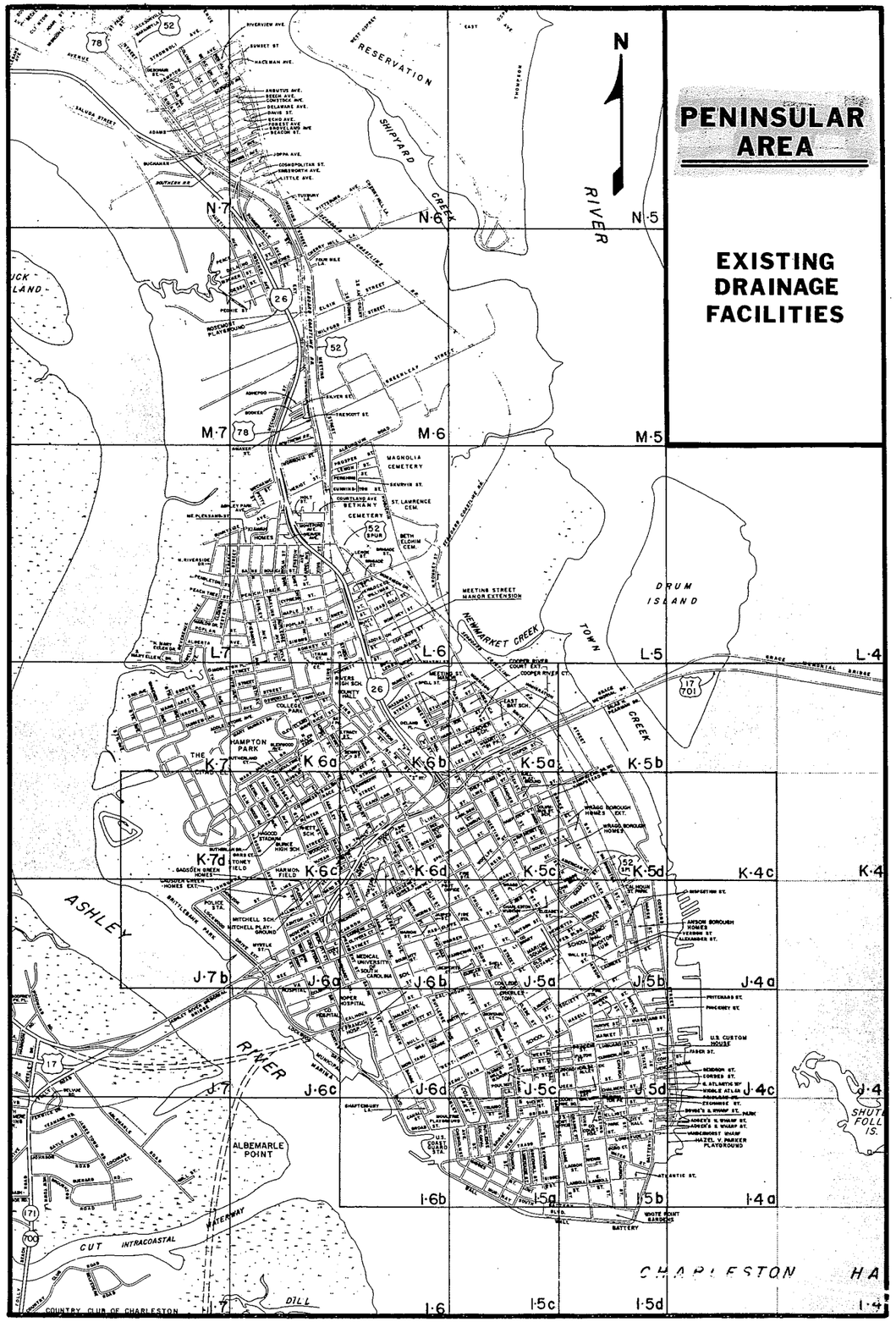
8. All new drainage canals or pipes which are given to the City shall be constructed within a drainage easement of a width greater than or equal to that given in the "Standard Specifications for Design and Construction of Road and Drainage Systems".

APPENDIX A

EXISTING STORMWATER DRAINAGE FACILITIES

ABBREVIATION LEGEND

C - CLEAN
FS - FULL OF SAND
HFS - HALF FULL OF SAND
CNO - COULD NOT OPEN
FWT - FULL OF WATER AND TRASH
PO - PAVED OVER


N
RIVER
SHIPYARD CREEK
RESERVATION
WEST CHESTER
EAST
THOMPSON
CUTLER AVE.
N·7
N·6
N·5
M·7
M·6
M·5
L·7
L·6
L·5
L·4
K·7
K 6a
K·6b
K·5a
K·5b
K·7d
K·6c
K·6d
K·5c
K·5d
K·4c
K·4
J·7b
J·6a
J·6b
J·5a
J·5b
J·4a
J·6c
J·6d
J·5c
J·5d
J·4c
J·4
I·6b
I·5a
I·5b
I·4a
I·7
I·6
I·5c
I·5d
I·4
PENINSULAR AREA
EXISTING DRAINAGE FACILITIES
RIVERVIEW AVE.
SUNSET ST.
HACKMAN AVE.
ABBUTUS AVE.
BEECH AVE.
COMSTOCK AVE.
DELAWARE AVE.
DAVIS ST.
ECHO AVE.
FOREST AVE
GRAYSLAND AVE
BEACON ST.
JOPPA AVE.
COSMOPOLITAN ST.
EMBEWORTH AVE.
LITTLE AVE.
SALUDA STREET
BUCHANAN
SOUTHERN RR.
TUTWILER LA.
PITTSBURG AVE.
CHERRY HILL
FOUR MILE LA.
CLAIN
ROSEHOST PLAYGROUND
PEDRIE ST.
CRAIGLAKE AVE.
WOLFORD
BAKERLEAF STREET
ASHLEY
ROOKER
TREMONT ST.
MAGNOLIA CEMETERY
SEGUVIA ST.
ST. LAWRENCE CEM.
COURTLAND AVE
BETHANY CEMETERY
BETH ELOHIM CEM.
HOMES
MEETING STREET MANOR EXTENSION
NEWMARKET CREEK
TOWN
DRUM ISLAND
COOPER RIVER
COURT EXT.
COOPER RIVER CT.
EAST BAY SCH.
HAMPTON PARK
COLLEGE PARK
WRAGG BOROUGH HOMES EXT.
WRAGG BOROUGH HOMES
SADSBEE GREEN HOMES
SADSBEE GREEN HOMES EXT.
HARMON FIELD
POLICE STA.
MITCHELL SCH.
MITCHELL PLAY GROUND
MEDICAL UNIVERSITY OF SOUTH CAROLINA
ANSON BOROUGH HOMES
ALEXANDER ST.
U.S. CUSTOM HOUSE
HAZEL V. PARKER PLAYGROUND
WHITE POINT GARDENS
BATTERY
ALBEMARLE POINT
U.S. COAST GUARD STA.
WATERWAY
CUT
INTRACOASTAL
COUNTRY CLUB OF CHARLESTON
DILL
CHARLESTON HA
SHUTE FOLL IS.

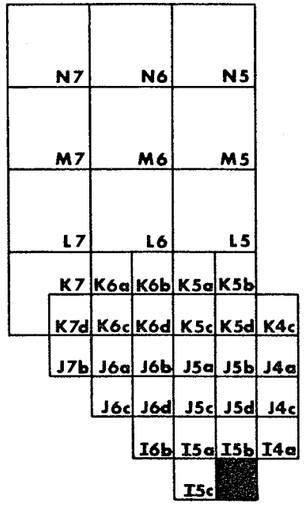
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-5D	42	2.0' x 3.5' B.A.	-0.35	C
I-5D	42A		-	CNO
I-5D	43	1.8' x 3.0' B.A. (S) 1.85' x 3.0' B.A. (N) 10" VCP (E)	0.49 0.46 2.57	HFS
I-5D	44	10" VCP (W) 10" VCP (N)	2.36 2.26	C
I-5D	45	2.2' x 2.0' B.A. (S) 2.3' x 2.0' B.A. (N) 12" VCP (E) 12" VCP (W)	1.26 1.23 1.70 1.74	C
I-5D	48	4.0' x 4.0' B.A.	0.16	C
I-5D	49	10" VCP (N) 10" VCP (E)	2.73 2.63	C
I-5D	50	10" VCP (W) 10" VCP (N)	1.16 1.06	C
I-5D	55	2.3' x 4.0' B.A.	-	HFS
I-5D	56	2.4' x 4.0' B.A. (N) 2.5' x 4.0' B.A. (S) 18" RCP (W)	-0.98 -1.09 0.17	HFS
I-5D	57		-	PO

INVENTORY

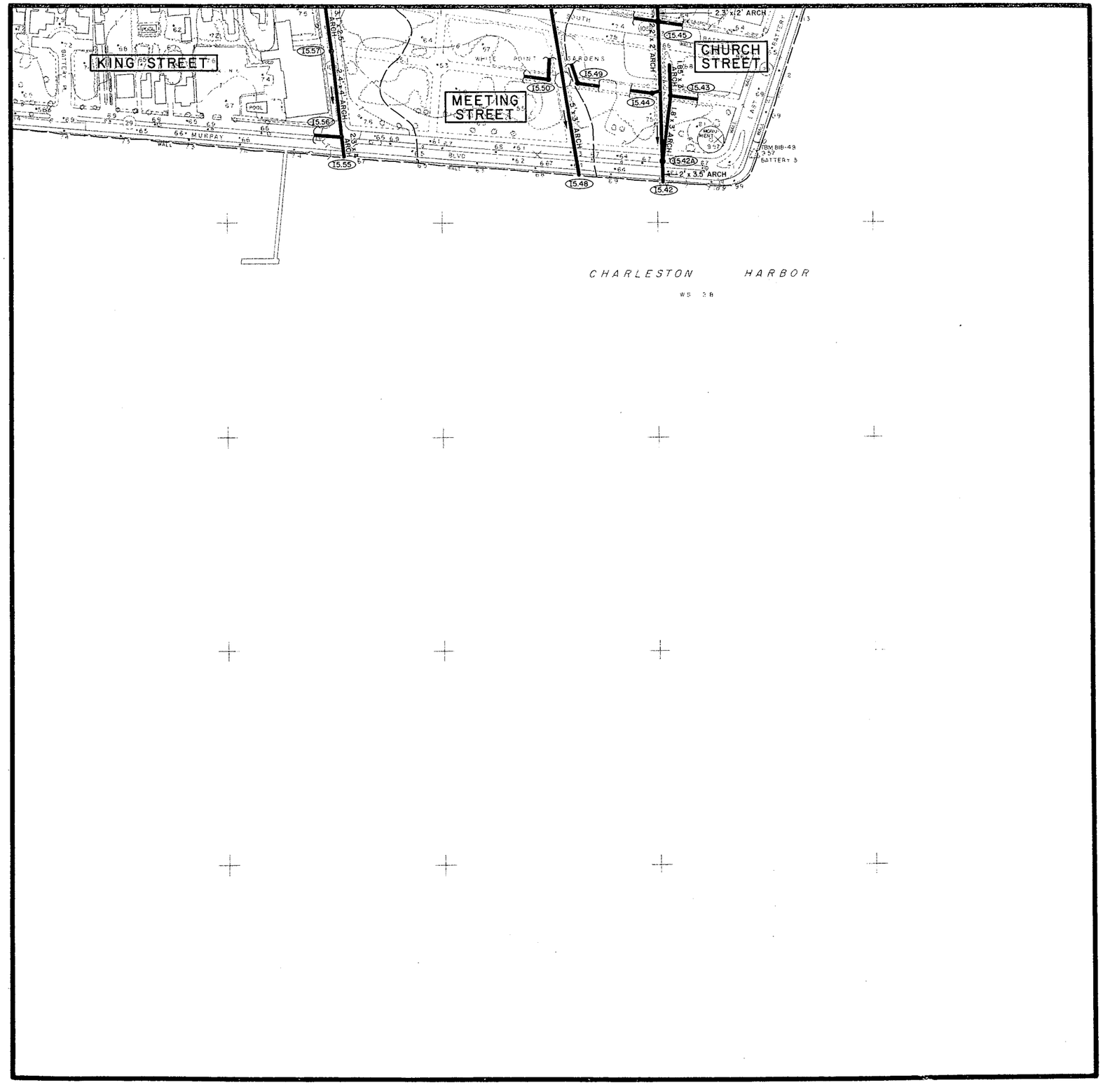
MAP I5d

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE

250 0 250 500 750

FEET

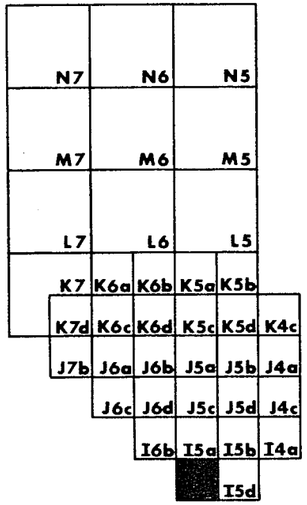
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-5C	68	36" CMP	-1.57	C

INVENTORY

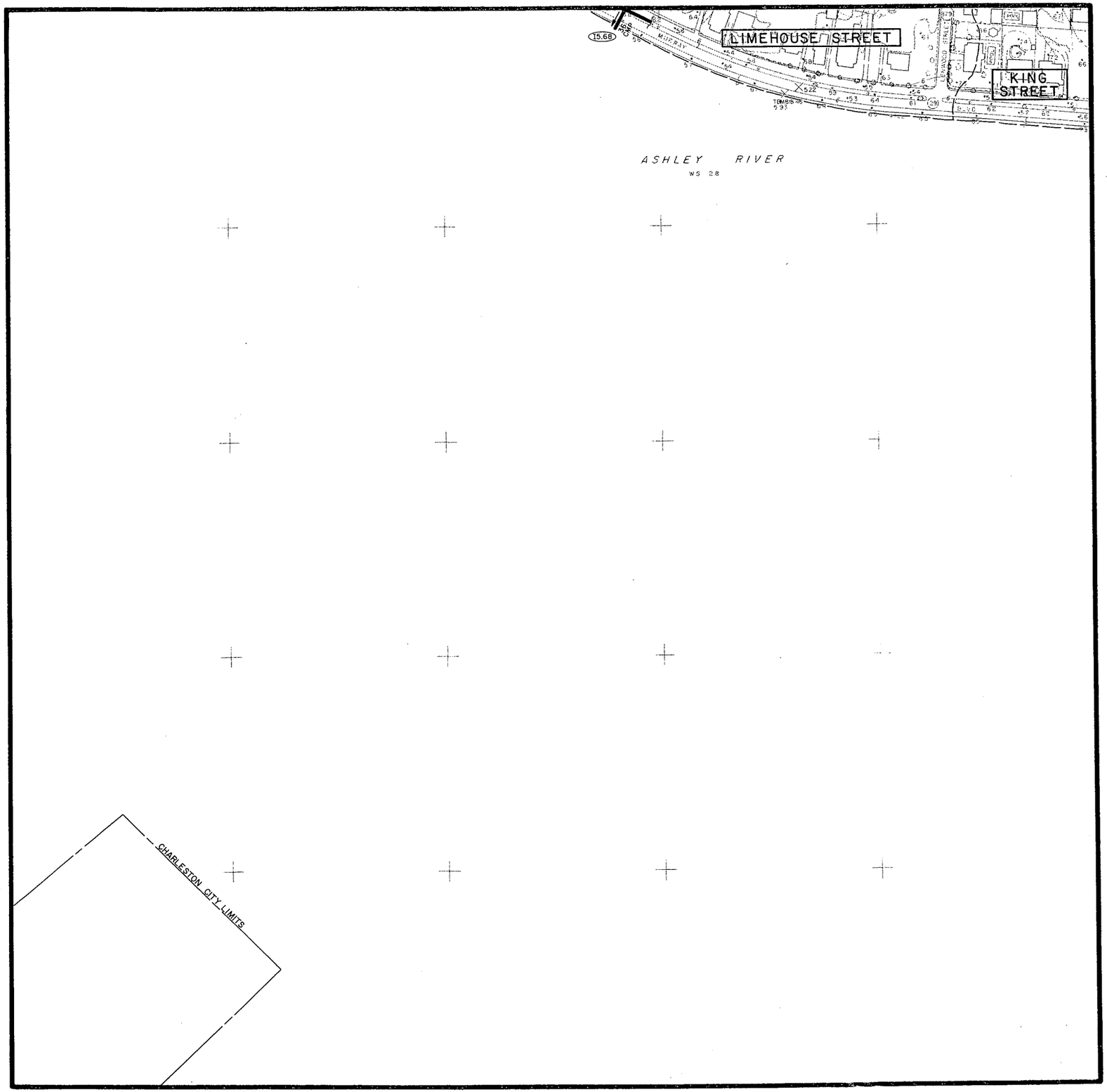
MAP I5c

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

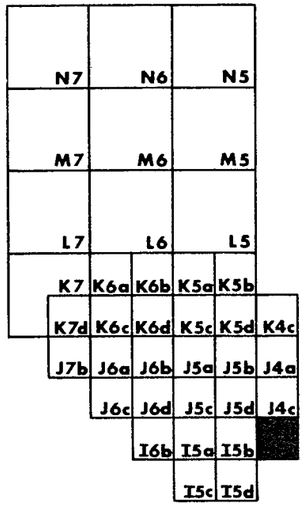
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-4A	1	36" RCP	-0.80	C
I-4A	2	36" RCP (W) 36" RCP (E) 15" VCP (N)	0.33 0.30 1.42	C
I-4A	11	36" RCP	-0.76	HFS

INVENTORY

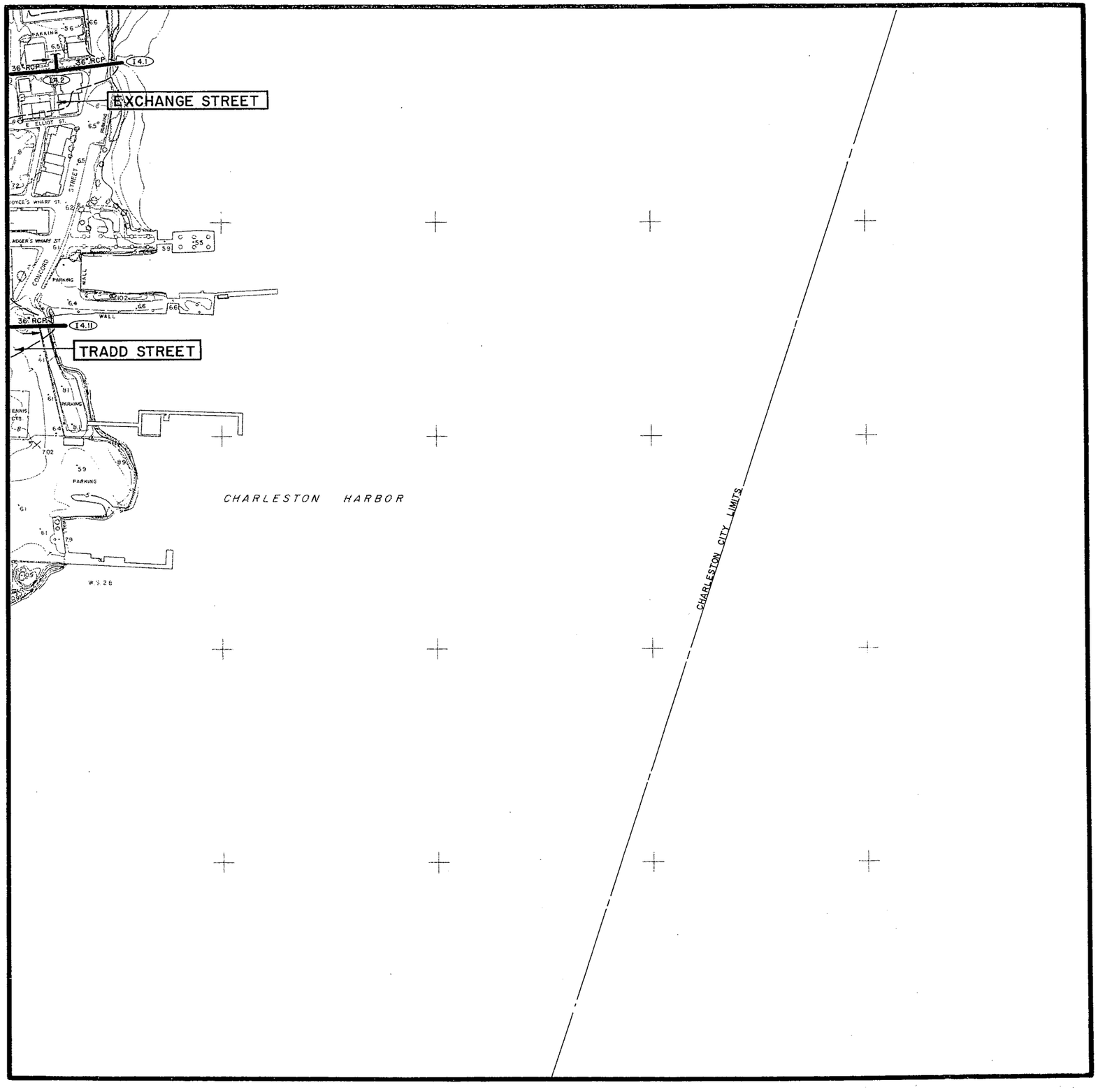
MAP I4a

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-5B	3	2.0' x 4.0' B.A. (W) 36" RCP (E)	1.68 1.68	HFS
I-5B	4	24" VCP (W) 2.0' x 4.0' B.A. (E)	3.92 3.00	C
I-5B	5		-	PO
I-5B	6		-	PO
I-5B	7	2.6' x 2.8' B.A. (W) 2.6' x 2.8' B.A. (E)	7.66 7.65	C
I-5B	8		3.76	C
I-5B	9		-	PO
I-5B	10		-	PO
I-5B	12		-	FS
I-5B	13		-	PO
I-5B	14		-	PO
I-5B	15		-	PO
I-5B	16		-	PO
I-5B	17	0.5' x 2.0' B.A. (N) 0.7' x 2.0' B.A. (S)	8.83 8.88	HFS
I-5B	18		-	PO
I-5B	19	4.0' x 3.0' B.A. (N) 4.0' x 3.0' B.A. (S) 4.0' x 2.5' B.A. (E)	0.11 0.09 1.26	C
I-5B	20	3.0' x 3.0' B.A. (N) 3.0' x 3.0' B.A. (S)	0.62 0.62	HFS
I-5B	21	3.4' x 3.0' B.A. (N) 3.4' x 3.0' B.A. (S) 15" VCP (E)	0.64 0.64 2.43	C
I-5B	22		-	PO
I-5B	23	2.5' x 3.5' B.A. (N) 1.25' x 1.25' B.A. (E) 1.25' x 1.25' B.A. (W)	3.93 3.93 3.93	C
I-5B	24	2.6' x 2.2' B.A. (N) 2.6' x 2.2' B.A. (S)	5.16 5.16	C
I-5B	25	2.7' x 2.2' B.A. (N) 2.7' x 2.2' B.A. (S)	5.79 5.79	C
I-5B	26	3.1' x 2.3' B.A. (S) 24" VCP (N)	5.85 5.90	C
I-5B	27	2.5' x 3.0' B.A. (W) 2.5' x 3.0' B.A. (E)	3.17 3.20	C
I-5B	28		-	PO
I-5B	29	12" VCP (N) 1.6' x 2.2' B.A. (S)	4.61 4.96	HFS
I-5B	30	36" Brick Pipe	1.20	HFS

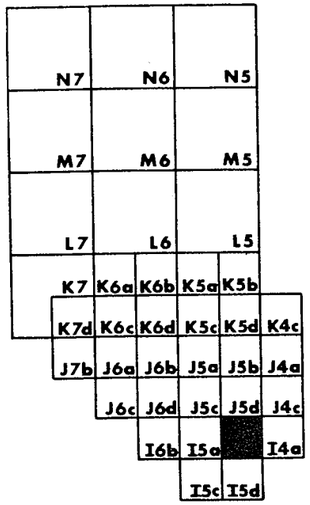
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-5B	31		-	PO
I-5B	32		-	PO
I-5B	33		-	PO
I-5B	34	3.5' x 2.2' B.A. (W) 3.5' x 2.2' B.A. (E) 3.5' x 2.2' B.A. (N)	-0.34 -0.44 -	HFS
I-5B	35		-	PO
I-5B	36		-	PO
I-5B	37		-	PO
I-5B	38		-	PO
I-5B	39	4.0' x 3.0' B.A. (N) 4.0' x 3.0' B.A. (S)	-0.80	C
I-5B	40		-	PO
I-5B	41	3.0' x 2.2' B.A. (N) 3.4' x 2.2' B.A. (S) 12" VCP (E)	3.16 2.61 2.72	C
I-5B	46	2.5' x 2.7' B.A. (N) 2.5' x 3.2' B.A. (S) 2.5' x 3.5' B.A. (E)	5.38 5.86 6.08	C
I-5B	47		-	PO
I-5B	51	5.0' x 3.0' B.A. (S) 5.0' x 3.0' B.A. (N) 12" VCP (W)	-0.89 -0.87 0.47	C
I-5B	52		-	PO
I-5B	53		-	PO
I-5B	54		-	PO
I-5B	58	2.9' x 2.5' B.A. (N) 3.1' x 2.5' B.A. (S)	-0.48 -0.69	C
I-5B	59		-	PO
I-5B	60		-	FWT
I-5B	61	12" VCP (E) 12" VCP (W)	1.47 1.47	C
I-5B	62	2.9' x 2.5' B.A. (S) 2.7' x 2.5' B.A. (N)	1.41 1.38	C
I-5B	63	3.7' x 2.5' B.A. (N) 3.6' x 2.5' B.A. (S) 12" VCP (E)	1.37 1.42 3.89	C
I-5B	64	3.5' x 2.5' B.A. (N) 3.3' x 2.5' B.A. (S) 2.5' x 2.0' B.A. (E)	2.15 2.23 2.28	C
I-5B	65	1.5' x 2.0' B.A. (E) 1.35' x 2.0' B.A. (W)	5.07 5.02	C
I-5B	66	18" VCP	-1.04	C
I-5B	67	18" VCP	-0.82	C

INVENTORY

MAP I5b

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-5A	69	4.0' x 4.0' B.A. (N)	-1.72	C
		4.0' x 4.0' B.A. (S)	-1.73	
		18" VCP (E)	-1.59	
		18" VCP (W)	-1.59	
I-5A	70	4.0' x 4.0' B.A. (N)	-1.67	C
		4.0' x 4.0' B.A. (S)	-1.67	
		18" VCP (E)	-0.94	
		18" VCP (W)	-1.08	
I-5A	71	4.0' x 4.0' B.A. (N)	-1.31	C
		4.0' x 4.0' B.A. (S)	-1.41	
		18" VCP (E)	-0.81	
		18" VCP (W)	-0.86	
I-5A	72	3.5' x 3.0' B.A. (E)	-1.50	C
		3.5' x 3.0' B.A. (S)	-1.50	
		18" VCP (W)	-0.38	
I-5A	73	4.1' x 3.0' B.A. (N)	0.35	C
		4.0' x 3.0' B.A. (S)	0.34	
I-5A	74		-	PO
I-5A	75		-	PO
I-5A	76	3.0' x 5.0' B.A. (N)	-0.66	C
		3.0' x 5.0' B.A. (S)	-0.77	
		24" VCP (E)	0.53	
		24" VCP (W)	0.49	
I-5A	77		-	PO
I-5A	78		-	PO
I-5A	79		-	PO
I-5A	80	3.4' x 3.0' B.A. (N)	0.95	C
		3.7' x 3.0' B.A. (S)	1.04	
I-5A	81		-	PO
I-5A	82	30" VCP	-2.74	C

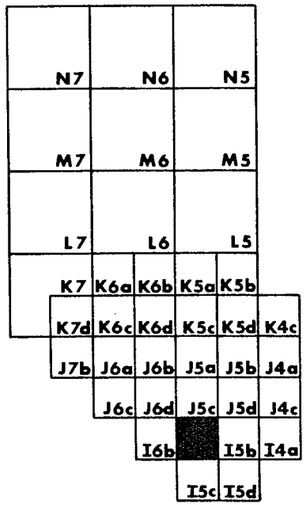
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-5A	83		-	PO
I-5A	84	24" VCP (N)	-2.73	HFS
		24" VCP (S)	-3.13	
I-5A	85	24" VCP (N)	-3.65	HFS
		24" VCP (S)	-3.68	
I-5A	86	24" VCP (N)	-2.28	C
		24" VCP (S)	-2.28	
I-5A	87		-	PO
I-5A	88	24" VCP (N)	-2.15	C
		24" VCP (S)	-2.65	
I-5A	89	24" VCP (N)	-1.94	C
		24" VCP (S)	-1.96	
		24" VCP (E)	-2.04	
		18" VCP (W)	-	
I-5A	90		-	PO
I-5A	91	24" VCP (E)	-1.14	C
		24" VCP (W)	-1.13	
		18" VCP (N)	-0.79	
I-5A	92		-	PO
I-5A	93	24" VCP (W)	-0.61	HFS
		24" VCP (E)	-0.56	
I-5A	94	42" RCP (E)	-0.11	C
		42" RCP (W)	-0.11	
I-5A	95	3.9' x 4.0' B.A. (E)	-0.82	C
		3.8' x 4.0' B.A. (W)	-0.47	
		12" VCP (S)	-0.43	
I-5A	96	4.2' x 4.0' B.A.	-0.36	C W/TIDE GATE

INVENTORY

MAP I5a

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

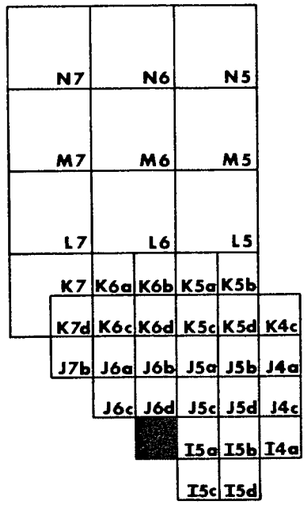
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-6B	1	10" CIP	3.73	C
I-6B	2	36" ALUM.	-1.29	C
I-6B	3	36" ALUM.	-1.60	C
I-6B	4	42" RCP	-0.25	C
I-6B	5	42" RCP (E) 42" RCP (W)	-1.89 -1.68	C
I-6B	6		-	PO
I-6B	7	42" RCP (E) 42" RCP (W)	-1.12 -1.12	C
I-6B	8	5.0' x 5.0' RC BOX	-2.91	HFS (tide gate)
I-6B	9		-	CNO
I-6B	10	4.0' x 5.0' Box (W) 4.0' x 5.0' Box (E) 15" RCP (N)	-2.53 - -	C
I-6B	11		-	PO
I-6B	12		-	PO
I-6B	13		-	FWT

INVENTORY

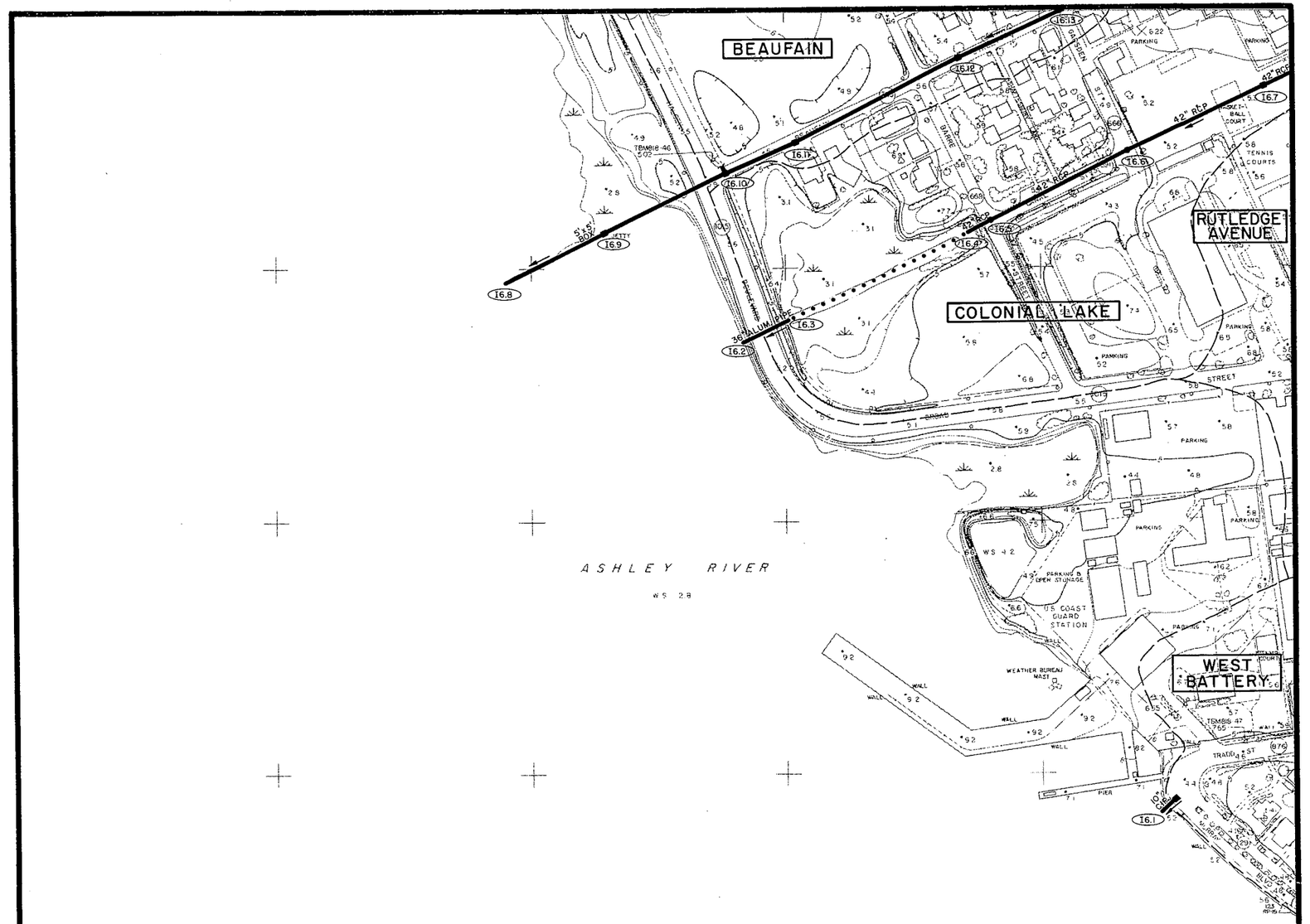
MAP I6b

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

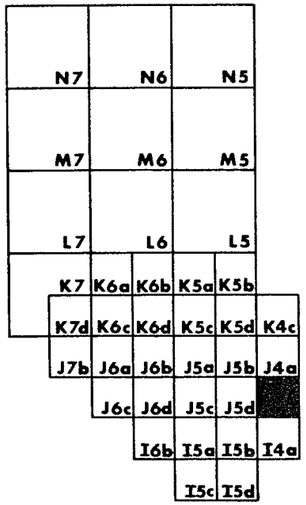
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-4C	1	48" CMP	-4.63	HFS
J-4C	1A	18" x 29" CMP (N) 48" CMP (E) 48" RCP (S)	0.81 -3.54 -3.44	C
J-4C	2	48" RCP (N) 4.0' x 4.0' B.A. (S)	-3.34 -1.92	HFS
J-4C	3	4.0' x 4.0' B.A. (E) 5.0' x 4.0' B.A. (W) 15" RCP (N) 15" RCP (S)	-2.15 -1.37 2.04 1.23	HFS
J-4C	4	18" x 29" CMP 18" x 29" CMP	0.82 0.82	C
J-4C	5		-	FWT
J-4C	6	6.6' x 20.0' B.A.	0.39	HFS
J-4C	7	4.2' x 2.5' B.A. (E) 4.3' x 2.5' B.A. (W) 15" RCP (N)	-3.80 -3.57 0.59	C
J-4C	8		-	PO
J-4C	9	18" x 29" CMP	1.05	C
J-4C	10	24" CMP	0.67	C
J-4C	11	18" x 29" CMP (E) 18" x 29" CMP (W)	-0.16 -0.16	C

INVENTORY

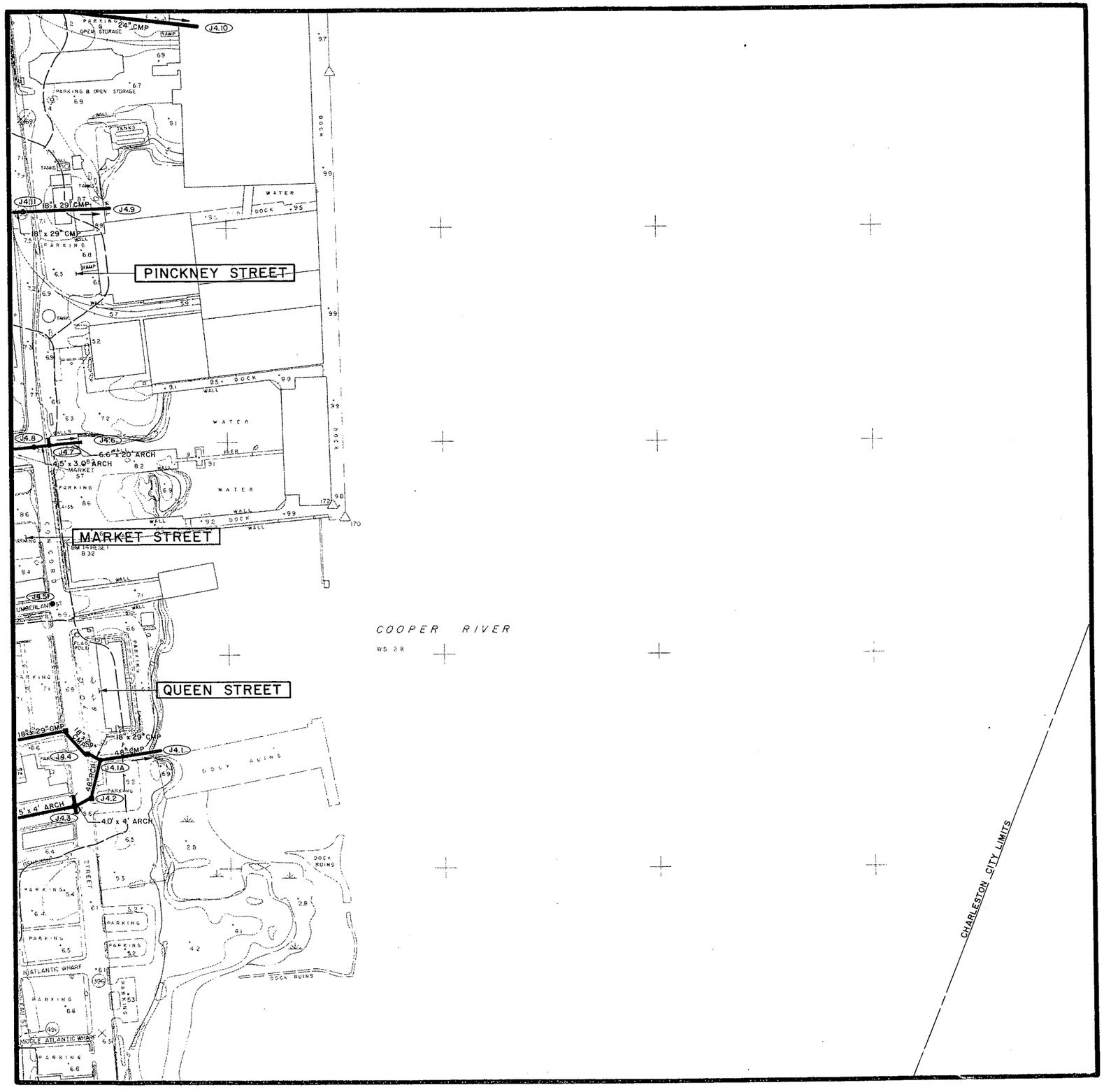
MAP J4c

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

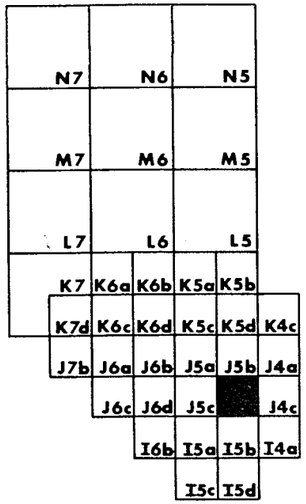
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-5D	1	3.0' x 4.0' B.A. (E)	-0.15	C
		2.2' x 4.0' B.A. (W)	0.22	
		18" RCP (S)	0.05	
J-5D	2	4.0' x 4.0' B.A. (E)	-0.59	C
		4.0' x 4.0' B.A. (W)	-0.57	
		3.1' x 3.4' B.A. (N)	-0.06	
J-5D	3	4.0' x 2.5' B.A. (E)	0.83	C
		4.4' x 2.5' B.A. (W)	0.89	
		12" VCP (N)	4.75	
		12" VCP (S)	4.96	
J-5D	4	3.7' x 2.5' B.A. (E)	2.11	C
		3.7' x 2.5' B.A. (W)	2.30	
		10" VCP (N)	2.80	
J-5D	5	4.0' x 2.5' B.A. (E)	1.59	C
		4.0' x 2.5' B.A. (W)	1.59	
		18" VCP (S)	1.59	
J-5D	6	2.3' x 2.8' B.A. (N)	5.39	C
		12" VCP (S)	5.60	
		18" VCP (E)	5.83	
		12" VCP (W)	6.08	
J-5D	7	2.8' x 2.5' B.A. (E)	2.69	C
		24" VCP (W)	1.77	
J-5D	8	2.1' x 3.0' B.A. (N)	1.87	C
		2.1' x 3.0' B.A. (S)	1.86	
J-5D	8A	4.2' x 2.5' B.A. (E)	1.45	C
		24" VCP (W)	2.17	
J-5D	9		-	PO
J-5D	10	24" VCP (E)	2.87	C
		24" VCP (W)	2.93	
		12" VCP (N)	7.62	
J-5D	11	24" VCP (E)	3.21	C
		24" VCP (W)	3.38	
		24" VCP (N)	3.32	
J-5D	12	24" VCP (S)	3.62	C
		2.2' x 2.0' B.A. (W)	3.47	
J-5D	13	2.5' x 2.0' B.A. (E)	3.26	C
		2.5' x 2.0' B.A. (S)	3.36	
		24" VCP (W)	3.06	
J-5D	14		-	PO
J-5D	15		-	PO
J-5D	16	24" VCP (E)	3.66	C
		24" VCP (W)	3.78	
		18" VCP (S)	5.64	
J-5D	17	4.8' x 2.5' B.A. (E)	-3.64	C
		4.1' x 2.5' B.A. (W)	-3.24	
		12" VCP (N)	0.30	
J-5D	18	B.A. (E)	-3.63	FWT
		B.A. (W)	-4.03	
		18" VCP (S)	3.16	Tide gate on 18" VCP
J-5D	19	5.0' x 3.0' B.A. (E)	-2.09	C
		5.0' x 3.0' B.A. (W)	-2.14	
J-5D	20	3.7' x 3.0' B.A. (E)	-1.13	C
		3.7' x 3.0' B.A. (W)	-0.93	
J-5D	21		-	FS
J-5D	22			FWT
J-5D	23		-	FWT
J-5D	24		-	FWT
J-5D	25		-	PO
J-5D	26	3.0' x 2.5' B.A. (E)	-0.89	FS
		2.2' x 2.5' B.A. (W)	-0.26	
		24" VCP (S)	-	
J-5D	27		-	PO
J-5D	28		-	PO
J-5D	29	2.9' x 2.5' B.A. (E)	-1.01	HFS
		1.5' x 2.5' B.A. (W)	0.00	
		18" VCP (N)	-0.16	
		18" VCP (S)	-0.16	
J-5D	30		-	PO
J-5D	31		-	PO
J-5D	32	24" VCP (E)	-1.53	FWT
		24" VCP (W)	-1.15	
		18" VCP (N)	-0.37	
J-5D	33	24" VCP (E)	-1.27	C
		24" VCP (W)	-1.21	
J-5D	34	18" VCP (N)	0.86	C
		24" VCP (E)	-1.25	
		18" VCP (S)	0.95	
		18" VCP (W)	-0.92	
J-5D	35	0.1' x 2.5' B.A. (E)	1.56	FS
		18" VCP (S)	1.33	
		0.9' x 2.5' B.A. (W)	1.42	
		18" VCP (N)	1.33	
J-5D	36	3.0' x 5.0' B.A. (N)	3.66	FS
		3.0' x 5.0' B.A. (S)	3.64	
		18" VCP (E)	-	
J-5D	37		-	PO
J-5D	38		-	PO
J-5D	39	3.0' x 3.0' B.A. (E)	3.42	C
		3.0' x 3.0' B.A. (W)	3.40	
		2.5' x 3.0' B.A. (S)	0.82	
		2.5' x 3.0' B.A. (N)	1.14	
J-5D	40	2.8' x 2.5' B.A. (E)	4.12	C
		2.9' x 2.5' B.A. (W)	4.35	
		15" RCP (S)	4.32	
J-5D	41	3.1' x 2.5' B.A. (E)	4.24	C
		3.1' x 2.5' B.A. (W)	4.17	
J-5D	42	2.5' x 2.5' B.A. (N)	7.93	HFS
		2.5' x 2.5' B.A. (S)	8.41	
		2.5' x 2.5' B.A. (W)	8.40	
J-5D	43		-	PO
J-5D	44		-	PO
J-5D	45		-	PO
J-5D	46	2.5' x 2.5' B.A. (N)	6.78	HFS
		2.5' x 2.5' B.A. (S)	7.04	
		24" VCP (E)	6.54	
J-5D	47		-	PO
J-5D	48		-	PO
J-5D	49	3.2' x 2.5' B.A. (E)	6.89	C
		2.9' x 2.5' B.A. (W)	7.20	
J-5D	50	24" VCP (E)	-1.82	C
		24" VCP (W)	-1.69	
		15" VCP (S)	-0.10	
J-5D	51	24" VCP (E)	-1.37	C
		24" VCP (W)	-1.24	
J-5D	52	24" VCP (E)	-0.27	C
		24" VCP (W)	-0.31	
J-5D	53	24" VCP (E)	1.61	C
		24" VCP (W)	-0.09	
J-5D	54	18" VCP (E)	-	18" VCP does not open in M.H.
		18" VCP (W)	-	C
		12" VCP (N)	3.25	
		12" VCP (S)	2.97	
J-5D	55		-	FS
J-5D	56		-	FS
J-5D	57	2.9' x 2.5' B.A. (E)	-	C
		12" VCP (W)	-	
J-5D	58	3.0' x 2.5' B.A. (E)	3.89	C
		3.0' x 2.5' B.A. (W)	3.91	
J-5D	59	2.5' x 2.4' B.A. (E)	3.55	C
		2.5' x 2.4' B.A. (W)	3.92	
		18" VCP (N)	3.13	
		12" VCP (S)	3.36	
		12" VCP (S/W)	3.82	
J-5D	60	2.6' x 2.5' B.A. (E)	5.40	C
		2.6' x 2.5' B.A. (W)	5.38	
J-5D	61	3.0' x 5.0' B.A. (N)	3.56	C
		3.0' x 5.0' B.A. (S)	3.56	
		2.5' x 4.0' B.A. (E)	3.96	
		2.5' x 4.0' B.A. (W)	3.97	
J-5D	62	3.5' x 1.5' B.A. (E)	1.64	C
		3.5' x 2.0' B.A. (S)	0.66	
		3.5' x 2.0' B.A. (N)	1.07	
J-5D	63	2.5' x 2.5' B.A. (W)	2.60	C
		18" VCP (E)	2.19	
		18" VCP (N)	6.35	
J-5D	64		-	PO
J-5D	65	2.8' x 2.5' B.A. (E)	5.98	C
		2.7' x 2.5' B.A. (W)	6.18	
J-5D	66	3.0' x 2.5' B.A. (E)	6.25	C
		2.8' x 2.5' B.A. (W)	6.42	
J-5D	67	Fire well (abandoned)		
J-5D	68		-	PO
J-5D	69	18" VCP (E)	5.43	C
		18" VCP (W)	4.96	
J-5D	132	24" VCP (E)	3.21	C
		24" VCP (W)	3.22	
		12" VCP (N)	-	
		12" VCP (S)	-	
J-5D	133	1.3' x 3.0' B.A. (N)	2.67	HFS
		1.5' x 3.0' B.A. (S)	2.28	
		24" VCP (E)	2.22	
		18" VCP (W)	2.62	
J-5D	136	5.0' x 2.5' B.A. (N)	3.07	C
		5.0' x 2.5' B.A. (E)	3.07	
		5.0' x 3.5' B.A. (W)	3.07	
		5.0' x 3.5' B.S. (S)	-	

INVENTORY

MAP J5d

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-5C	70	4.2' x 3.0' B.A. (N)	0.25	C
		5.0' x 3.0' B.A. (S)	-0.75	
		15" VCP (W)	0.99	
		24" VCP (E)	3.55	
J-5C	71		-	PO
J-5C	72	24" VCP (E)	4.05	C
		24" VCP (W)	4.21	
		15" VCP (N)	4.21	
J-5C	73		-	PO
J-5C	74	3.0' x 5.0' B.A. (N)	-0.03	C
		3.0' x 5.0' B.A. (S)	-0.86	
		18" VCP (E)	-0.86	
J-5C	75	3.0' x 5.0' B.A. (N)	-0.89	HFS
		3.0' x 5.0' B.A. (S)	-0.89	
J-5C	76	1.6' x 3.0' B.A. (N)	2.71	HFS
		1.8' x 3.0' B.A. (S)	2.41	
J-5C	77	24" VCP (W)	3.33	C
		24" VCP (E)	3.26	
J-5C	78	24" VCP (W)	4.10	C
J-5C	79	2.1' x 2.2' B.A. (E)	6.44	C
		18" VCP (W)	6.33	
J-5C	80	3.0' x 3.0' B.A. (N)	2.41	HFS
		3.0' x 3.0' B.A. (S/E)	2.44	
		24" VCP (W)	2.44	
J-5C	81		-	PO
J-5C	82		-	PO
J-5C	83		-	PO
J-5C	84	18" VCP (N)	-0.07	C
		18" VCP (S)	0.13	
		30" VCP (E)	-1.94	
		30" VCP (W)	-2.22	
J-5C	85	30" VCP (E)	-1.59	C
		30" VCP (W)	-1.59	
J-5C	86	18" VCP (E)	-0.98	C
		30" VCP (W)	-0.91	
		12" VCP (N)	-0.15	
		15" VCP (S)	-1.55	
J-5C	87	24" VCP (W)	0.41	C
		18" VCP (S)	1.52	
		18" VCP (N)	-	
		15" VCP (E)	-	

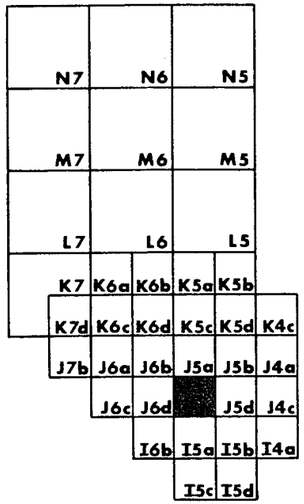
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-5C	88	1.6' x 3.0' B.A. (N)	0.88	C
		1.6' x 3.0' B.A. (S)	0.98	
J-5C	89	3.0' x 5.0' B.A. (N)	-0.96	C
		3.0' x 5.0' B.A. (S)	-1.01	
		24" VCP (E)	1.27	
J-5C	90		-	PO
J-5C	91		-	PO
J-5C	92	2.5' x 3.0' B.A. (N)	5.31	C
		2.5' x 3.0' B.A. (S)	5.33	
		24" CIP (W)	5.34	
		18" VCP (E)	5.34	
J-5C	93	2.2' x 3.0' B.A. (N)	1.82	C
		2.2' x 3.0' B.A. (S)	1.82	
J-5C	94	2.1' x 3.0' B.A. (N)	1.49	C
		2.1' x 3.0' B.A. (S)	1.49	
J-5C	95	1.3' x 3.0' B.A. (N)	1.98	HFS
		1.3' x 3.0' B.A. (S)	2.12	
J-5C	96	36" Brick Pipe (N)	2.65	C
		24" Brick Pipe (E)	3.04	
		36" Brick Pipe (S)	2.76	
		12" VCP (W)	3.07	
J-5C	97	12" VCP (N)	4.49	C
		12" VCP (S)	4.49	
J-5C	98	18" VCP (N)	3.11	C
		12" VCP (S)	3.25	
		12" VCP (W)	4.86	
J-5C	102	24" VCP (N)	1.50	C
		24" VCP (S)	1.36	
J-5C	103	24" VCP (N)	1.65	C
		18" VCP (S)	1.46	
J-5C	107		-	PO
J-5C	108	3.0' x 3.5' B.A. (N)	1.00	C
		3.0' x 3.5' B.A. (S)	1.00	
J-5C	113	2.5' x 3.0' B.A. (N)	7.13	C
		2.5' x 3.0' B.A. (S)	7.13	
J-5C	114	2.0' x 2.5' B.A. (N)	7.44	C
		2.6' x 1.5' B.A. (E)	7.02	
		2.9' x 2.5' B.A. (S)	7.19	
J-5C	115	1.8' x 2.5' B.A. (N)	6.86	C
		2.3' x 2.5' B.A. (S)	6.91	
J-5C	137	3.5' x 3.5' B.A. (N/W)	6.98	C
		3.8' x 3.5' B.A. (E)	6.67	
J-5C	138		-	PO

INVENTORY

MAP J5c

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-6D	1		-	PO
J-6D	2		-	PO
J-6D	3	30" VCP (S)	-2.08	C
		30" VCP (W)	-1.83	
		18" VCP (N)	-2.08	
		2.1' x 2.0' B.A. (E)	-3.18	
J-6D	4	3.0' x 2.0' B.A. (W)	-0.30	C
		1.9' x 2.0' B.A. (E)	0.30	
		12" VCP (N)	1.00	
		12" VCP (S)	0.08	
J-6D	5		-	PO
J-6D	6	42" RCP	-1.52	FS
J-6D	7	42" RCP	0.67	HFS
J-6D	8	18" RCP	2.42	C
J-6D	9	24" RCP	2.10	C
J-6D	10	24" RCP	0.06	C
J-6D	11	24" RCP	0.53	HFS
J-6D	12	24" RCP	0.22	C
J-6D	13	30" RCP	1.08	C
J-6D	14	30" RCP (E)	-0.07	C
		30" RCP (W)	-0.07	
		18" RCP (N)	0.76	
J-6D	15	30" RCP (E)	0.54	C
		18" RCP (W)	0.29	
J-6D	16	18" RCP (E)	1.61	C
		12" RCP (N/W)	2.61	
J-6D	23		-	PO
J-6D	24	3.5' x 3.0' BOX (E)	-1.84	C
		3.5' x 3.0' BOX (W)	-1.84	
J-6D	25	3.5' x 3.0' BOX (E)	-1.72	C
		3.5' x 3.0' BOX (W)	-1.72	
J-6D	26	3.1' x 3.0' BOX (E)	-1.29	C
		3.1' x 3.0' BOX (W)	-1.29	
		30" RCP (N)	-0.99	
		18" VCP (S)	-1.14	

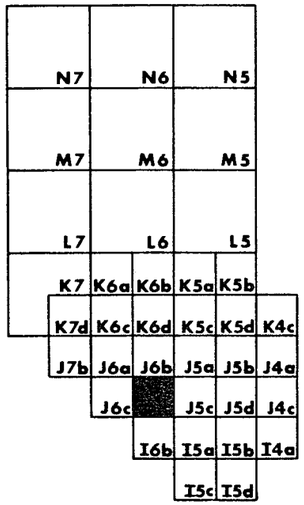
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-6D	27		-	Manhole lid broken
J-6D	28		-	PO
J-6D	29		-	PO
J-6D	30	3.1' x 3.0' BOX (E)	-1.15	C
		3.1' x 3.0' BOX (W)	-1.15	
		24" VCP (S)	-0.73	
J-6D	31	18" VCP (N)	0.48	C
		18" VCP (S)	0.50	
		12" VCP (W)	0.41	
J-6D	32	18" VCP (S)	0.48	C
J-6D	33		-	PO
J-6D	34	3.5' x 3.0' BOX (E)	-0.85	C
		3.5' x 3.0' BOX (W)	-0.84	
		18" VCP (S)	-0.84	
J-6D	35		-	PO
J-6D	36	3.7' x 3.0' BOX (W)	-1.10	C
		3.7' x 3.0' BOX (E)	-1.10	
		24" VCP (S)	-0.38	
		24" VCP (N)	-0.94	
J-6D	37	3.5' x 3.0' B.A. (S)	-0.57	C
		5.0' x 3.5' BOX (W)	-0.52	
		5.0' x 3.5' BOX (E)	-0.55	
		2.5' x 2.5' B.A. (N)	-0.01	
J-6D	57		-	PO
J-6D	58	24" VCP (N)	0.51	C
		24" VCP (S)	0.13	
		15" VCP (E)	1.93	
		15" VCP (W)	2.04	
J-6D	61	18" VCP (N)	-0.03	C
		30" RCP (S)	-0.03	
		24" RCP (E)	0.52	
		15" VCP (W)	0.22	
J-6D	62	24" RCP (W)	0.80	C
		15" VCP (E)	0.80	
		10" VCP (N)	1.95	

INVENTORY

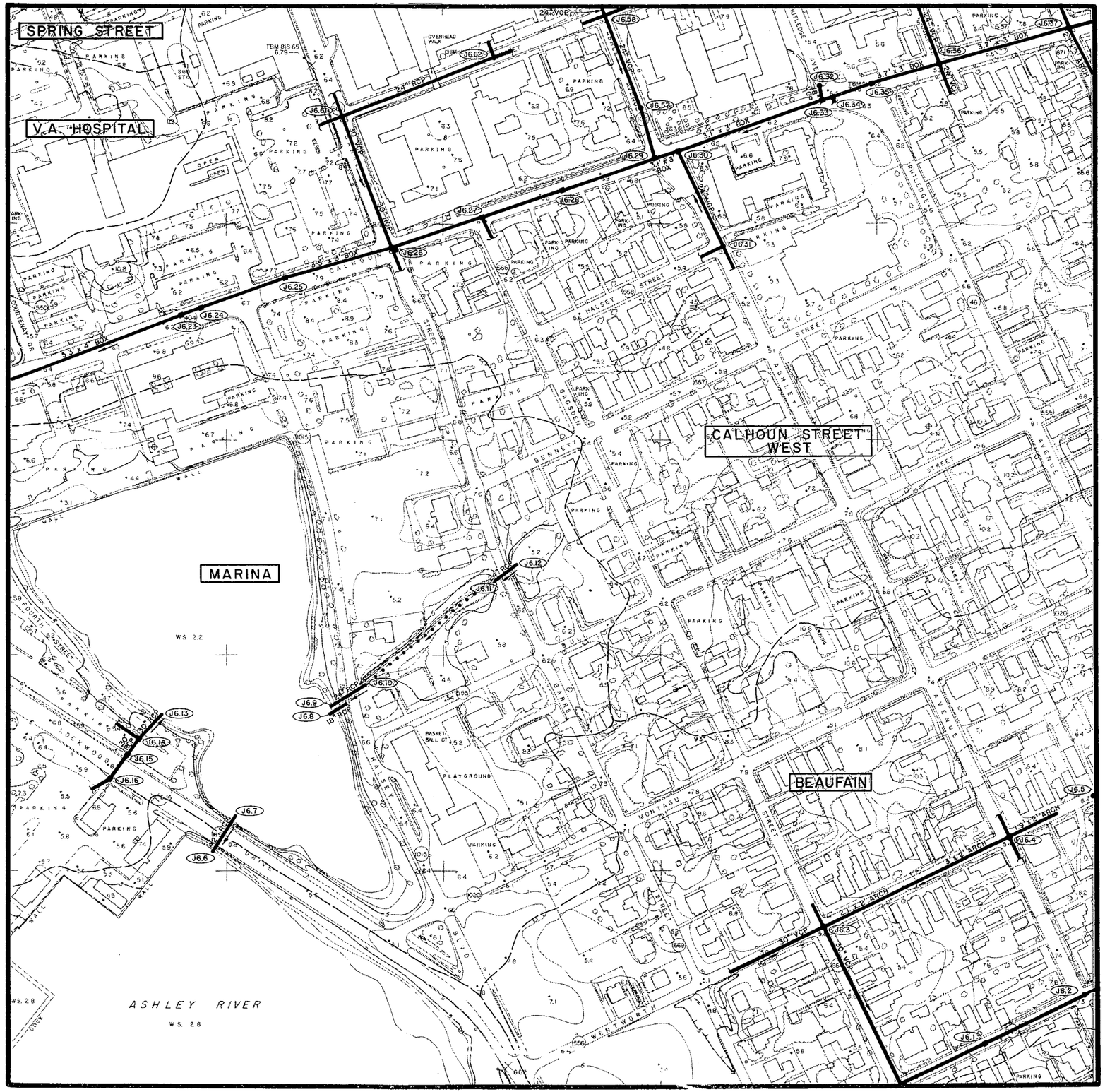
MAP J6d

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-6C	87	24" RCP (N) 24" RCP (S/W)	-1.31 -0.85	C
J-6C	88	24" RCP (N/E) 24" RCP (S/W)	-0.45 -0.31	C
J-6C	89		-	CNO
J-6C	90	30" RCP (E) 24" RCP (E) 48" CMP (W) 24" RCP (S)	-1.24 -1.24 -1.09 -0.89	HFS
J-6C	91	24" RCP (N) 18" RCP (S) 15" RCP (E)	-0.48 -0.67 -0.64	C
J-6C	92	30" RCP (E) 24" RCP (E) 24" RCP (W) 30" RCP (W) 12" RCP (S)	- -0.63 -0.83 - -0.98	C
J-6C	93	30" RCP (W) 24" RCP (W) 24" RCP (E #1) 24" RCP (E #2)	-0.43 -1.00 -0.20 -0.95	C
J-6C	94	24" RCP (W #1) 24" RCP (W #2) 24" RCP (E)	0.46 0.46 -	C
J-6C	95	18" RCP (E) 24" RCP (W) 18" RCP (S)	-0.40 -0.40 -0.40	C
J-6C	96	1.5' x 4.0' BOX (N) 30" RCP (S/W)	1.57 1.46	C
J-6C	97	1.5' x 4.0' BOX (S) 30" RCP (N) 30" RCP (E)	1.79 1.63 1.49	C
J-6C	98	30" RCP	-	C
J-6C	99	30" RCP (E) 30" RCP (S) 15" RCP (N)	1.64 1.58 1.79	C
J-6C	100	30" RCP	1.69	C
J-6C	101	Pump Station		
J-6C	102	30" RCP (W) 15" RCP (N) 18" RCP (S) 30" RCP (E)	-1.90 0.55 -0.73 -1.80	C
J-6C	103	30" RCP (N) 30" RCP (W)	-1.71 -1.68	C
J-6C	104	30" RCP (S) 18" RCP (N/W)	-1.63 -0.46	C

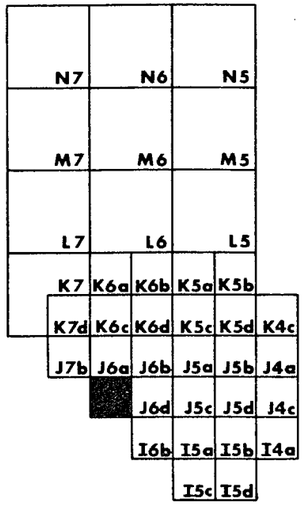
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-6C	17	6.0' x 5.0' BOX	-2.84	C
J-6C	18		-	CNO
J-6C	19		-	PO
J-6C	20	5.5' x 5.0' BOX (E) 5.5' x 5.0' BOX (W)	-2.50 -2.50	C
J-6C	21	5.5' x 5.0' BOX (E) 5.5' x 5.0' BOX (W) 15" RCP (N) 15" RCP (S)	-2.15 -2.15 1.56 2.12	C
J-6C	22	5.3' x 4.0' BOX (E) 5.3' x 4.0' BOX (W)	-2.42 -2.42	C
J-6C	63	5.0' x 8.0' BOX	0.30	C
J-6C	64	24" CIP	0.15	Force main
J-6C	65	5.0' x 8.0' BOX	-	C
J-6C	66	60" RCP	-0.89	C
J-6C	67	48" RCP	-0.71	C
J-6C	68	42" RCP (N) 48" RCP (S)	-0.66 -0.70	C
J-6C	69	42" RCP (N) 42" RCP (S) 18" RCP (E)	-0.10 -0.10 -0.10	C
J-6C	70	42" RCP (N) 42" RCP (S) 15" RCP (E)	0.29 0.49 0.50	C
J-6C	71	42" RCP (N) 42" RCP (S) 15" RCP (W)	0.54 0.54 1.99	C
J-6C	72	42" RCP (N/E) 42" RCP (S)	0.66 0.66	C
J-6C	81	60" RCP (E) 60" RCP (W) 30" RCP (N/E)	-0.35 -0.35 -0.35	C
J-6C	82	30" RCP (S) 30" RCP (N)	-0.01 -0.01	C
J-6C	83	24" RCP (E) 12" RCP (N) 30" RCP (S)	1.08 0.48 0.58	C
J-6C	84	24" RCP (N) 24" RCP (W)	1.83 1.78	C
J-6C	85	18" RCP (N) 24" RCP (S)	2.48 2.52	C
J-6C	86	30" RCP (N) 24" RCP (S) 48" CMP (E) 60" RCP (W)	-0.69 -0.69 -0.69 -0.69	C

INVENTORY

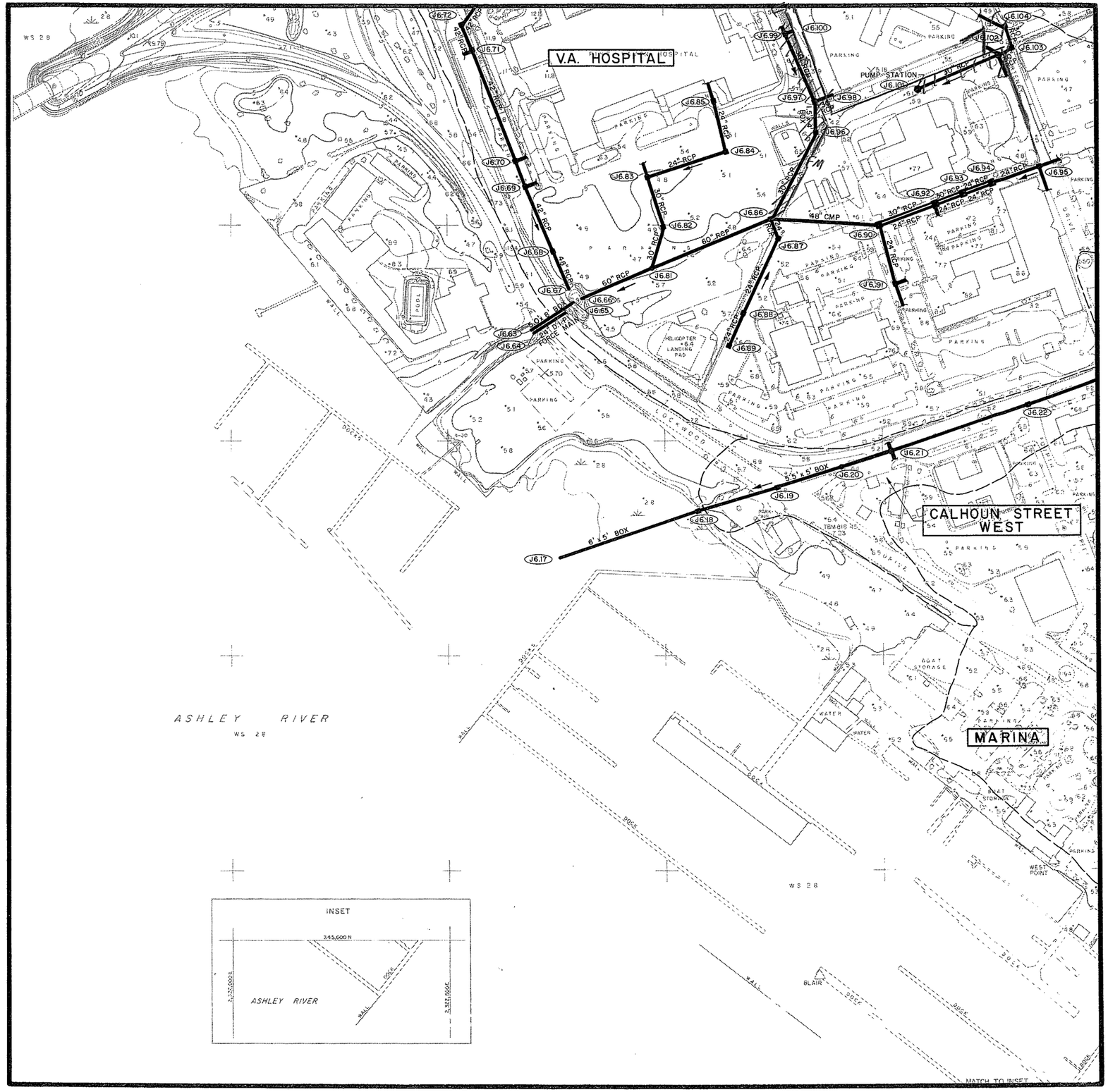
MAP J6c

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
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- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

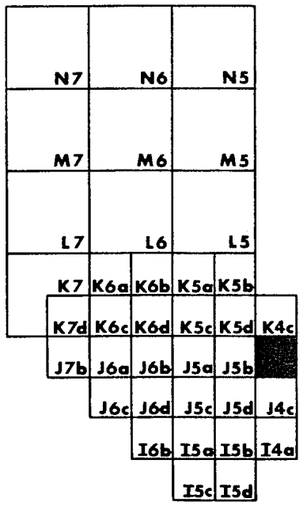
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-4A	13	60" CMP	-4.94	C
J-4A	14	18" VCP	-	C
J-4A	15	18" VCP	-	C
J-4A	16	36" CMP	-2.16	4'x6' Box with 36" CMP stub out

INVENTORY

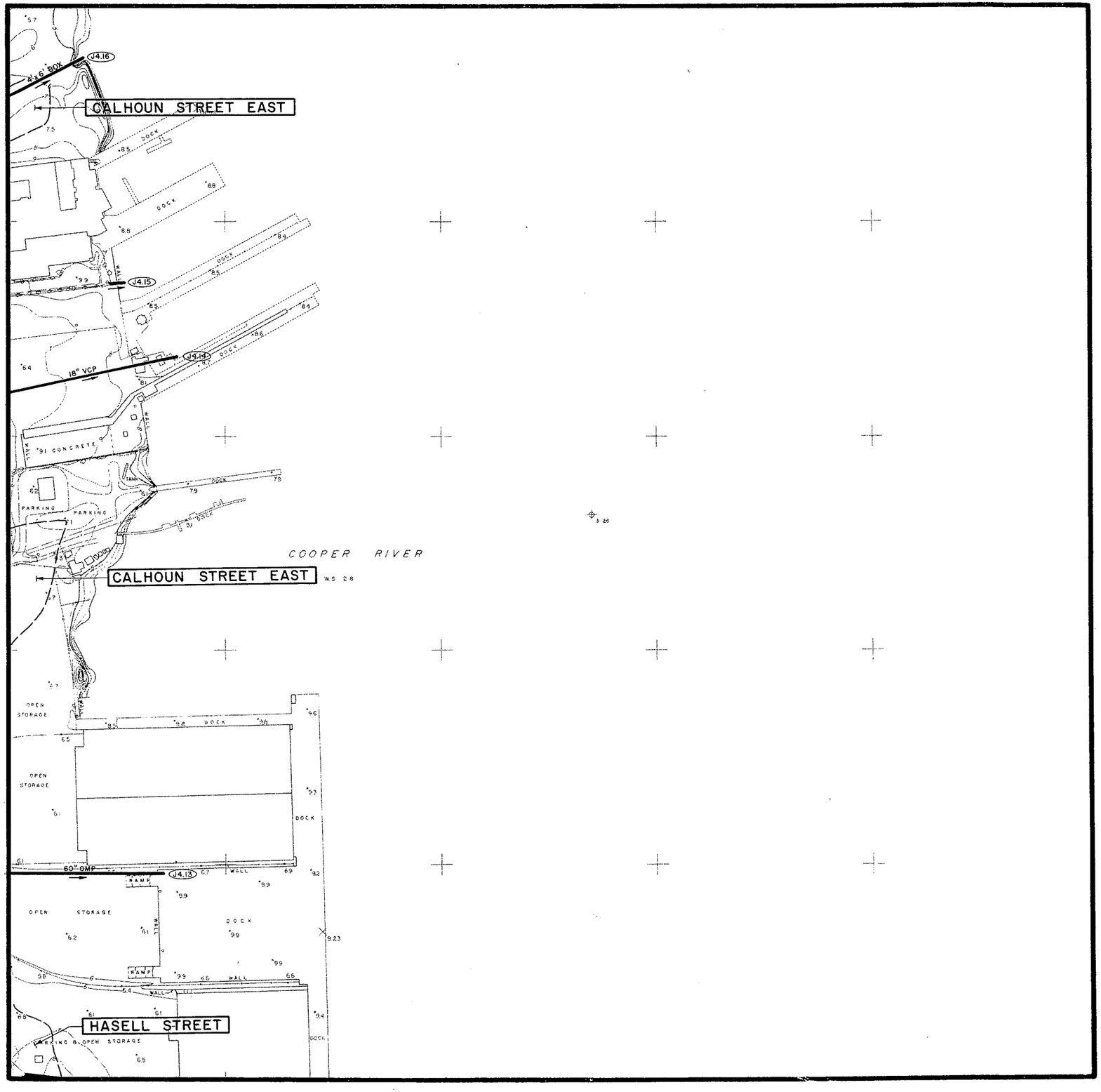
MAP J4a

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-5B	158		-	FS
J-5B	159		-	FWT
J-5B	160	15" VCP (N) 12" VCP (S)	-3.02 -3.07	HFS
J-5B	161	18" VCP (E) 18" VCP (W)	-1.50 -1.50	C
J-5B	162	3.5' x 3.5' B.A. (E) 3.4' x 3.5' B.A. (W) 18" VCP (N)	-3.65 -3.49 0.90	C
J-5B	163		-	FWT
J-5B	164		-	PO
J-5B	165	4.4' x 3.5' B.A. (E) 4.6' x 3.5' B.A. (W) 15" VCP (S)	-1.83 -1.98 -0.96	C
J-5B	166	4.5' x 3.5' B.A. (E) 4.8' x 3.5' B.A. (W)	-1.50 -1.78	C
J-5B	167	4.0' x 3.5' B.A. (E) 4.0' x 3.5' B.A. (W) 3.0' x 3.5' B.A. (S)	-1.25 -1.54 -1.54	C
J-5B	175	2.1' x 2.5' B.A. (E) 2.5' x 2.5' B.A. (W)	7.93 8.09	C
J-5B	187		-	PO
J-5B	188		-	PO
J-5B	189	24" RCP (S) 24" RCP (N)	2.17 1.81	C
J-5B	190	24" RCP (S) 24" RCP (N)	2.41 2.37	C
J-5B	191	24" RCP (S) 24" RCP (N)	3.57 3.50	C
J-5B	192	24" RCP (N) 18" RCP (S)	4.38 4.47	C
J-5B	193	4.5' x 3.5' B.A. (W) 4.5' x 3.5' B.A. (E)	-1.85 -1.79	C
J-5B	194		-	PO
J-5B	194A		-	PO
J-5B	195	24" RCP (N) 24" RCP (S)	0.48 0.50	C
J-5B	196	24" RCP (N) 24" RCP (S)	1.52 1.52	C
J-5B	197	24" RCP (N) 24" RCP (S)	1.08 1.31	C
J-5B	198	24" RCP (N) 24" RCP (S)	3.81 3.76	C
J-5B	199	24" RCP (N) 24" RCP (S)	5.17 5.12	C
J-5B	200	24" RCP (N) 24" RCP (W)	5.70 5.88	C
J-5B	201	24" RCP (E) 18" RCP (W)	6.86 6.86	C

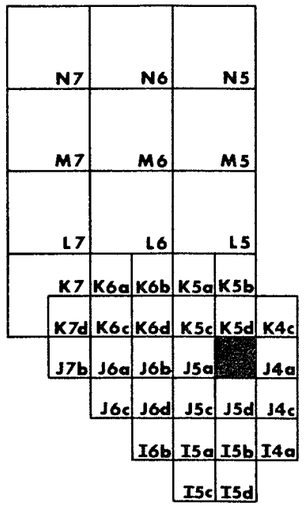
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-5B	12-A	24" CMP (E) 24" VCP (W) 24" VCP (N) 24" CMP (S/W) 15" VCP (S/W)	0.00 0.32 0.20 1.59 2.37	C
J-5B	128	3.4' x 3.5' B.A. (E) 3.4' x 3.5' B.A. (W) 18" RCP (N)	-3.57 -3.87 -0.52	C
J-5B	129	3.8' x 3.5' B.A. (E) 3.8' x 3.5' B.A. (W) 18" RCP (S)	-4.46 -4.46 -1.49	FWT
J-5B	130	2.5' x 2.5' BOX (W)	2.43	C
J-5B	131	2.5' x 2.5' BOX (E) 3.2' x 1.8' BOX (N) 24" VCP (W)	1.58 1.90 2.17	C
J-5B	134A		-	CNP
J-5B	134	4.0' x 3.5' B.A. (E) 4.0' x 3.5' B.A. (W)	2.14 1.96	C
J-5B	135	3.8' x 3.5' B.A. (E) 3.9' x 3.5' B.A. (W) 18" VCP (N) 12" VCP (S)	3.13 3.13 3.48 3.39	C
J-5B	143	1.6' x 3.0' B.A. (E) 1.3' x 3.0' B.A. (W)	9.77 9.77	HFS
J-5B	145		-	PO
J-5B	146		-	PO
J-5B	147	18" VCP (N) 18" VCP (S) 18" VCP (W) 18" VCP (E)	6.49 6.60 6.69 -	C
J-5B	148	2.5' x 2.5' B.A. (N) 2.5' x 2.5' B.A. (S)	3.94 3.86	C
J-5B	149	2.5' x 2.5' B.A. (N) 2.5' x 2.5' B.A. (S)	3.43 3.47	C
J-5B	150	0.7' x 2.0' B.A. (W) 1.2' x 2.0' B.A. (E) 15" VCP (N) 15" VCP (S)	2.29 1.99 1.10 1.30	HFS
J-5B	151	1.2' x 2.0' B.A. (E) 1.2' x 2.0' B.A. (W) 24" VCP (N) 24" VCP (S)	-1.11 -0.86 -2.07 -2.31	FS
J-5B	152	24" VCP (N) 15" VCP (S/W) 12" VCP (S)	-0.99 0.01 -0.24	HFS
J-5B	153	24" VCP (N) 24" VCP (S)	-2.27 -1.97	HFS
J-5B	154	24" VCP (N) 24" VCP (S)	-1.96 -2.11	C
J-5B	155	24" VCP (N) 24" VCP (S) 18" VCP (E)	-2.42 -2.45 -2.20	C
J-5B	156	24" VCP (N) 24" VCP (S)	-2.25 -2.47	C
J-5B	157	24" VCP (N) 24" VCP (S)	-2.31 -2.41	HFS

INVENTORY

MAP J5b

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-5A	29-A	24" VCP (N) 24" VCP (S)	1.38 1.38	C
J-5A	30-A		-	PO
J-5A	40-A		-	PO
J-5A	41-A	3.5' x 2.5' B.A. (S) 3.5' x 2.5' B.A. (N) 18" VCP (W)	1.37 1.76 -	C
J-5A	42-A		-	PO
J-5A	43-A		-	PO
J-5A	44-A		-	PO
J-5A	45-A	3.8' x 4.0' B.A. (E) 3.8' x 4.0' B.A. (W)	3.39 3.39	C
J-5A	99		-	PO
J-5A	100	4.5' x 4.0' BOX (E) 4.5' x 4.0' BOX (W) 3.9' x 2.5' B.A. (S)	0.34 - -	C
J-5A	101	3.9' x 2.5' B.A. (N) 24" VCP (S)	0.36 1.21	C
J-5A	104		-	PO
J-5A	105		-	PO
J-5A	106	6.5' x 4.0' B.A. (N) 6.0' x 4.0' BOX (E) 7.0' x 4.0' B.A. (S) 7.0' x 4.0' BOX (W)	-0.14 -0.58 -0.67 -0.48	C
J-5A	109		-	PO
J-5A	110		-	PO
J-5A	111	4.0' x 3.5' BOX (E) 4.0' x 3.5' BOX (W) 12" VCP (S)	0.93 - -	C
J-5A	112	12" VCP (N) 12" VCP (S)	5.22 5.34	C
J-5A	116		-	PO
J-5A	117	4.5' x 3.0' B.A. (N) 4.5' x 3.0' B.A. (S) 18" VCP (W) 15" VCP (E)	0.55 0.55 - -	C
J-5A	118		-	PO
J-5A	119	4.5' x 3.0' B.A. (N) 4.5' x 3.0' B.A. (S) 18" VCP (E) 18" VCP (W)	-0.73 -0.73 - -	C
J-5A	120		-	PO
J-5A	121	5.0' x 3.0' B.A. (N) 5.0' x 3.0' B.A. (S) 18" VCP (E) 18" VCP (W)	0.39 -0.35 - -	C
J-5A	122	2.1' x 3.0' B.A. (N) 2.1' x 3.0' B.A. (S)	2.45 2.45	C
J-5A	123		-	PO

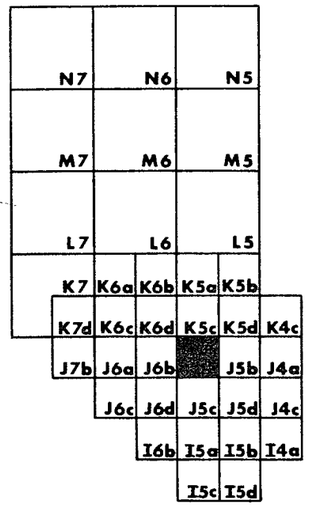
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-5A	125	1.8' x 4.0' B.A. (E) 1.8' x 4.0' B.A. (W)	3.13 3.13	C
J-5A	126		-	PO
J-5A	127	2.0' x 4.0' B.A. (W) 2.0' x 4.0' B.A. (E) 15" VCP (N) 15" VCP (S)	2.70 2.71 - -	C
J-5A	139	2.0' x 3.0' B.A. (W) 2.0' x 3.0' B.A. (E)	9.17 9.23	C
J-5A	140		-	PO
J-5A	141	2.0' x 3.0' B.A. (E) 2.0' x 3.0' B.A. (W)	9.12 8.28	C
J-5A	142	2.0' x 3.0' B.A. (W) 2.4' x 3.0' B.A. (E) 15" RCP (N)	9.53 9.35 12.81	C
J-5A	168		-	PO
J-5A	169	4.0' x 4.0' B.A. (N) 4.0' x 4.0' B.A. (S) 4.0' x 3.0' B.A. (E) 4.0' x 3.0' B.A. (W)	6.39 6.26 1.84 1.84	C
J-5A	170	3.0' x 2.5' B.A. (N) 3.0' x 2.5' B.A. (S)	8.37 8.37	C
J-5A	171	0.6' x 2.5' B.A. (E) 0.6' x 2.5' B.A. (W)	11.15 11.07	FS
J-5A	172	0.3' x 2.5' B.A. (E) 0.6' x 2.5' B.A. (W)	10.42 10.65	FS
J-5A	173	0.0' x 2.5' B.A. (E) 0.0' x 2.5' B.A. (W)	11.09 11.22	FS
J-5A	174	2.0' x 2.5' B.A. (E) 2.0' x 2.5' B.A. (W)	8.21 8.15	C
J-5A	176		-	PO
J-5A	177		-	PO
J-5A	178		-	PO
J-5A	179	4.0' x 4.0' B.A. (N) 4.0' x 4.0' BOX (S) 4.0' x 4.0' BOX (E) 4.0' x 4.0' BOX (W)	-0.06 -0.06 -0.06 -0.06	C
J-5A	180	4.0' x 2.5' B.A. (S) 4.0' x 2.5' B.A. (N)	-0.08 -0.08	C
J-5A	181		-	PO
J-5A	182	4.0' x 2.5' B.A. (S) 4.0' x 2.5' B.A. (N)	0.68 0.68	C
J-5A	183		-	PO
J-5A	184		-	PO
J-5A	185		-	PO
J-5A	186		-	PO
J-5A	202	2.0' x 4.0' B.A. (E) 1.7' x 4.0' B.A. (W)	2.95 2.95	C
J-5A	203	1.7' x 4.0' B.A. (E) 2.2' x 4.0' B.A. (W)	3.21 2.85	C

INVENTORY

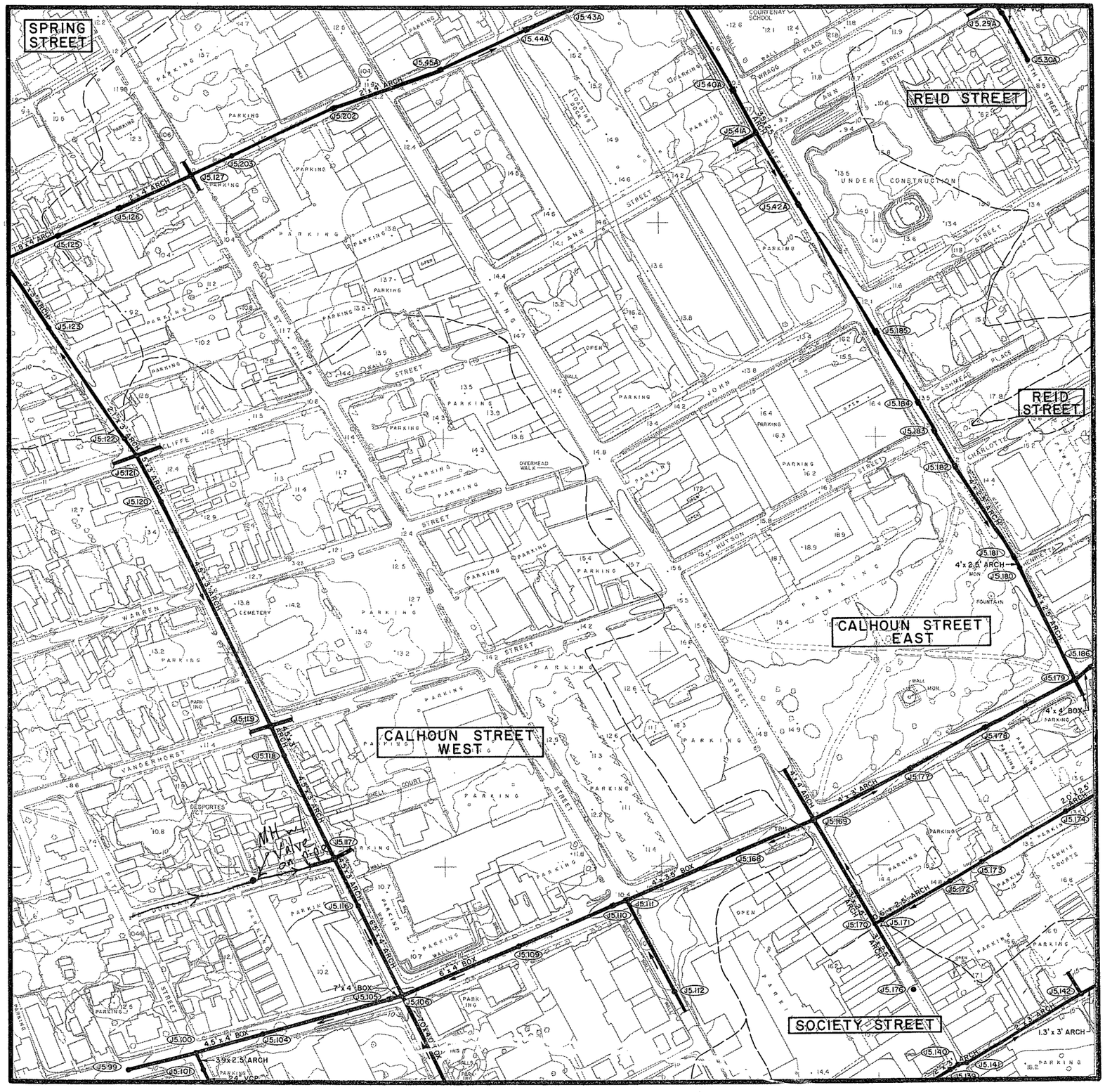
MAP J5a

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

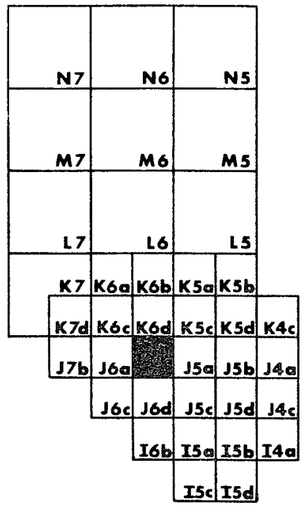
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-6B	38		-	FWT
J-6B	39	24" VCP (W) 24" VCP (E) 12" VCP (N)	1.19 1.09 0.69	HFS
J-6B	40	24" VCP (E) 24" VCP (W) 12" VCP (S)	1.03 1.35 1.04	FWT
J-6B	41	24" VCP (E) 24" VCP (W)	1.19 1.16	C
J-6B	42	24" VCP (E) 24" VCP (W) 12" VCP (N)	0.24 0.24 1.91	FWT
J-6B	43	24" VCP (E) 24" VCP (W)	0.62 0.32	FWT
J-6B	44	24" VCP (E) 18" VCP (W)	0.85 1.75	FWT
J-6B	45		-	PO
J-6B	46		-	PO
J-6B	47		-	PO
J-6B	48	24" VCP (E) 5.0' x 3.0' B.A. (N) 5.0' x 3.0' B.A. (S) 18" VCP (W)	3.55 0.07 -0.08 -	C
J-6B	49		-	PO
J-6B	50	1.0' x 3.3' B.A. (N) 1.4' x 3.3' B.A. (S)	2.02 1.73	FS
J-6B	51		-	PO
J-6B	52	24" VCP (E) 30" VCP (S) 30" VCP (N)	1.10 0.01 0.01	C
J-6B	53	24" VCP (N) 24" VCP (S)	-0.11 -0.11	C
J-6B	54	18" VCP (E) 18" VCP (W) 24" VCP (S)	1.12 0.37 0.25	FWT
J-6B	55		-	PO
J-6B	56	24" VCP (E) 30" VCP (S) 12" VCP (W)	-0.54 -0.76 -	C
J-6B	59		-	PO
J-6B	60	24" VCP (S) 12" VCP (N) 12" VCP (E) 12" VCP (W)	1.39 2.64 2.64 2.39	C
J-6B	106	18" VCP (S) 18" VCP (N) 15" VCP (W) 12" VCP (E)	3.15 - - -	C
J-6B	108		-	PO
J-6B	109	4.0' x 3.0' BOX (E) 4.0' x 3.0' BOX (W)	-0.69 -0.69	C
J-6B	110	4.0' x 3.0' BOX (E) 4.0' x 3.0' BOX (W) 24" VCP (N)	-0.43 -0.43 -0.43	C
J-6B	111	24" VCP (N) 18" VCP (S) 15" VCP (E)	2.55 2.61 4.31	
J-6B	112	1.9' x 2.0' B.A. (W) 1.9' x 2.0' B.A. (E)	4.65 4.67	C
J-6B	113	2.0' x 2.0' B.A. (E) 2.0' x 2.0' B.A. (W)	4.82 4.72	C
J-6B	114	2.0' x 2.0' B.A. (W) 2.0' x 2.0' B.A. (E)	5.71 5.70	C
J-6B	115	18" VCP (N) 24" VCP (E)	3.73 3.58	C
J-6B	116	18" VCP (E) 18" VCP (W)	2.41 2.51	C
J-6B	117		-	PO
J-6B	118		-	PO
J-6B	119		-	PO
J-6B	124	2.0' x 3.5' B.A. (E) 5.0' x 3.0' B.A. (S) 5.0' x 3.0' B.A. (N)	3.01 -0.56 -0.61	C

INVENTORY

MAP J6b

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



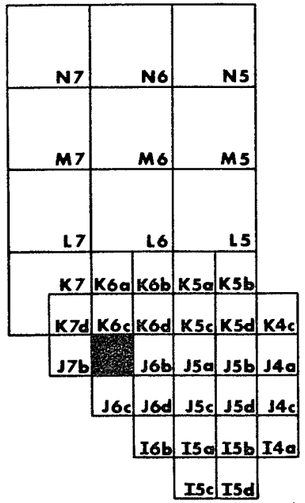
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-6A	1	5' x 8' BOX	-1.22	C
J-6A	2	5' x 8' BOX	-1.34	C
J-6A	3	42" RCP (N) 42" RCP (S)	1.11 1.16	C
J-6A	4	48" RCP	-2.37	C
J-6A	5	48" RCP	-2.47	C
J-6A	6	24" VCP (E) 24" VCP (W)	-0.14 -0.14	C
J-6A	7	18" VCP (S) 24" VCP (W) 12" VCP (N)	0.84 0.94 1.19	C
J-6A	9	24" RCP	2.00	C
J-6A	10	24" RCP (N) 24" RCP (S)	2.12 2.14	C
J-6A	11	24" RCP (N) 12" RCP (E)	4.33 4.71	C
J-6A	12	36" CMP	1.63	C
J-6A	13	36" CMP	1.56	C
J-6A	13A	24" RCP	4.20	C
J-6A	14	2.4' x 4' BOX (N) 2.4' x 4' BOX (S) 15" VCP (E)	0.70 0.70 -0.12	HFS
J-6A	15		-	CNO
J-6A	16	2.2' x 4' BOX (N) 2.2' x 4' BOX (S) 12" VCP (E)	0.86 0.86 0.04	HFS
J-6A	17	5' x 3' BOX (E) 5' x 3' BOX (W)	-2.33 -2.33	C
J-6A	18		-	PO
J-6A	19	4.5' x 3' BOX (E) 4.5' x 3' BOX (W)	-1.60 -1.60	C
J-6A	20	4.6' x 3' BOX (E) 4.6' x 3' BOX (W)	-1.46 -1.46	C
J-6A	21	4.8' x 3' BOX (E) 4.8' x 3' BOX (W) 18" VCP (S)	-1.55 -1.55 -1.15	C
J-6A	22	5' x 3' BOX (E) 5' x 3' BOX (W) 18" VCP (S)	-1.33 -1.33 -1.04	C
J-6A	23	4.6' x 3' BOX (E) 4.6' x 3' BOX (W) 18" VCP (N)	-0.95 -0.95 0.03	C
J-6A	24	4.8' x 3' BOX (E) 4.8' x 3' BOX (W) 3.8' x 4' BOX (N)	-1.15 -1.15 -1.15	C
J-6A	25	4.3' x 3' BOX (E) 4.3' x 3' BOX (W) 24" VCP (S)	-1.22 -1.22 -0.70	C
J-6A	26		-	CNO
J-6A	27	2.6' x 4' BOX (N) 2.6' x 4' BOX (S)	0.38 0.38	HFS
J-6A	28	24" VCP (N) 24" VCP (S) 12" VCP (W)	0.44 0.54 0.94	C
J-6A	29	42" CMP	-1.57	C
J-6A	30	42" CMP	-1.07	C
J-6A	31	42" CMP	-1.68	C
J-6A	32	42" CMP	-1.34	C
J-6A	33		-	PO
J-6A	34	36" RCP	-1.88	C
J-6A	73	36" RCP (E) 36" RCP (W) 15" RCP (N)	1.25 1.25 2.35	C
J-6A	74	36" RCP (E) 36" RCP (W) 18" RCP (N) 8" VCP (S)	0.35 0.40 1.85 2.80	C
J-6A	75	36" RCP (E) 36" RCP (W)	0.65 0.54	C
J-6A	76	36" RCP (E) 36" RCP (W)	0.62 0.72	C
J-6A	77	24" RCP (N) 30" RCP (S/E) 36" RCP (W)	1.79 1.28 1.24	C
J-6A	78	24" RCP (S) 12" RCP (N)	1.41 1.81	C
J-6A	79	30" RCP (N/W) 30" RCP (E)	1.57 1.95	C
J-6A	80	30" RCP (W)	-	FWT
J-6A	105		-	PO
J-6A	107	24" RCP (N) 15" RCP (E) 18" RCP (S) 18" RCP (W)	1.72 2.60 2.10 2.45	C

INVENTORY

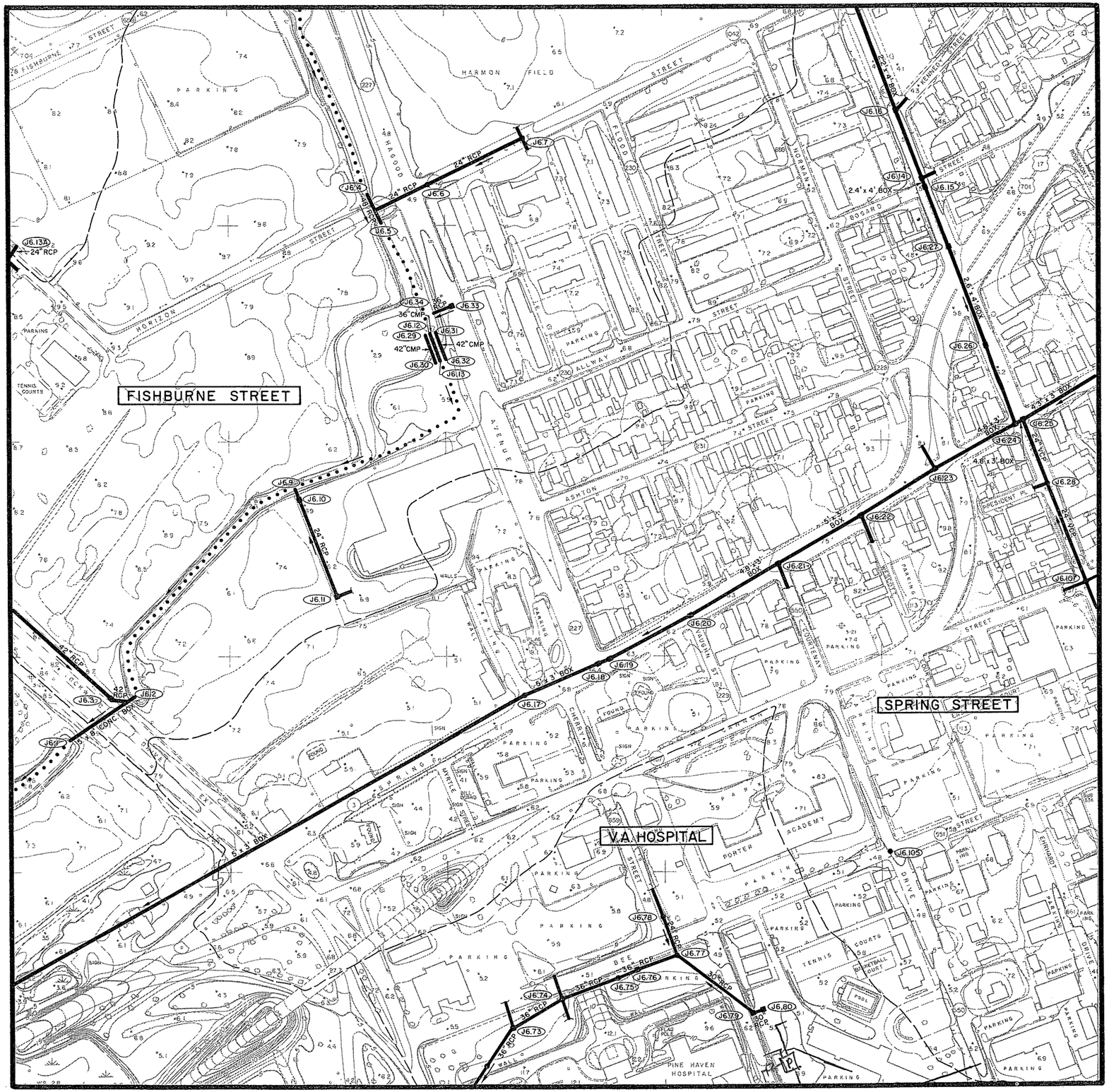
MAP J6a

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

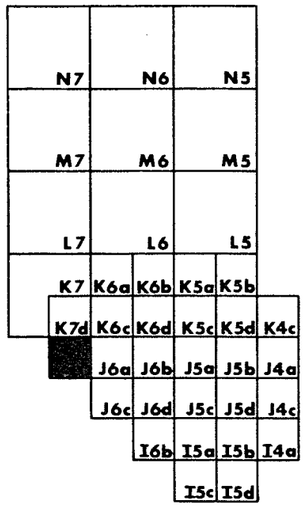
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-7B	1	5' x 8' BOX	-0.68	C
J-7B	2	5' x 8' BOX	-0.53	C
J-7B	3	15" CMP	1.67	C
J-7B	4	15" CMP	2.42	C
J-7B	5	42" RCP (N) 42" RCP (S) 24" CMP (E)	1.43 1.40 2.43	C
J-7B	6	24" CMP (W)	3.34	C
J-7B	7	30" RCP (N/E) 18" RCP (E) 24" CMP (S/E) 42" RCP (S)	1.61 5.21 2.22 1.57	C
J-7B	8	24" CMP (W)	3.79	C
J-7B	9	30" RCP (S) 24" RCP (E) 18" RCP (N)	3.76 4.42 5.80	C
J-7B	10	24" RCP (W) 24" RCP (E)	4.46 4.55	C
J-7B	11	24" RCP (E) 24" RCP (W) 18" RCP (N)	5.16 5.13 5.53	C
J-7B	12	24" RCP (W) 18" RCP (N) 24" RCP (E) 15" RCP (S)	4.25 4.73 4.31 4.75	C
J-7B	14	5' x 3' BOX	2.83	C

INVENTORY

MAP J7b

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

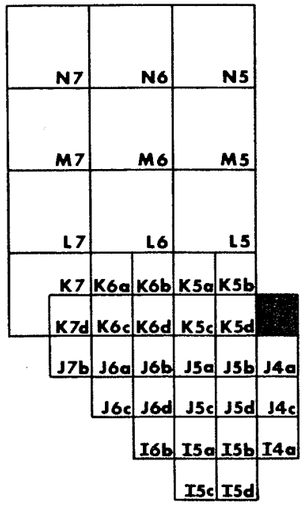
GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-4C	1	12" VCP	-	C

INVENTORY | MAP K4c

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET



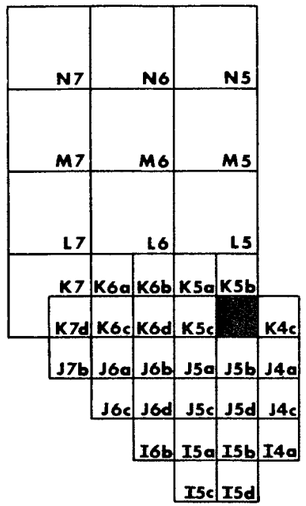
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-5D	1	4.4' x 4.5' BOX (W)	-1.67	C
		24" CMP (S)	-0.56	
		4.8' x 4.5' BOX (E)	-2.42	
K-5D	2	24" CMP (N)	-0.58	C
		18" CMP (S)	-0.57	
K-5D	3	4.2' x 5.0' BOX (W)	-2.81	C
		4.2' x 5.0' BOX (E)	-2.55	
K-5D	5	40" x 65" CMP	-	C
K-5D	6	40" x 65" CMP (E)	0.13	C
		40" x 65" CMP (W)	0.13	
K-5D	7	40" x 65" CMP (E)	1.46	C
		40" x 65" CMP (W)	1.46	
K-5D	8	40" x 65" CMP (E)	1.52	C
		18" CMP (N/W)	1.78	
		18" CMP (S/W)	1.78	
K-5D	9	18" x 29" CMP (E)	1.24	HFS
		18" x 29" CMP (W)	1.24	
K-5D	10		-	FS
K-5D	11		-	CNO
K-5D	12		-	FS
K-5D	13		-	CNO
K-5D	14	18" x 29" CMP (E)	-0.24	FS
		18" x 29" CMP (W)	0.32	
K-5D	15	18" x 29" CMP (E)	0.25	FS
		18" x 29" CMP (N)	0.25	
		18" x 29" CMP (S)	0.25	
K-5D	16	4.4' x 4.5' BOX (E)	0.14	C
		5.0' x 4.0' BOX (W)	0.14	
K-5D	17	5.0' x 4.0' BOX (E)	-1.60	C
		5.0' x 4.0' BOX (W)	-1.60	
		12" VCP (N)	-	
		18" VCP (S)	-	
K-5D	22	24" VCP (N)	0.00	C
		24" VCP (S)	0.62	
		15" VCP (E)	0.02	
K-5D	23	24" VCP (N)	-	FS
		24" VCP (W)	-	
K-5D	54	15" VCP (N)	1.49	C
		12" VCP (S)	2.74	
		15" VCP (E)	1.77	
		12" VCP (W)	1.99	

INVENTORY

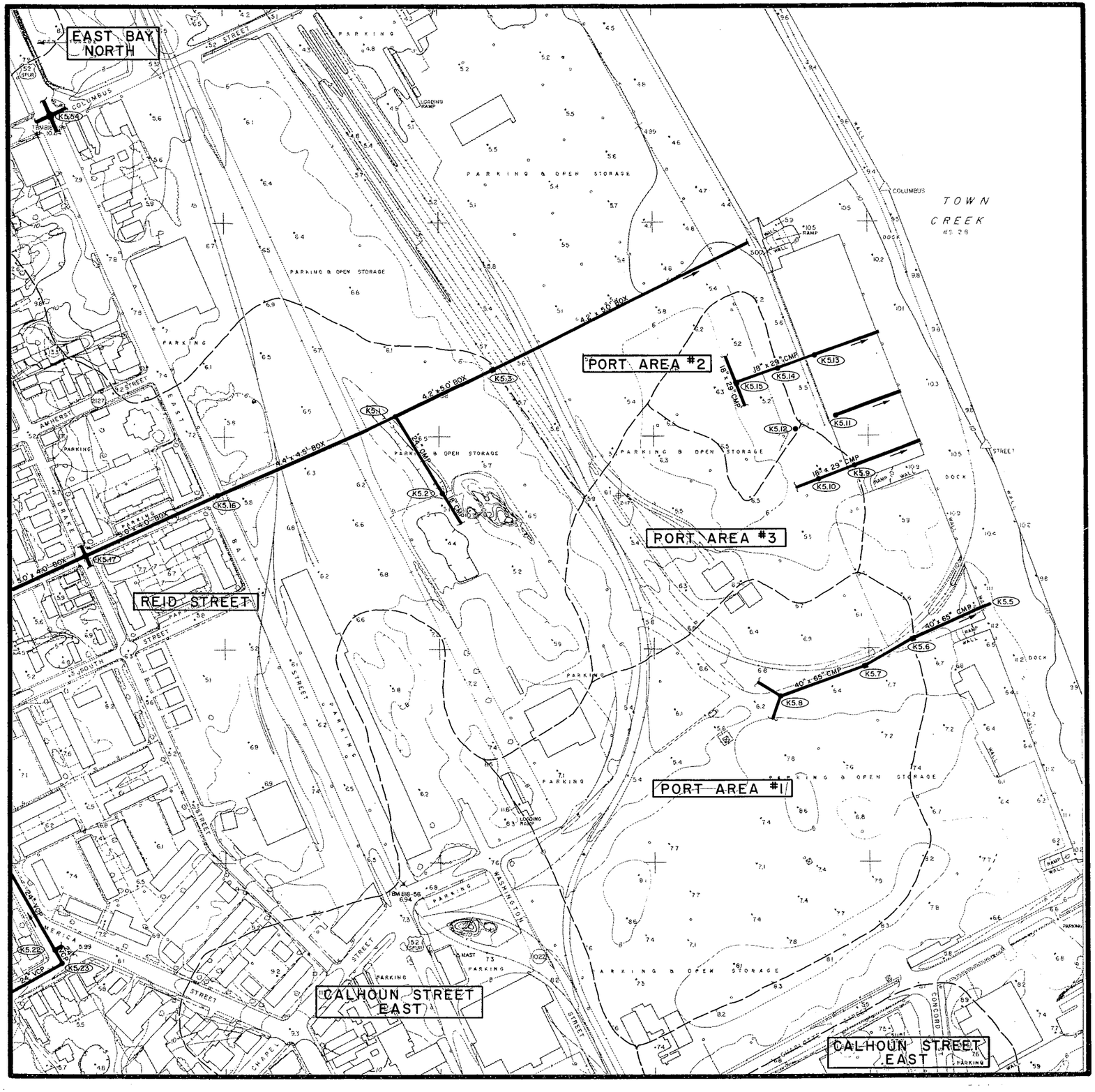
MAP K5d

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-5C	1	36" RCP (E)	4.67	C
		36" RCP (W)	4.67	
		12" RCP (N)	6.94	
K-5C	2	36" RCP (E)	5.00	C
		36" RCP (W)	5.00	
		12" RCP (N)	7.42	
K-5C	2-A	-	-	PO
K-5C	3	24" VCP (N)	1.56	C
		24" VCP (S)	1.56	
		18" VCP (W)	3.68	
		24" VCP (E)	3.80	
K-5C	4	24" RCP (E)	1.94	C
		24" RCP (W)	1.94	
K-5C	6	24" VCP (N)	1.99	C
		24" VCP (S)	2.03	
		18" VCP (W)	2.28	
K-5C	7	24" VCP (N)	1.87	C
		24" VCP (S)	1.87	
K-5C	8	24" VCP (N)	2.58	C
		24" VCP (W)	2.54	
		18" VCP (S)	5.87	
K-5C	18	3.5'x3.5' B.A. (N)	-0.07	C
		24" VCP (S)	-1.64	
		24" VCP (W)	-1.89	
		5.0'x4.0' BOX (E)	-1.99	
K-5C	18-A	3.5' x 3.5' B.A. (N)	-	C
		2.5' x 2.5' B.A. (W)	-	
		2.5' x 2.5' B.A. (E)	-	
		3.5' x 3.5' B.A. (S)	-	
K-5C	18-B	-	-	PO
K-5C	19	-	-	PO
K-5C	20	24" VCP (N)	-0.86	C
		24" VCP (S)	-0.67	
K-5C	21	24" VCP (N)	-0.78	C
		24" VCP (S)	-0.23	
		12" VCP (W)	1.12	
K-5C	24	24" VCP (E)	0.78	C
		24" VCP (W)	0.69	
K-5C	25	24" VCP (E)	0.91	C
		24" VCP (W)	0.91	
K-5C	26		-	PO
K-5C	27	24" VCP (E)	1.19	C
		24" VCP (S)	1.18	
		12" VCP (N)	4.75	

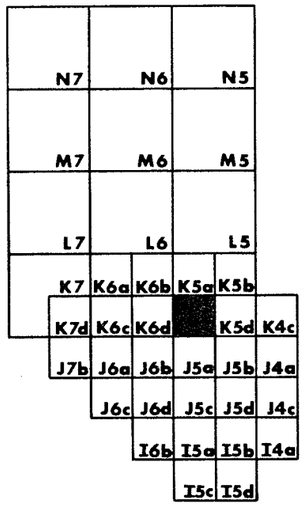
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-5C	28	24" VCP (N)	1.24	C
		24" VCP (S)	1.26	
		18" VCP (W)	1.45	
K-5C	31	24" VCP (E)	0.63	C
		24" VCP (W)	0.59	
K-5C	32	24" VCP (E)	2.94	C
		24" VCP (W)	2.95	
		12" VCP (N)	4.87	
		12" VCP (S)	5.32	
K-5C	33		-	PO
K-5C	34		-	PO
K-5C	35	24" VCP (E)	4.99	C
		24" VCP (W)	4.75	
		12" VCP (N)	-	
		12" VCP (S)	-	
K-5C	36		-	PO
K-5C	37	24" VCP (E)	5.28	C
		3.0'x3.0' B.A. (N)	3.11	C
		3.0'x3.0' B.A. (S)	-	
K-5C	38		-	PO
K-5C	39	2.0'x2.0' B.A. (W)	2.46	C
		3.0'x3.0' B.A. (S)	2.46	
		3.0'x3.0' B.A. (N)	2.46	
K-5C	46		-	PO
K-5C	47	30" VCP (E)	3.17	C
		30" VCP (W)	3.21	
		18" VCP (N)	-	
		18" VCP (S)	-	
K-5C	48	30" VCP (E)	3.17	HFS
		30" VCP (W)	2.89	
		12" VCP (N)	-	
		12" VCP (S)	-	
K-5C	49	24" VCP (E)	3.66	FS
		24" VCP (W)	3.63	
K-5C	50		-	PO
K-5C	51		-	PO
K-5C	52		-	PO
K-5C	53	3.0'x2.5' B.A. (W)	3.74	C
		3.0'x2.5' B.A. (S)	3.84	

INVENTORY

MAP K5c

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

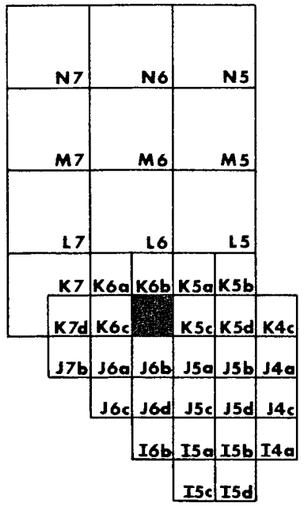
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-6D	1	24" VCP (N)	1.06	C
		24" VCP (W)	0.97	
		18" VCP (S)	1.09	
K-6D	2	24" VCP (E)	1.60	C
		24" VCP (W)	1.40	
		24" VCP (S)	1.49	
K-6D	3	24" VCP (W)	2.19	C
		24" VCP (E)	2.14	
K-6D	4	18" VCP (N)	3.73	C
		18" VCP (S)	3.94	
		18" VCP (E)	3.99	
		24" VCP (W)	2.71	
K-6D	5	24" VCP (E)	2.61	C
		24" VCP (W)	2.56	
		18" VCP (S)	3.49	
K-6D	6	18" VCP (N)	2.86	C
		15" RCP (E)	3.67	
		24" VCP (W)	2.75	
K-6D	7	24" VCP (E)	1.99	HFS
		24" VCP (W)	2.19	
K-6D	8	24" VCP (E)	1.85	HFS
		24" VCP (W)	1.82	
K-6D	9	18" RCP (N)	8.12	HFS
		24" RCP (E)	8.19	
		15" RCP (S)	8.65	
K-6D	10		-	CNO
K-6D	11	24" RCP (E)	7.55	C
		24" RCP (W)	7.30	
		15" VCP (N)	8.55	
		15" VCP (S)	8.60	
K-6D	12	24" RCP (E)	6.94	C
		24" RCP (W)	-	
		15" VCP (N)	8.12	
		15" VCP (S)	8.12	
K-6D	13	24" RCP (E)	7.07	C
		24" RCP (W)	7.17	
K-6D	14	36" RCP (N)	5.28	C
		36" RCP (E)	5.28	
		24" RCP (W)	5.28	
K-6D	15	36" RCP (E)	5.04	C
		36" RCP (W)	5.04	
K-6D	16	36" RCP (N)	5.75	C
		36" RCP (S)	5.75	
K-6D	17	36" RCP (E)	5.40	C
		36" RCP (W)	5.40	
K-6D	18	18" VCP (E)	4.73	C
		15" VCP (W)	7.85	
		24" VCP (S)	4.71	
K-6D	19	24" VCP (N)	4.71	C
		24" VCP (S)	4.71	
K-6D	20	24" VCP (N)	6.79	FWT
		24" VCP (S)	6.79	
		18" VCP (E)	6.79	
K-6D	21	24" VCP (N)	4.43	C
		24" VCP (S)	4.39	
K-6D	22	24" VCP (N)	4.24	C
		24" VCP (E)	4.19	
K-6D	23		-	CNO
K-6D	24		-	PO
K-6D	25		-	CNO
K-6D	26	36" VCP (W)	-	C
		36" VCP (E)	-	
		15" VCP (N)	-	
		15" VCP (S)	-	

INVENTORY

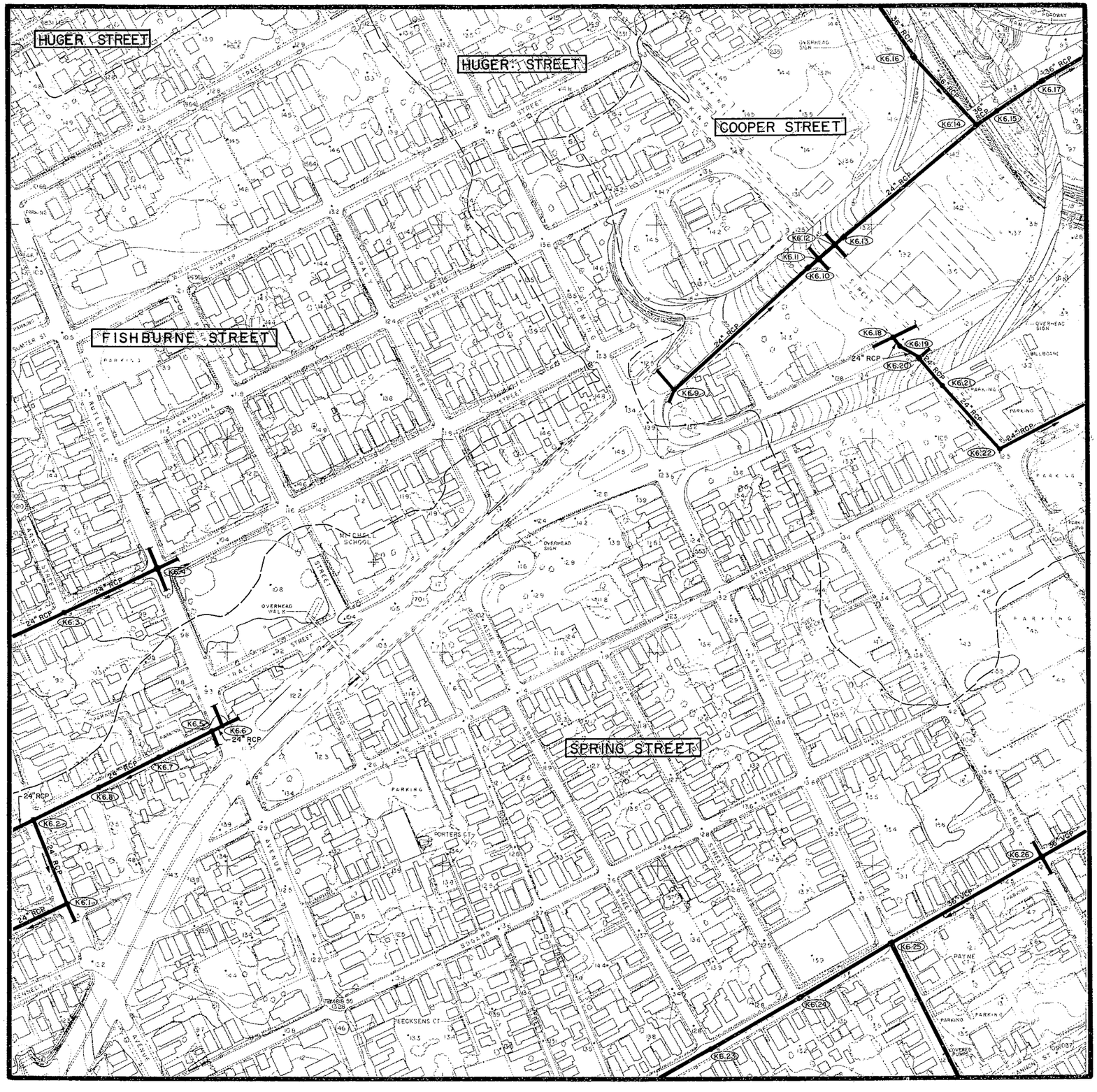
MAP K6d

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N


HUGER STREET
HUGER STREET
COOPER STREET
FISHBURNE STREET
SPRING STREET
K6.1
K6.2
K6.3
K6.4
K6.5
K6.6
K6.7
K6.8
K6.9
K6.10
K6.11
K6.12
K6.13
K6.14
K6.15
K6.16
K6.17
K6.18
K6.19
K6.20
K6.21
K6.22
K6.23
K6.24
K6.25
K6.26
24" RCP
36" RCP
42" RCP
48" VCP
OVERHEAD SIGN
OVERHEAD WALK
PARKING
PORTERS CT.
PEECKSENS CT.
PAYNE CT.
ANSONBOROUGH
ST. PHILIP
ST. MICHAEL
ST. GEORGE
ST. JOHN
ST. PAUL
ST. PETER
ST. MARY
ST. JAMES
ST. LUKE
ST. ANDREW
ST. THOMAS
ST. BARNABAS
ST. MATTHEW
ST. MARK
ST. JOSEPH
ST. LAWRENCE
ST. STEPHEN
ST. TIMOTHY
ST. ALBANS
ST. AUGUSTINE
ST. BARTHOLOMEW
ST. CHRISTOPHER
ST. ANTHONY
ST. ANNE
ST. ANDREWS
ST. PHILIP SCHOOL
ST. MICHAEL SCHOOL
ST. JOHN'S HALL
ST. MARY'S HALL
ST. JAMES HALL
ST. LUKE'S HALL
ST. ANDREW'S HALL
ST. THOMAS HALL
ST. BARNABAS HALL
ST. MATTHEW'S HALL
ST. MARK'S HALL
ST. JOSEPH'S HALL
ST. LAWRENCE HALL
ST. STEPHEN'S HALL
ST. TIMOTHY'S HALL
ST. ALBANS HALL
ST. AUGUSTINE HALL
ST. BARTHOLOMEW'S HALL
ST. CHRISTOPHER'S HALL
ST. ANTHONY'S HALL
ST. ANNE'S HALL
ST. ANDREWS HALL
ST. PHILIP'S HALL
ST. MICHAEL'S HAL

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-6C	1		-	PO
K-6C	2	24" VCP (N)	2.60	C
		24" VCP (S)	2.45	
		15" VCP (E)	2.70	
		15" VCP (W)	4.28	
K-6C	3		-	PO
K-6C	4	24" VCP (N)	3.56	C
		24" VCP (S)	3.56	
		12" VCP (W)	-	
K-6C	5	24" VCP (N)	1.50	C
		24" VCP (S)	1.75	
K-6C	6	24" VCP (N)	1.56	C
		15" VCP (S)	2.03	
		24" VCP (E)	1.71	
		24" VCP (W)	1.61	
K-6C	7	24" VCP (E)	1.54	C
		24" VCP (W)	1.51	
K-6C	8	24" VCP (E)	0.15	C
		24" VCP (W)	0.20	
		24" VCP (S)	1.30	
K-6C	9	24" VCP (N)	1.44	C
		24" VCP (S)	1.36	
K-6C	10	24" VCP (N)	1.22	C
		24" VCP (S)	1.15	
K-6C	11	24" VCP (N)	1.16	HFS
		24" VCP (E)	1.00	
		24" VCP (W)	1.10	
K-6C	12	24" VCP (E)	0.10	FWT
		24" VCP (W)	-0.01	
K-6C	13	24" VCP (E)	0.47	C
		24" VCP (W)	0.59	
K-6C	14	24" VCP (E)	0.36	C
		24" VCP (W)	0.36	
K-6C	15	3.0'x4.0' Box (W)	-0.70	C
		24" VCP (E)	0.38	
		24" VCP (N)	-0.19	
		4.0'x3.5' Box (S)	-0.19	
K-6C	16	24" VCP (N)	1.42	C
		24" VCP (S)	1.42	
K-6C	17	24" VCP (S)	2.76	C
		12" VCP (W)	-	
		18" VCP (N)	-	
		18" VCP (E)	-	
K-6C	18	24" VCP (E)	0.76	C
		24" VCP (W)	0.86	

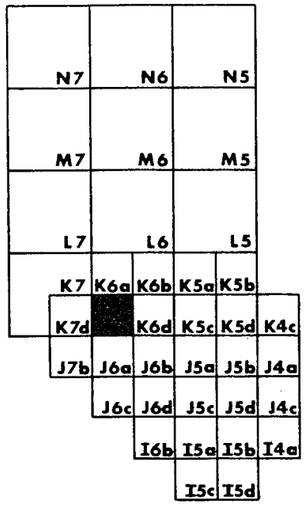
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-6C	19	24" VCP (E)	0.47	HFS
		24" VCP (W)	0.73	
K-6C	20	24" VCP (E)	0.78	HFS
		24" VCP (W)	0.70	
K-6C	21	24" VCP (E)	0.62	C
		24" VCP (W)	0.13	
K-6C	22		-	PO
K-6C	23	24" VCP (E)	0.10	C
		24" VCP (W)	0.12	
		4.0'x3.5' Box (S)	-0.51	
		4.0'x3.5' Box (N)	-0.51	
K-6C	24	24" VCP (E)	0.00	HFS
		24" VCP (W)	-0.09	
K-6C	25	24" VCP (E)	0.03	C
		24" VCP (W)	0.03	
K-6C	26	24" VCP (E)	0.25	C
		24" VCP (W)	0.15	
K-6C	27	24" VCP (E)	0.57	C
		24" VCP (W)	0.50	
K-6C	28	2.0' x 4' BOX (N)	1.96	HFS
		2.0' x 4' BOX (S)	1.96	HFS
		12" RCP (E)	2.11	C
K-6C	29	3.0'x4.0' Box (N)	0.49	C
		3.0'x4.0' Box (S)	0.49	
K-6C	30	2.1' x 4' BOX (E)	0.05	HFS
		2.1' x 4' BOX (W)	0.05	
K-6C	31	2.1' x 4' BOX (E)	-0.25	HFS
		2.1' x 4' BOX (W)	-0.25	
K-6C	32	2.0' x 4' BOX	-	FWT
K-6C	33	24" VCP (S)	1.94	C
K-6C	34	24" VCP (N)	0.79	C
		24" VCP (E)	0.81	
		24" VCP (W)	0.60	
K-6C	34A		-	Could not locate
K-6C	35		-	CNO
K-6C	36	36" RCP (N)	2.83	C
		36" RCP (W)	2.82	
K-6C	37		-	CNO
K-6C	38	36" RCP (N)	3.40	C
		36" RCP (S)	3.39	

INVENTORY

MAP K6c

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

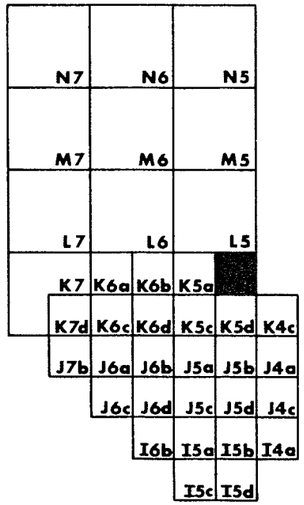
GRAPHIC SCALE 250 0 250 500 750 FEET

INVENTORY

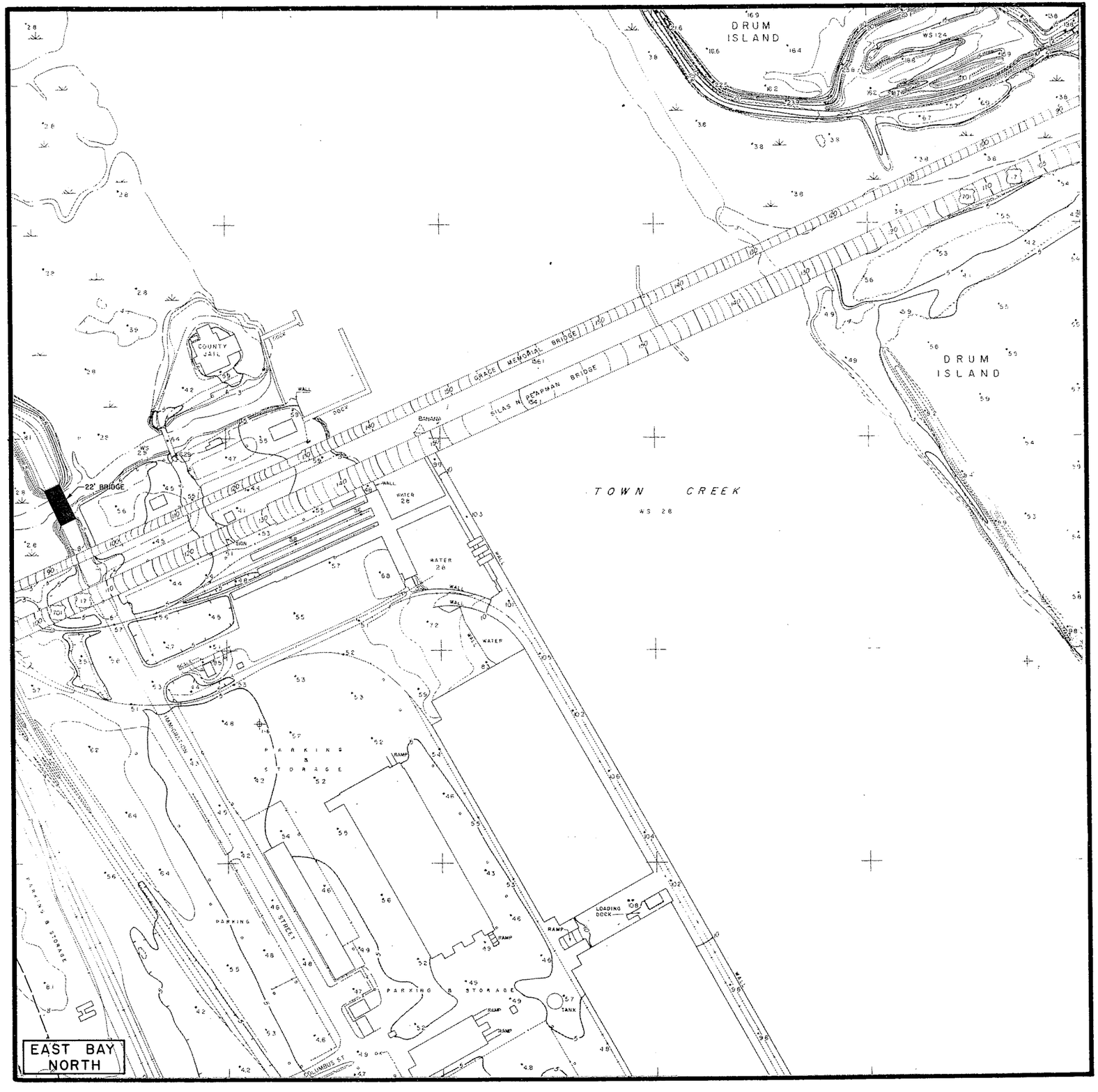
MAP K5b

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-5A	1		-	PO
K-5A	2	18" VCP (N)	3.29	C
		15" VCP (S)	3.29	
		24" VCP (E)	1.09	
		24" VCP (W)	1.07	
K-5A	3	24" VCP (N)	0.69	C
		24" VCP (W)	0.46	
		24" VCP (E)	0.25	
K-5A	4	24" VCP (S)	-	PO
		18" VCP (N)	-	
		12" VCP (W)	-	
K-5A	5	24" VCP (E)	0.01	C
		24" VCP (W)	-0.08	
K-5A	5A	24" RCP (E)	1.71	C
		24" RCP (W)	1.88	
		15" RCP (S/E)	2.45	
K-5A	6	24" VCP (E)	-0.49	C
		24" VCP (W)	-0.55	
K-5A	7	4.0'x3.5' B.A. (E)	-0.65	C
		30" VCP (S)	-1.47	FS
		24" VCP (W)	-0.80	FS
		24" VCP (N)	-0.80	FS
K-5A	8	18" VCP (N)	0.63	C
		24" VCP (S)	0.69	C
		18" VCP (W)	0.63	C
		12" VCP (E)	0.85	FS
K-5A	9	4.0' x 3.5' BOX	3.71	C
K-5A	10	24" RCP	2.09	C
K-5A	11	3.5' x 3.5' BOX (E)	0.21	C
		3.5' x 3.5' BOX (W)	0.21	
		24" RCP (N)	0.21	
K-5A	11A		-	Underground junction
K-5A	12	24" RCP (N)	0.15	C
		24" RCP (S)	0.33	
K-5A	13	24" RCP (N)	0.30	C
		24" RCP (S)	0.03	
K-5A	14	18" RCP (N)	0.90	C
		24" RCP (S)	0.65	
K-5A	15	24" RCP (E)	0.81	C
		24" RCP (N)	0.58	
K-5A	16	24" RCP (W)	0.53	C
		24" RCP (S)	0.54	
K-5A	17	18" RCP (N)	0.90	C
		24" RCP (S)	0.65	
K-5A	18	18" RCP	2.10	C
K-5A	19	18" RCP	2.26	C
K-5A	20	30" RCP	0.28	C
K-5A	21	54" RCP	-1.29	C
K-5A	22	30" RCP (E)	0.28	C
		30" RCP (S)	0.40	
K-5A	22.1	54" RCP (E)	-2.30	C
		24" RCP (W)	0.17	
		54" RCP (S)	-2.42	
K-5A	22.2	24" RCP (E)	0.00	C
		18" RCP (W)	0.17	
		18" RCP (S)	0.14	
K-5A	22.3		-	PO
K-5A	23	30" RCP (N)	0.74	C
		30" RCP (S/W)	0.74	
		18" RCP (S)	0.68	
K-5A	24	30" RCP (N/E)	1.53	C
		30" RCP (S/W)	1.48	
K-5A	25	30" RCP (N/E)	1.30	
		18" RCP (N/W)	2.51	
		18" RCP (W)	2.55	
		24" RCP (S)	1.28	

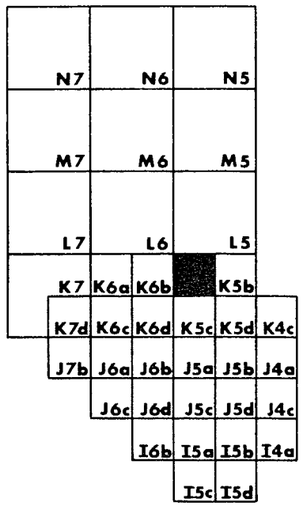
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-5A	26	24" RCP (N)	2.33	C
		24" RCP (S)	2.09	
K-5A	27	24" RCP (N)	3.80	C
		24" RCP (S)	3.80	
K-5A	28	24" RCP (N)	3.87	C
		18" RCP (S)	3.97	
K-5A	29	30" VCP (W)	-0.57	C
		30" VCP (S)	-0.89	
		30" VCP (N)	-0.68	
K-5A	30		-	FS
K-5A	31	30" VCP (E)	-1.64	HFS
		30" VCP (W)	-1.64	
K-5A	32	30" VCP (E)	0.31	C
		30" VCP (W)	0.16	
		15" VCP (N)	0.63	
		18" VCP (S)	0.38	
K-5A	33	30" VCP (E)	0.73	C
		30" VCP (W)	0.69	
		18" VCP (N)	1.32	
		18" VCP (S)	0.79	
K-5A	34	30" VCP (E)	0.92	C
		30" VCP (W)	0.72	
K-5A	35		-	PO
K-5A	36	30" VCP (E)	1.72	C
		24" VCP (W)	1.52	
K-5A	37	24" VCP (E)	1.07	C
		24" VCP (S)	1.12	
		24" VCP (N)	1.22	
		18" VCP (W)	4.03	
K-5A	38	24" VCP (S)	1.70	C
		24" VCP (N)	1.60	
K-5A	39	24" VCP (N)	0.36	C
		18" VCP (E)	-	
		18" VCP (W)	-	
		15" VCP (S)	-	
K-5A	40	24" VCP (N)	-	Pipe full of sand
		24" VCP (S)	-1.11	HFS
		15" VCP (N/E)	2.24	HFS w/tide gate
		30" RCP (W)	-	C
K-5A	41	30" VCP (N)	-0.57	C
		30" VCP (S)	-0.76	
		42" VCP (E)	-0.34	
		42" VCP (W)	-0.22	
K-5A	41A	-	-	PO
K-5A	42	42" VCP (E)	1.54	C
		42" VCP (W)	1.62	
K-5A	43		-	CNO
K-5A	44		-	CNO
K-5A	45		-	CNO
K-5A	46	24" RCP (E)	0.04	C
		24" RCP (W)	0.14	
K-5A	47	24" RCP (E)	0.63	C
		24" RCP (W)	1.25	
K-5A	48		-	CNO
K-5A	49		-	CNO
K-5A	50	30" RCP (E)	0.50	C
		24" RCP (W)	0.93	C
		24" RCP (S)	-	FS
K-5A	51	24" VCP (N)	-0.92	FS
		24" VCP (S)	-0.98	
K-5A	52	18" VCP (W)	-0.20	C
		24" VCP (N)	-0.36	
		18" VCP (S)	-	
		18" VCP (E)	-	

INVENTORY

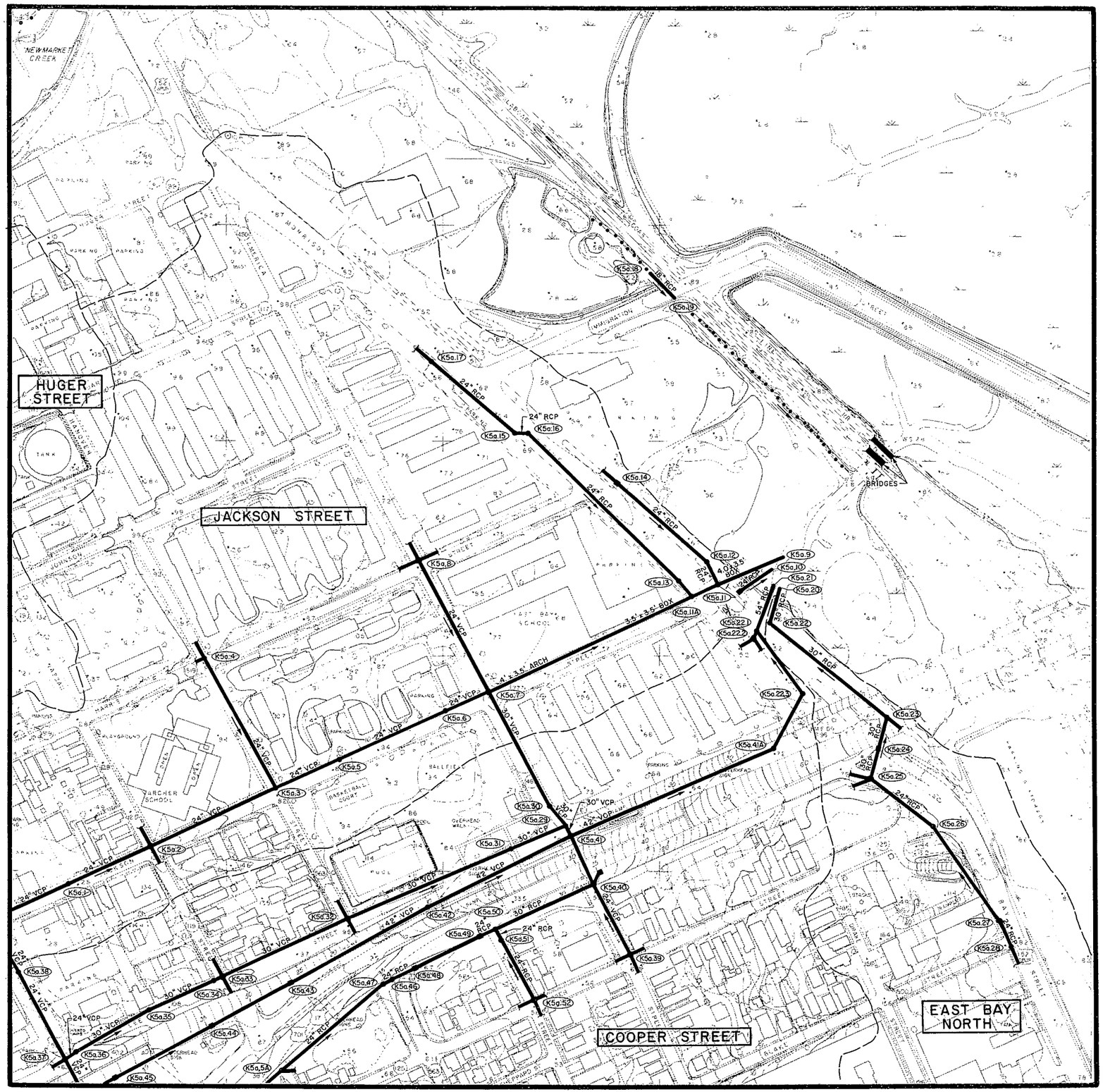
MAP K5a

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA







LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

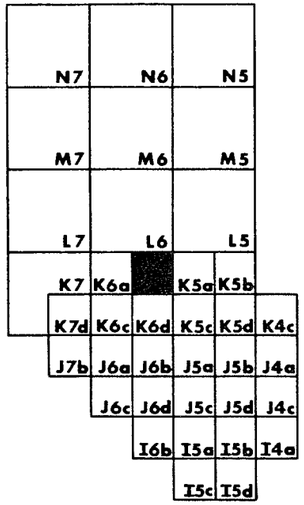
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-6B	1	15" VCP (E) 24" VCP (S) 18" VCP (W)	3.53 3.52 3.73	C
K-6B	2	24" VCP (N) 24" VCP (S)	2.81 2.81	C
K-6B	3	24" VCP (N) 24" VCP (S) 30" VCP (E) 18" VCP (W)	2.24 2.44 1.99 2.31	C
K-6B	4	-	-	PO
K-6B	5	24" VCP (N) 24" VCP (S) 18" VCP (E) 18" VCP (W)	3.04 3.10 - -	C
K-6B	6		-	PO
K-6B	7		-	PO
K-6B	8	30" VCP (E) 30" VCP (W)	1.50 1.46	C
K-6B	9	30" VCP (E) 30" VCP (W) 24" VCP (S)	0.77 0.77 1.67	C
K-6B	10	24" VCP (N) 24" VCP (S)	1.95 2.33	C
K-6B	11	24" VCP	3.12	C
K-6B	12		-	PO
K-6B	13	30" VCP (E) 30" VCP (W)	0.79 0.79	C
K-6B	14	30" VCP (N) 18" VCP (E) 24" VCP (S) 30" VCP (W)	0.43 0.38 0.43 0.63	C
K-6B	15	24" VCP (N) 24" VCP (S) 18" VCP (E) 18" VCP (W)	1.31 1.16 - -	C
K-6B	16	24" VCP (N) 24" VCP (S)	2.01 1.97	C
K-6B	17	24" VCP (N) 24" VCP (S) 18" VCP (E)	2.27 2.24 -	C
K-6B	18	24" VCP (N) 24" VCP (S) 18" RCP (W)	2.68 2.73 2.68	C
K-6B	19	24" VCP (N) 24" VCP (S) 18" VCP (E)	3.03 3.16 3.27	C
K-6B	20	24" VCP (N) 24" VCP (S)	2.80 2.65	C
K-6B	21	24" VCP (N) 24" VCP (S) 24" VCP (E)	2.05 2.05 2.05	C
K-6B	22	2.4' x 10' B.A.	0.89	HFS
K-6B	23	60" CMP (S) 60" CMP (N)	-1.47 -2.18	C
K-6B	25	24" CMP	-0.68	C
K-6B	26	30" VCP (N) 30" VCP (E)	-1.27 -1.27	FWT
K-6B	27	24" RCP	2.38	C
K-6B	28	24" RCP	2.30	C
K-6B	29	24" RCP (E) 30" RCP (W)	7.49 7.52	C
K-6B	30	24" RCP (E) 24" RCP (W)	7.72 7.72	C
K-6B	31	24" RCP (E) 24" RCP (W)	7.86 7.86	C
K-6B	32	24" RCP (W)	8.05	C
K-6B	33		-	CNO
K-6B	34	30" RCP (N) 36" RCP (S)	6.86 7.02	C
K-6B	35	36" RCP (N) 36" RCP (S) 15" RCP (E)	5.95 6.46 8.26	C

INVENTORY

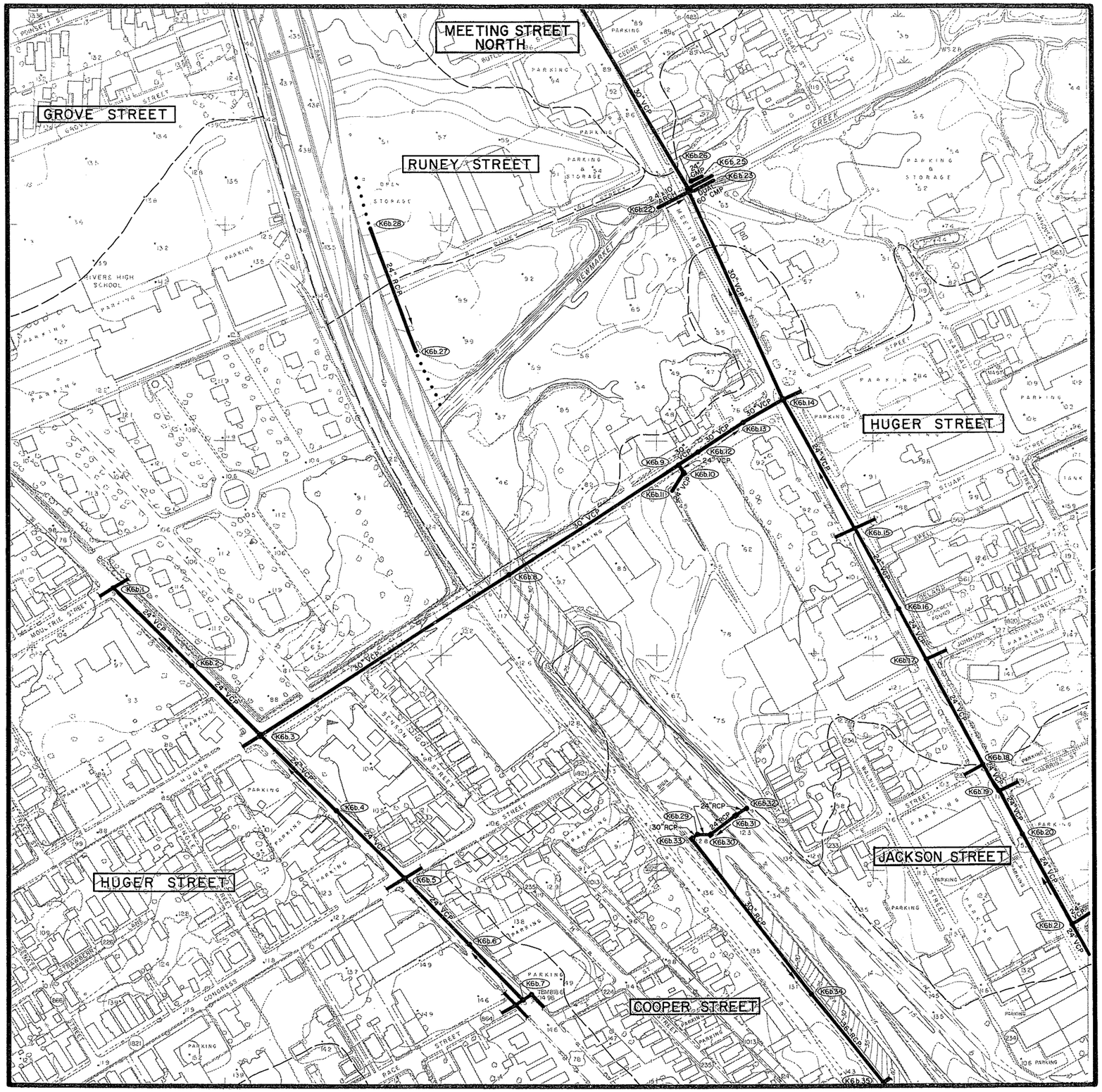
MAP K6b

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE

250 0 250 500 750

FEET

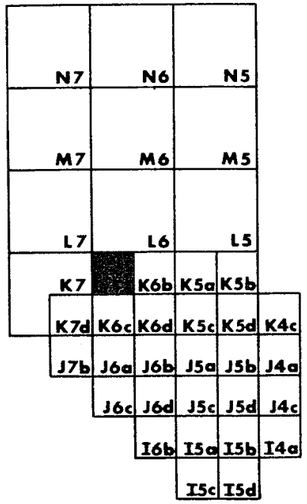
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-6A	1	30" VCP (E)	0.90	C
		30" VCP (W)	0.90	
		24" VCP (N)	0.93	
		18" VCP (S)	-	
K-6A	2	24" VCP (E)	1.41	C
		30" VCP (W)	1.37	
		15" VCP (S)	-	
K-6A	3	24" VCP (E)	1.87	C
		24" VCP (W)	1.94	
K-6A	4		-	PO
K-6A	5	24" VCP (N)	2.08	C
		24" VCP (W)	2.07	
K-6A	6	24" VCP (N)	2.65	C
		24" VCP (S)	2.61	
K-6A	7	24" VCP (N)	2.47	C
		24" VCP (S)	2.46	
K-6A	8	18" VCP (N)	3.99	C
		18" VCP (S)	3.99	

INVENTORY

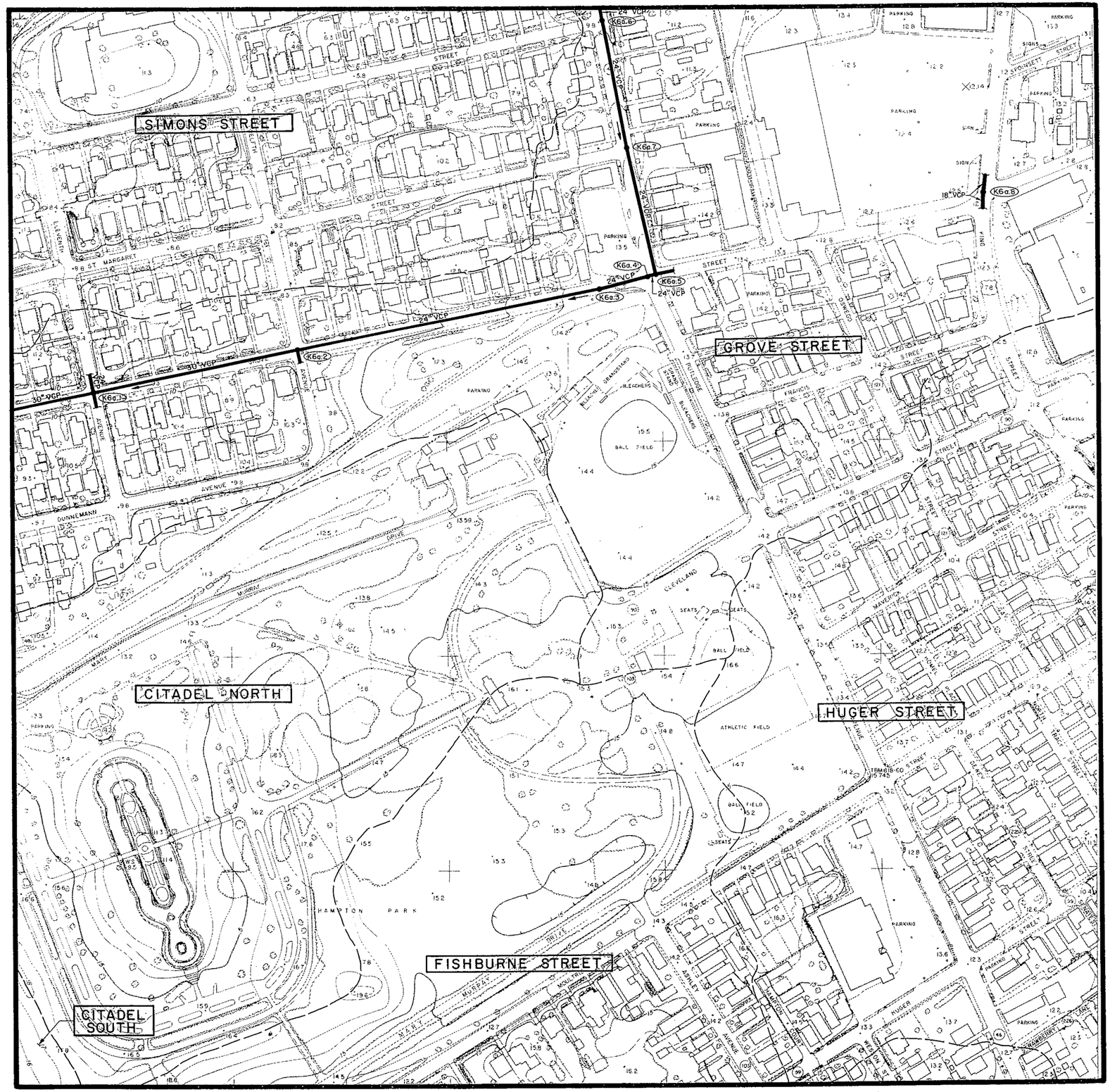
MAP K6a

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

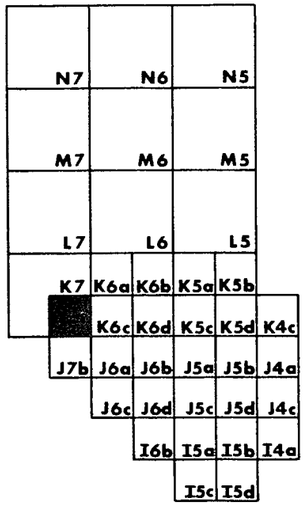
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-7D	1	36" RCP	2.07	C
K-7D	2	36" RCP (N) 36" RCP (S)	3.44 3.43	C
K-7D	3	36" RCP (N) 36" RCP (S)	3.60 3.60	C
K-7D	4	30" RCP (N) 36" RCP (S)	3.57 3.56	C
K-7D	5	30" RCP (E) 30" RCP (S)	3.83 3.83	C
K-7D	6	24" RCP (N) 30" RCP (W)	4.35 4.35	C
K-7D	7	24" RCP (N) 24" RCP (S/W)	5.18 5.18	C
K-7D	8	24" RCP (N/E) 24" RCP (S)	7.02 6.37	C
K-7D	9	24" RCP (N) 24" RCP (S)	7.21 7.18	C
K-7D	10	24" RCP (N) 24" RCP (S)	7.25 7.25	C
K-7D	11	24" RCP (S)	7.96	C

INVENTORY

MAP K7d

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 250 0 250 500 750 FEET

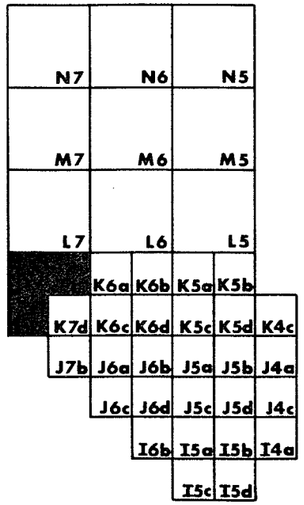
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-7	1	3.0' x 3.5' Box	-2.28	C
K-7	2	3.5'x3.0' Box (E)	-1.75	C
		3.5'x3.0' Box (W)	-1.77	
		12" VCP (N)	-	
		12" VCP (S)	-	
K-7	3			PO
K-7	4	3.5'x3.0' Box (E)	-1.33	C
		3.5'x3.0' Box (W)	-1.27	
K-7	5	15" RCP	2.05	C
K-7	6			PO
K-7	7	3.5'x3.0' Box (E)	-0.93	C
		3.5'x3.0' Box (W)	-0.93	
		24" VCP (N)	-0.53	
		24" VCP (S)	-0.92	
K-7	8	24" VCP (N)	-0.68	C
		18" VCP (E)		
K-7	9	18" RCP (N)	-0.36	C
		24" RCP (S)	-0.36	
		12" RCP (E)	0.21	
		12" RCP (W)	-0.28	
K-7	10	2.5'x3.5' Box (E)	-0.19	C
		3.0'x3.6' Box (W)	-0.19	
K-7	11	24" RCP (E)	1.27	C
		24" RCP (W)	1.24	
K-7	12			PO
K-7	13	15" VCP (E)	0.21	C
		15" VCP (W)	0.19	
		15" VCP (N)	-	
		15" VCP (S)	-	
K-7	14			PO
K-7	15	3.5'x3.0' Box (E)	0.10	C
		3.5'x3.0' Box (W)	0.10	
		12" VCP (N)	-	
		12" VCP (S)	-	
K-7	16			PO
K-7	17	3.5'x3.0' Box (E)	0.39	C
		3.5'x3.0' Box (W)	0.23	
		12" VCP (N)	-	
		12" VCP (S)	-	
K-7	19	Dual 30" RCP	0.20	C
K-7	20	Dual 30" RCP	0.22	C
K-7	22	15" RCP	1.01	C
K-7	22A	-	-	Outfall Underwater
K-7	23	18" RCP (E)	9.27	C
		24" RCP (W)	8.87	
K-7	24	24" RCP (E)	8.47	C
		24" RCP (W)	8.37	
K-7	25	24" RCP (E)	8.26	C
		24" RCP (W)	8.14	
K-7	26	24" RCP (E)	7.63	C
		24" RCP (W)	7.52	
K-7	27	24" RCP (E)	6.90	C
		24" RCP (W)	6.86	
K-7	28	24" RCP (E)	5.59	C
		24" RCP (W)	5.54	
K-7	29	24" RCP (E)	4.82	C
		24" RCP (W)	4.73	
K-7	30	24" RCP (E)	3.97	C
		24" RCP (W)	3.96	
K-7	31	24" RCP	2.77	C
K-7	32	24" RCP (N)	1.32	C
		24" RCP (S)	0.32	
K-7	33	24" RCP (N)	-0.32	C
		24" CMP (S)	-0.32	Tide Gate on Pipe
K-7	34	24" CMP	-0.92	C
K-7	35	24" RCP (N)	-0.49	C
K-7	36	24" RCP (N/W)	-0.21	C
		24" RCP (S)	-0.46	
K-7	37	24" RCP (N)	0.29	C
		24" VCP (S)	-	
K-7	38	24" VCP (N)	0.20	C
		24" VCP (S/W)	0.24	
K-7	39	24" VCP (N)	-0.09	C
		24" VCP (S)	-0.35	
K-7	40	24" VCP (N/W)	0.67	C
		24" VCP (S)	0.77	

INVENTORY

MAP K7

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

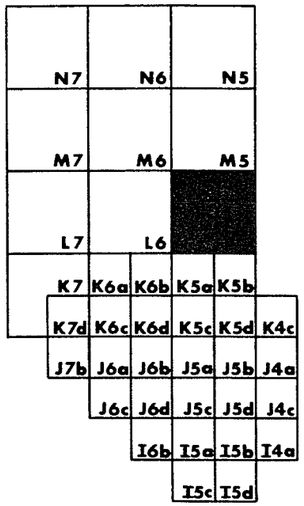
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-5	1	Dual 6.0'x10' Box	-1.14	C
L-5	3	Dual 6.0'x10' Box	0.11	C
L-5	49	30" RCP	-	Could not locate end
L-5	55	24" RCP	1.52	C

INVENTORY

MAP L5

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-6	1	18" RCP	2.50	C
L-6	2	18" RCP	2.74	C
L-6	3	18" VCP (N) 24" VCP (S) 15" VCP (E) 15" VCP (W)	3.06 3.21 3.11 3.06	C
L-6	4	18" VCP (N) 24" VCP (S) 12" VCP (E) 15" VCP (W)	3.59 3.72 3.89 3.57	C
L-6	5	24" VCP (N) 24" VCP (S)	3.38 3.45	HFS
L-6	6			PO
L-6	7	24" VCP (N) 24" VCP (S) 18" VCP (W)	3.26 3.26 3.40	C
L-6	8	24" VCP (N) 24" VCP (S)	2.99 3.09	C
L-6	9			PO
L-6	10			PO
L-6	11			PO
L-6	12			PO
L-6	13			PO
L-6	14	24" VCP (N) 24" VCP (S) 18" VCP (W) 18" VCP (E)	2.44 2.25 2.38 2.59	C
L-6	15			PO
L-6	16			PO
L-6	17			PO
L-6	17A			PO
L-6	18	24" RCP (N)	8.70	C
L-6	19	30" RCP (N) 24" RCP (S) 12" RCP (E) 24" RCP (W)	8.65 8.99 9.71 8.88	HFS
L-6	20	12" RCP (N) 18" RCP (S) 24" RCP (E) 12" VCP (W)	11.30 9.18 9.34 9.18	C
L-6	21	30" RCP (N) 30" RCP (S)	8.68 8.60	C
L-6	22	36" RCP (N) 30" RCP (S) 15" RCP (E) 15" RCP (W)	7.97 8.37 8.52 8.36	C
L-6	23	36" RCP (E) 36" RCP (W)	8.40 8.42	C
L-6	24	36" RCP (N) 36" RCP (E) 12" RCP (S/W)	8.33 8.19 10.30	C
L-6	25	24" RCP (S) 24" RCP (N/E) 12" RCP (W)	9.09 9.21 9.44	C

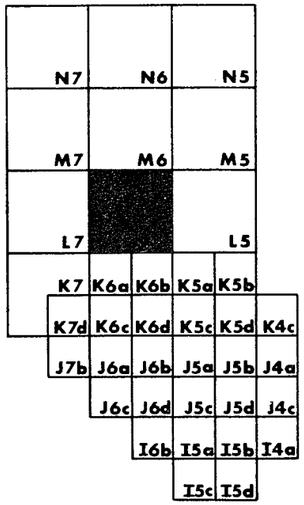
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-6	26			CNO
L-6	27	24" RCP	9.67	C
L-6	28	36" RCP (N) 36" RCP (S) 24" RCP (E)	7.54 7.58 8.00	C
L-6	29	24" RCP (W) 15" RCP (S)	8.25 8.69	C Outfall not located
L-6	30	36" RCP (N) 36" RCP (S)	6.89 7.09	C
L-6	31	36" RCP (N) 36" RCP (S) 18" RCP (E)	5.03 5.03	C
L-6	31A			CNO
L-6	32	6.3' x 4' B.A.	-3.15	C with slide gate
L-6	33	6.3' x 4' B.A.	-1.90	C
L-6	34	5' x 4' B.A.	-1.32	C
L-6	35	5' x 4' B.A.	-1.34	C
L-6	36	24" RCP	2.80	C
L-6	37	24" RCP (N) 24" RCP (S)	2.26 2.26	C
L-6	38	24" RCP (N) 24" RCP (S)	1.16 1.16	C
L-6	39	24" RCP	2.10	HFS
L-6	40	24" RCP	3.23	C
L-6	41	24" RCP	4.37	C
L-6	42	36" RCP	0.22	C
L-6	43	36" RCP (E) 36" RCP (W)	0.27 0.27	C
L-6	44	36" RCP (E) 36" RCP (W)	0.62 0.62	C
L-6	45	36" RCP	0.45	C
L-6	46	36" RCP	2.22	C
L-6	47	30" RCP	0.87	C
L-6	48	36" RCP	0.62	C
L-6	50	36" RCP	-	C
L-6	51	36" RCP	0.72	C
L-6	52	24" RCP	0.20	C
L-6	53	24" RCP	1.88	C
L-6	54	24" RCP	2.42	C
L-6	56	24" RCP	-	C
L-6	57	24" RCP (E) 24" RCP (W)	2.04 2.04	C
L-6	58	24" RCP	2.24	C
L-6	59	18" RCP (N) 24" RCP (E) 15" RCP (W)	4.67 4.71 4.71	C
L-6	60	24" RCP	3.22	FWT

INVENTORY

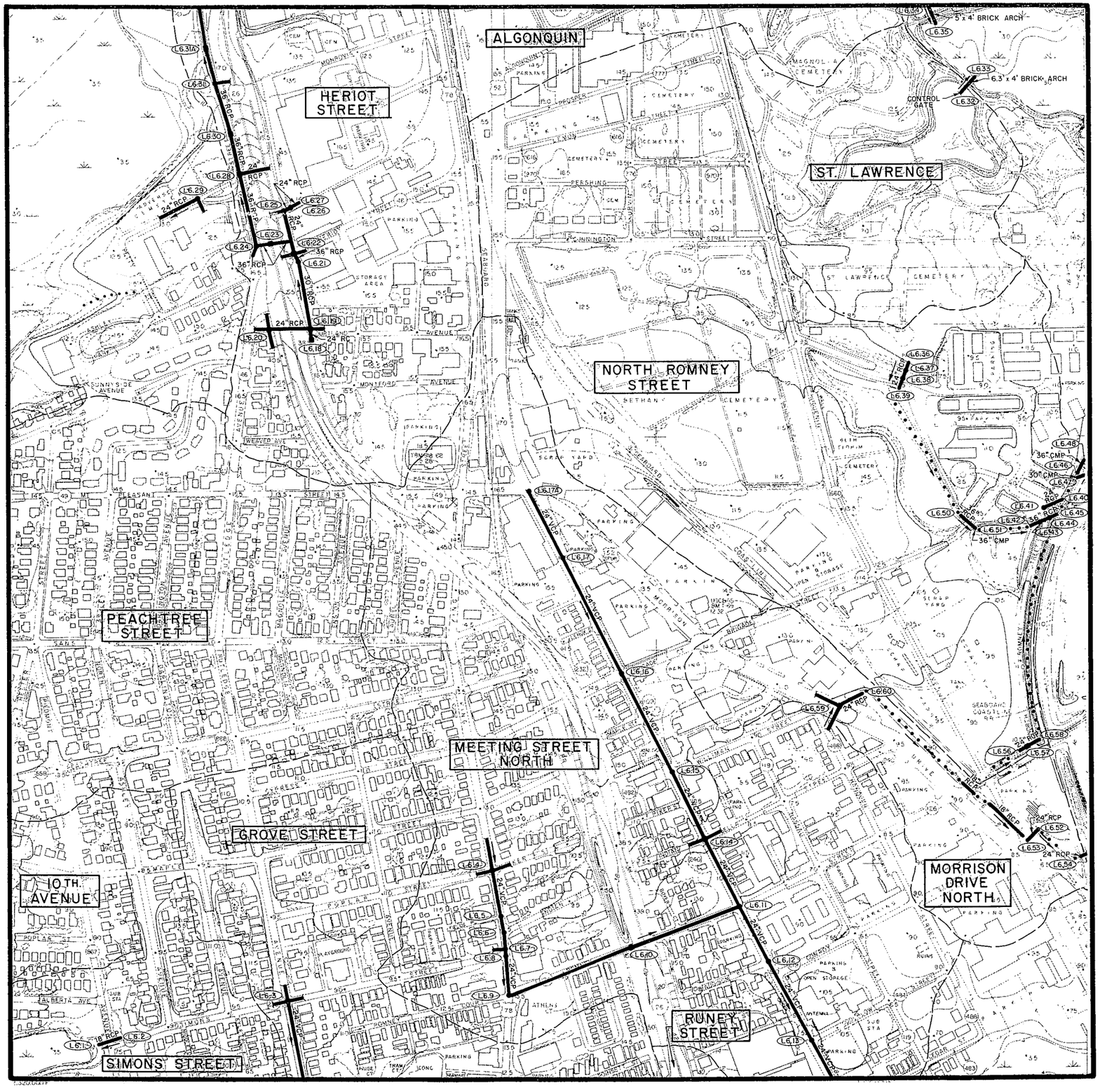
MAP L6

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

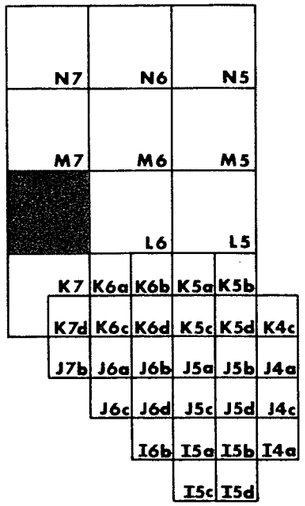
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-7	1	15" VCP	-0.76	Hole in manhole wall, discharge into marsh
L-7	2		-	FWT
L-7	3		-	FWT
L-7	4		-	FWT
L-7	5		-	FWT
L-7	6	24" RCP	-	FWT

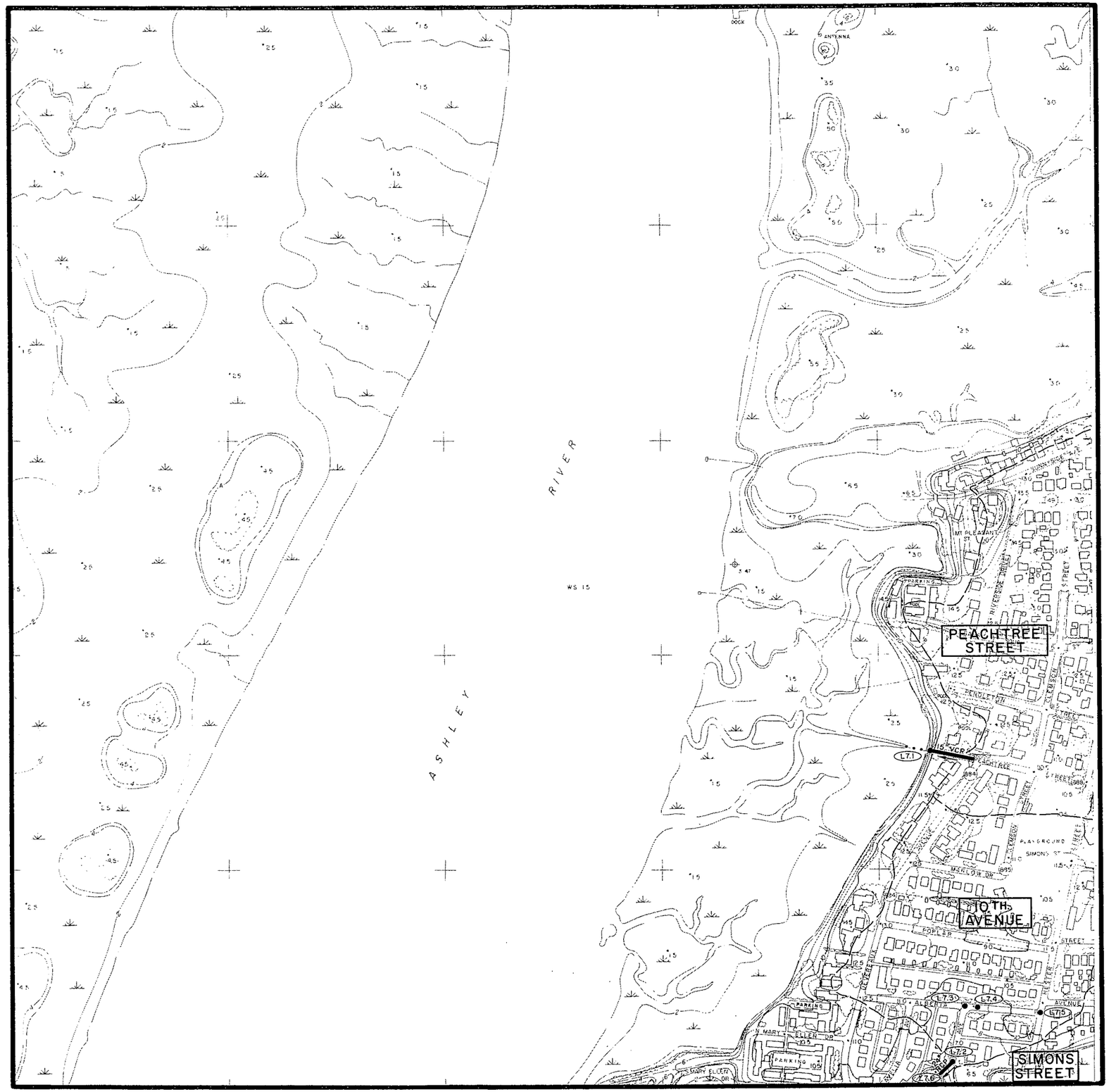
INVENTORY | MAP L7

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

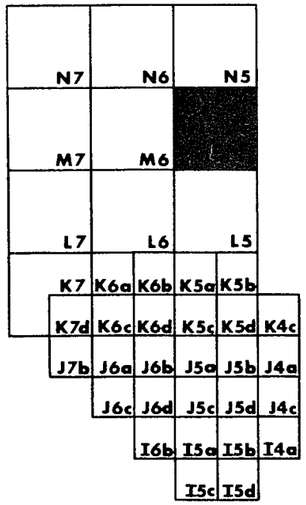
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-5	1	36" CMP	1.25	C
M-5	2	24" RCP	2.08	C
M-5	3	24" CMP	2.66	C
M-5	4	24" CMP (N) 12" PVC (S)	3.42 3.98	C
M-5	5	18" RCP	2.21	C
M-5	6	24" RCP	3.27	C
M-5	7	24" RCP	2.91	C
M-5	8	48" RCP	1.78	C
M-5	9			CNO
M-5	10			CNO
M-5	11	133' Bridge	-1.78 8.49	Bottom Channel Top of Bridge

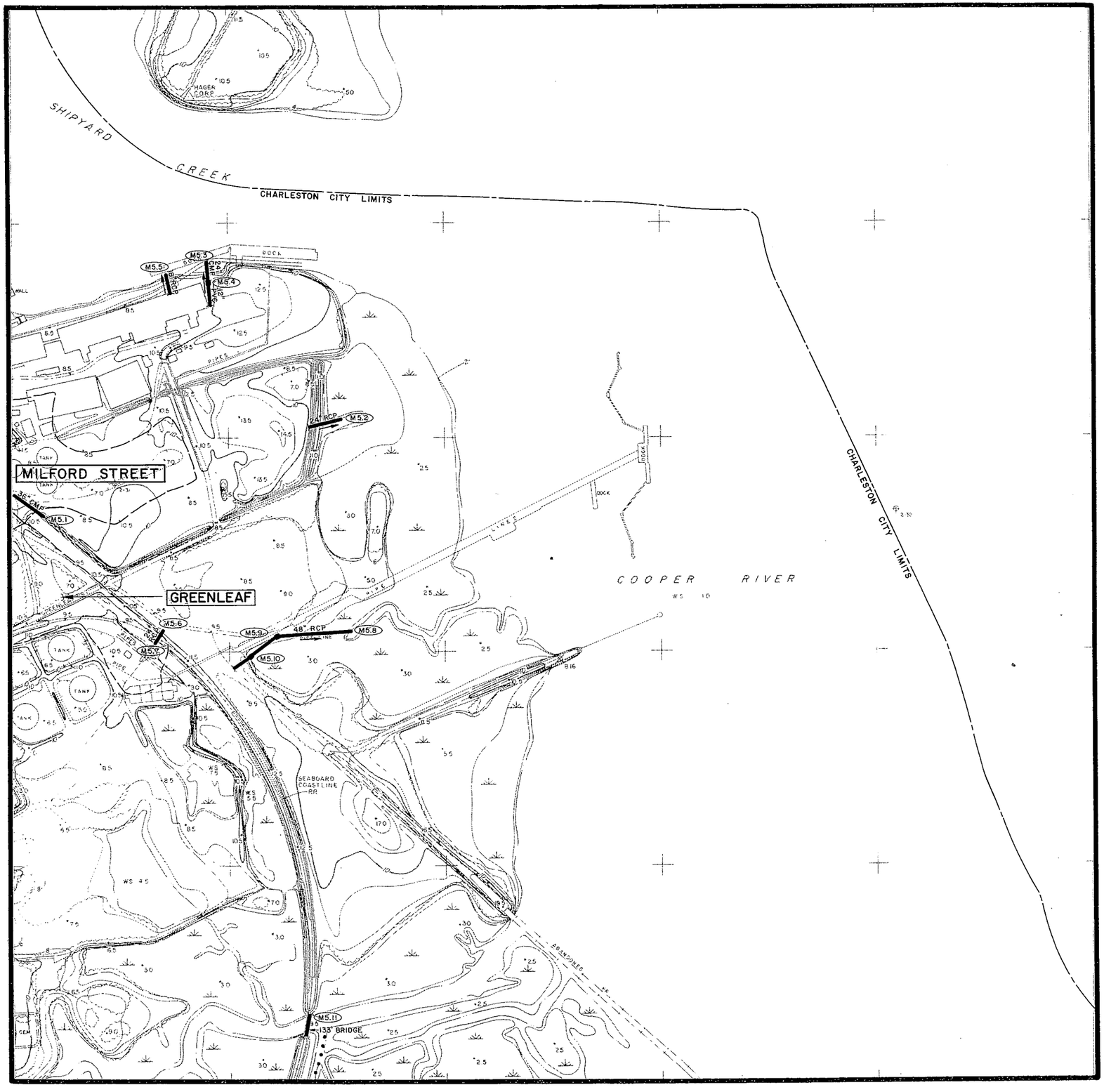
INVENTORY | MAP M5

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

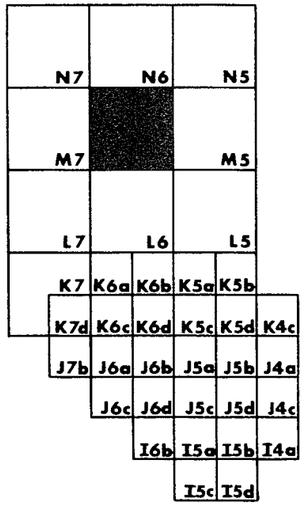
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-6	1	18" RCP	4.36	C
M-6	2	36" RCP	2.67	C
M-6	3	24" RCP	5.03	C
M-6	4	24" RCP	6.34	C
M-6	5	36" RCP	3.28	C
M-6	6	36" RCP	4.07	C
M-6	7	15" RCP (N) 36" RCP (S) 36" RCP (E) 36" RCP (W)	6.61 4.32 4.16 4.48	C
M-6	8	36" RCP	4.53	C
M-6	9	36" RCP	4.72	C
M-6	10	36" RCP	4.83	C
M-6	11	36" RCP	5.07	C
M-6	12	36" RCP (E) 36" RCP (W) 18" RCP (S)	4.95 4.92 4.88	C
M-6	13	24" RCP (N) 3' x3' BOX (E) 24" RCP (S) 36" RCP (W)	7.69 5.50 7.67 5.49	C
M-6	14	24" RCP	7.79	C
M-6	15	24" RCP	7.74	C
M-6	16	3'x 3' BOX (W) 36" RCP (E) 24" RCP (N) 24" RCP (S)	6.00 5.85 9.57 9.91	FS HFS C C
M-6	17	24" RCP	9.98	C
M-6	18	24" RCP	10.12	C
M-6	19	36" RCP	7.28	HFS
M-6	20	24" RCP	7.12	C
M-6	21	24" RCP (W) 18" RCP (N) 18" RCP (S) 24" RCP (S/E)	8.05 8.37 8.52 7.95	C
M-6	22	24" RCP (N/W) 18" RCP (N) 15" RCP (S)	8.26 8.65 9.02	C
M-6	23	36" RCP (N) 36" RCP (S)	5.51 5.47	C
M-6	24	36" RCP (N) 36" RCP (S)	6.26 6.23	C
M-6	25	36" RCP (N) 36" RCP (S) 24" RCP (W)	7.49 7.62 7.44	C
M-6	26	24" RCP	7.86	C
M-6	27	36" RCP (N) 18" RCP (S) 24" RCP (W)	7.58 7.82 7.54	C
M-6	28	24" RCP (E) 24" RCP (W)	8.51 8.76	C
M-6	29	24" RCP	9.85	C
M-6	30	24" RCP	13.56	C
M-6	31	24" RCP	13.30	C
M-6	32	24" RCP	13.14	C
M-6	33	24" RCP	12.77	C
M-6	34	36" RCP	11.07	C
M-6	35	36" RCP	11.00	C
M-6	36	24" RCP	10.90	C
M-6	37	48" STEEL PIPE	10.80	C
M-6	38	24" RCP	7.37	FS
M-6	39	24" RCP	7.69	FS
M-6	40	24" RCP	7.45	FS
M-6	41	24" RCP	7.16	FS
M-6	42	30" RCP	6.80	FS
M-6	43	30" RCP	6.43	FS
M-6	44	24" RCP	5.83	HFS
M-6	45	24" RCP	5.73	HFS
M-6	46	24" RCP	5.57	HFS
M-6	47	24" RCP	5.35	HFS
M-6	48	24" RCP	5.24	HFS
M-6	49	24" RCP	5.11	HFS
M-6	56	36" RCP	2.72	HFS
M-6	57	36" RCP	2.34	HFS
M-6	58	4' x 4.5' BOX	2.87	C
M-6	59	4' x 4.5' BOX	2.99	C
M-6	60	36" RCP	3.11	C
M-6	61	36" RCP (S/W) 12" RCP (N/E) 15" VCP (E) 18" RCP (S)	4.62 5.04 5.12 5.46	C
M-6	62	24" RCP	11.38	HFS
M-6	63	24" RCP	11.34	HFS
M-6	64	24" RCP (E) 18" RCP (W)	6.57 6.34	C
M-6	65	24" RCP (E) 24" RCP (W)	7.45 7.48	C
M-6	66	24" RCP (E) 24" RCP (W)	7.19 7.22	C
M-6	67	24" RCP (W) 24" RCP (S)	8.99 8.97	C
M-6	68	24" RCP	6.12	C
M-6	69	48" RCP	2.08	C
M-6	70	48" RCP	2.80	C
M-6	71	24" RCP	3.89	C
M-6	72	24" RCP	2.32	C
M-6	73	24" RCP	8.16	C
M-6	74	24" RCP	9.59	C
M-6	75	24" RCP	9.15	C
M-6	76	24" RCP	9.28	C
M-6	77			CNO
M-6	78	24" RCP (N) 24" RCP (S)	8.79 8.91	C
M-6	79	24" RCP	9.71	C
M-6	80	24" RCP	9.83	C
M-6	81	24" RCP	9.64	C
M-6	82	24" RCP (N) 24" RCP (S)	8.26 8.33	C
M-6	83	24" RCP	7.68	C
M-6	84	24" RCP	7.10	C
M-6	85	24" RCP	5.99	C
M-6	86	24" RCP	2.11	C
M-6	87	24" CMP	7.43	FS
M-6	88	24" CMP (N/E) 18" CMP (N/W) 36" CMP (S)	2.15 2.23 1.86	C
M-6	89	36" CMP (N) 36" CMP (S)	1.71 1.71	C
M-6	90	30" CMP	2.48	C
M-6	91			CNO
M-6	92	24" RCP (N) 24" RCP (S)	7.11 6.77	C
M-6	93	24" RCP (N) 24" RCP (S)	8.04 7.71	C
M-6	94	18" RCP (N) 18" RCP (S)	7.52 7.59	C

INVENTORY

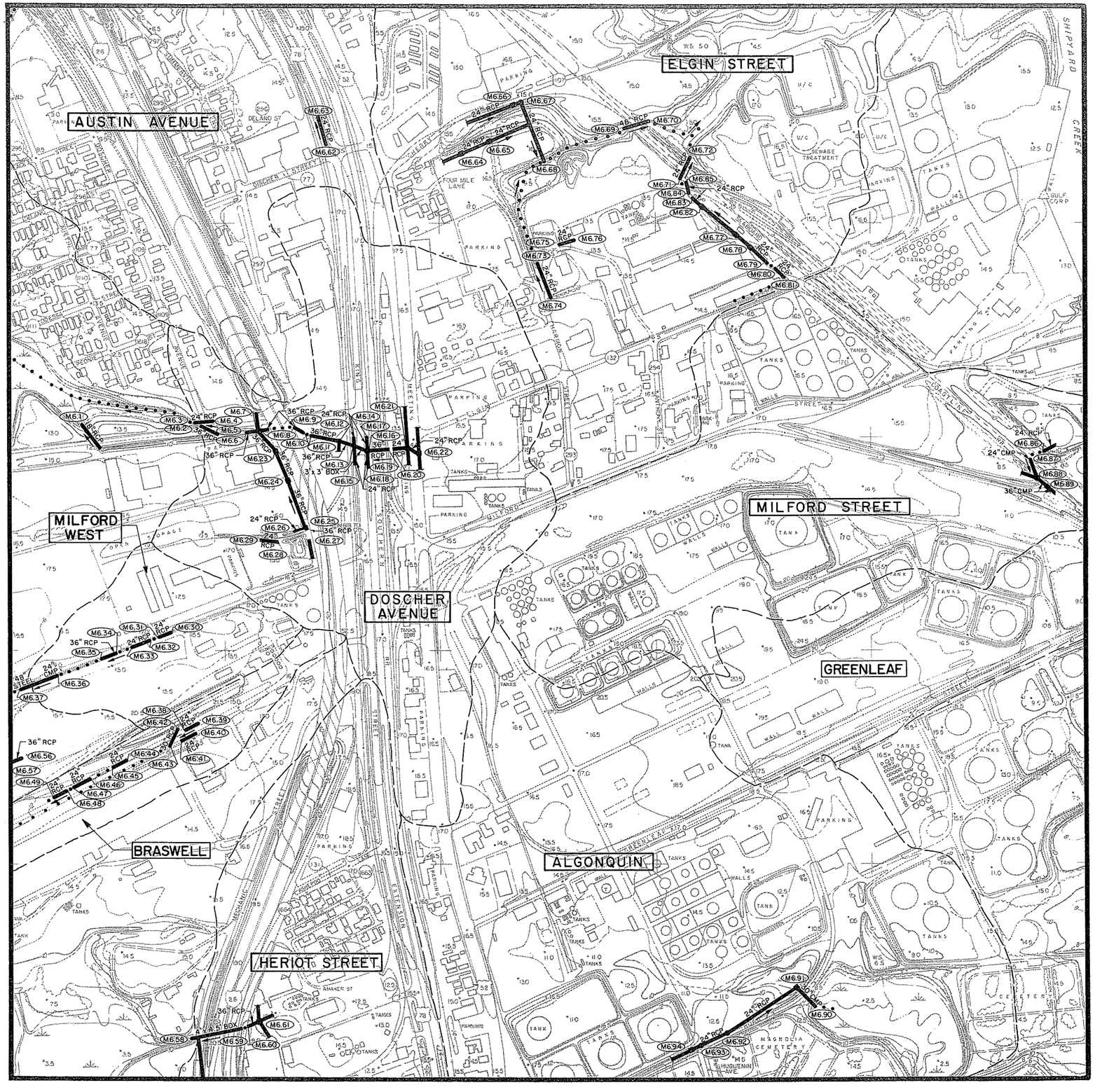
MAP M6

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

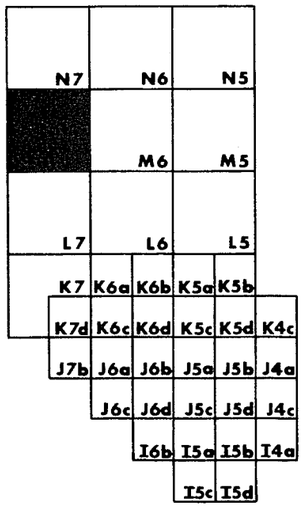
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-7	1	Bridge	-	C
M-7	50	30" RCP	4.66	HFS
M-7	51	30" RCP	4.43	HFS
M-7	52	24" RCP	4.84	HFS
M-7	53	24" RCP	4.48	HFS
M-7	54	36" RCP	3.58	C
M-7	55	36" RCP	2.93	C

INVENTORY

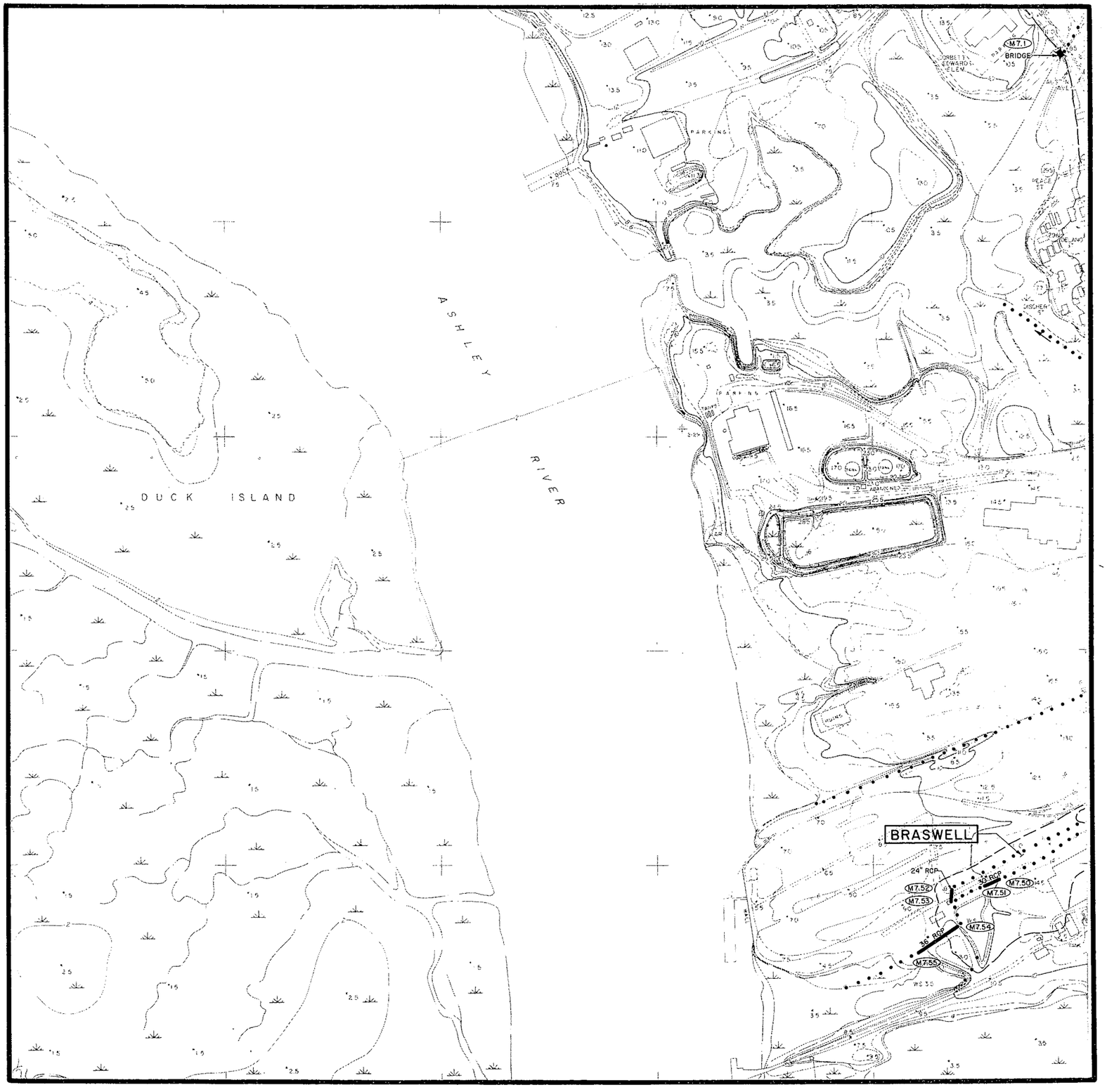
MAP M7

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
N-6	1	36" RCP	1.62	C
N-6	2	36" RCP (N) 36" RCP (S)	5.60 5.60	C C
N-6	3	36" RCP	0.71	C
N-6	4	4' x 4' BOX	1.27	C
N-6	5	4 x 4 ' Box	0.98	HFS
N-6	6	36" RCP	1.62	C
N-6	7	36" RCP	1.07	C
N-6	8	24" RCP	7.83	C
N-6	9	24" RCP	7.65	C
N-6	10	48" RCP	-0.12	C
N-6	11	48" RCP	0.32	C
N-6	12	36" RCP	0.29	
N-6	13	36" RCP (N) 36" RCP (S) 24" RCP (E)	- - -	C

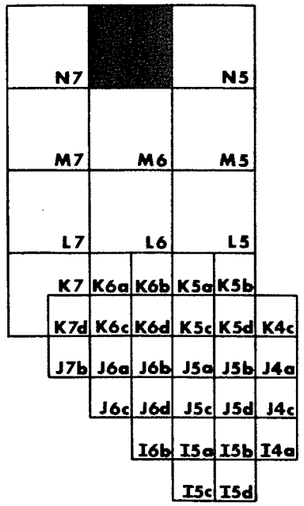
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
N-6	14	24" RCP	4.62	C
N-6	15	24" RCP	7.36	C
N-6	16			CNO
N-6	17	36" RCP	-1.67	C
N-6	18	18" RCP (N) 24" RCP (S) 24" RCP (E) 24" RCP (W)	7.00 6.60 10.25 10.25	HFS HFS C C
N-6	19	24" RCP	10.25	C
N-6	20	24" RCP	10.18	C
N-6	21	24" RCP	7.01	C
N-6	22	24" RCP	6.62	HFS
N-6	23	24" RCP	6.52	C
N-6	24	24" RCP	5.93	C
N-6	25	24" RCP	6.28	C
N-6	26	24" RCP	6.26	C
N-6	27	24" RCP (N/W) 24" RCP (S/W)	-	C
N-6	70A	Bridge		

INVENTORY

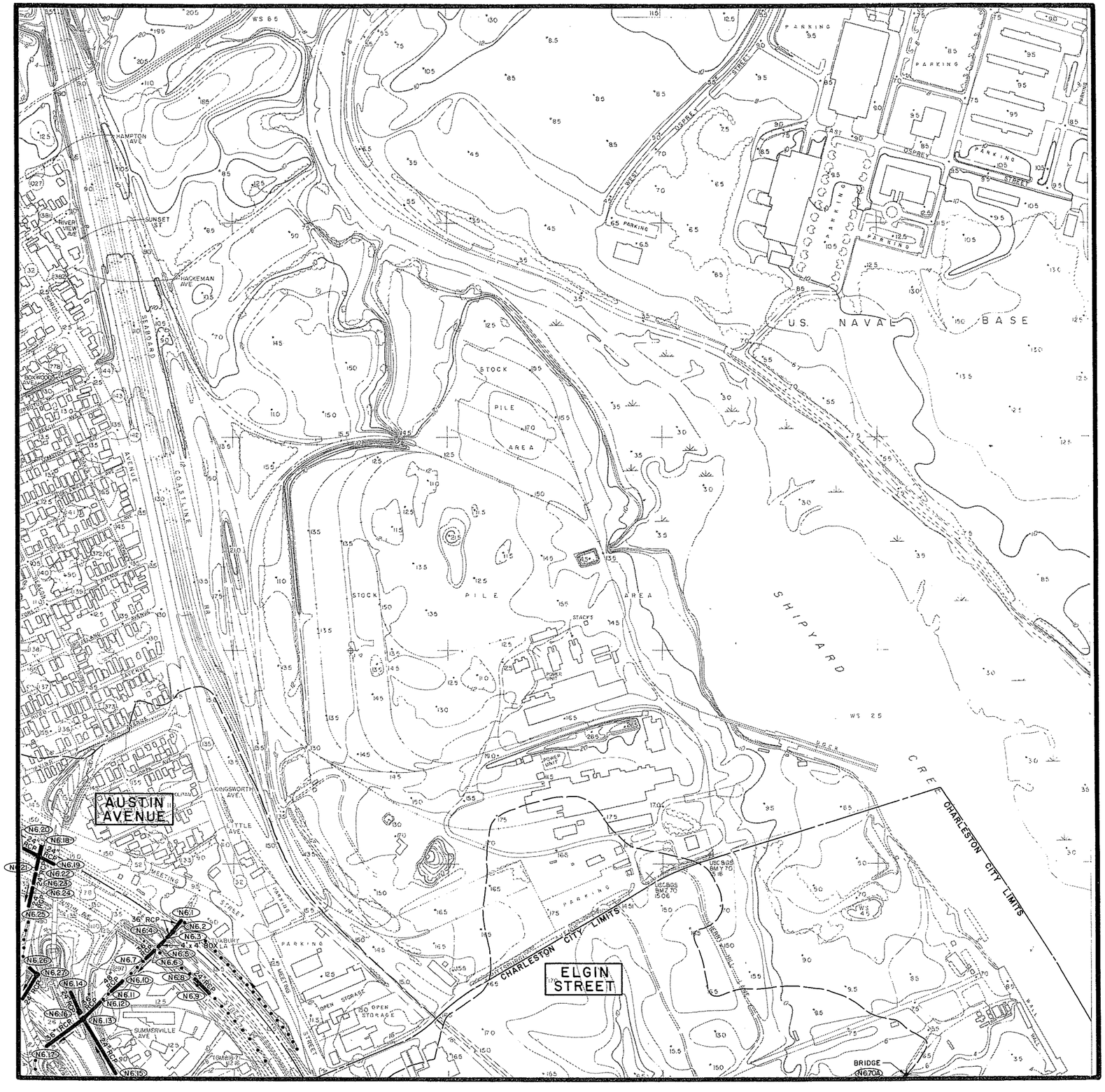
MAP N6

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

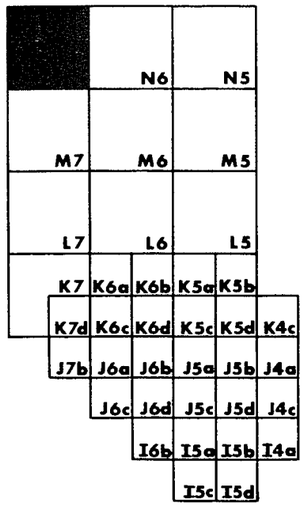
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
N-7	1	30" RCP	6.41	C
N-7	2	30" RCP (E)	3.97	C
		30" RCP (W)	4.26	
		18" RCP (N)	-	
		18" RCP (S)	-	
N-7	3	30" RCP (E)	4.45	C
		18" RCP (N)	6.24	
		18" RCP (S)	6.34	
N-7	4	24" RCP	5.24	C
N-7	5	24" RCP (N)	5.36	C
		24" RCP (S)	5.36	C
N-7	6	24" RCP	6.93	C
N-7	7	24" RCP	6.83	C
N-7	8	24" RCP	6.77	C
N-7	9	24" RCP	-	FWT

INVENTORY

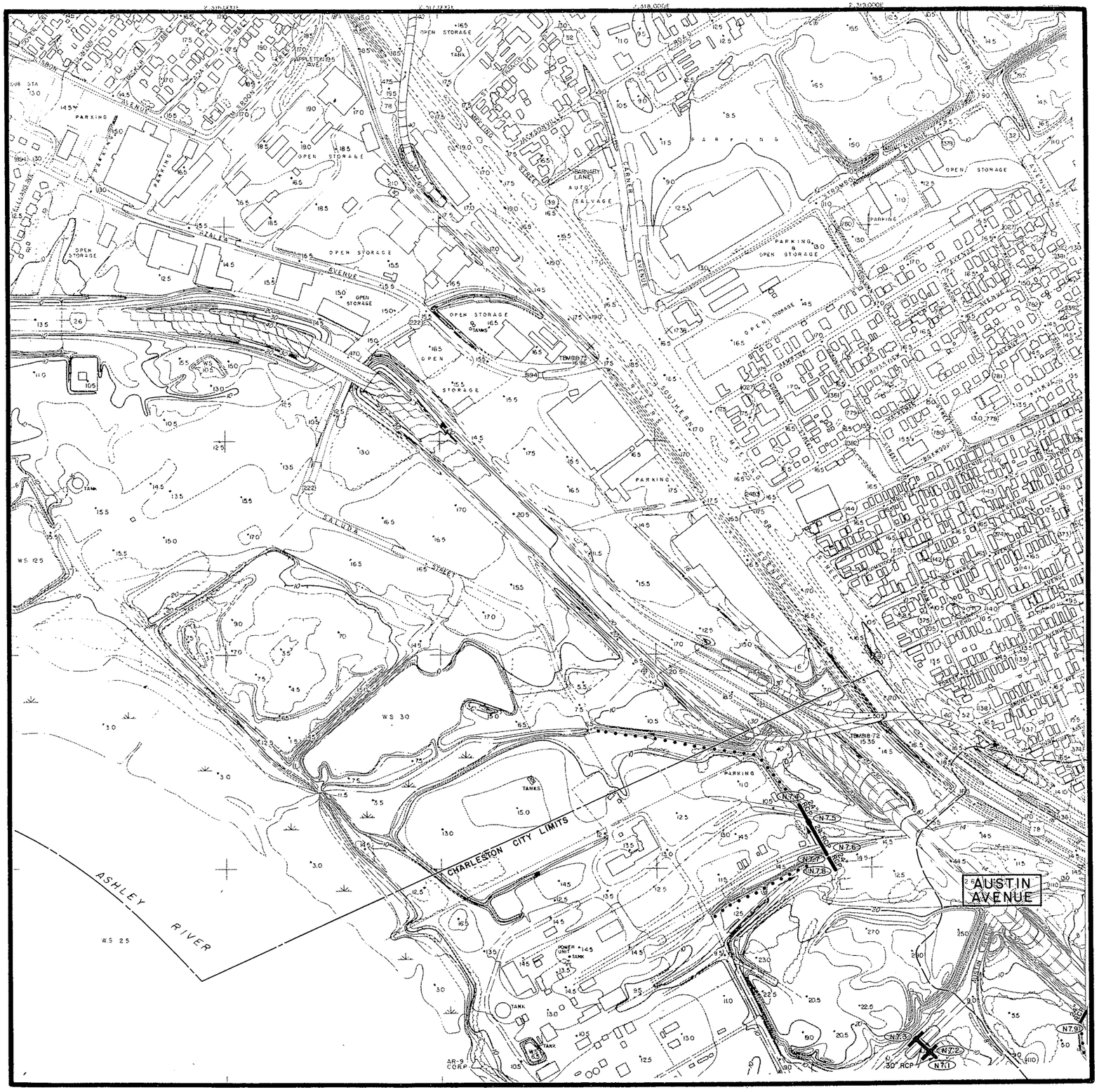
MAP N7

existing drainage facilities
CITY OF CHARLESTON

PENINSULAR AREA



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

WEST OF THE ASHLEY

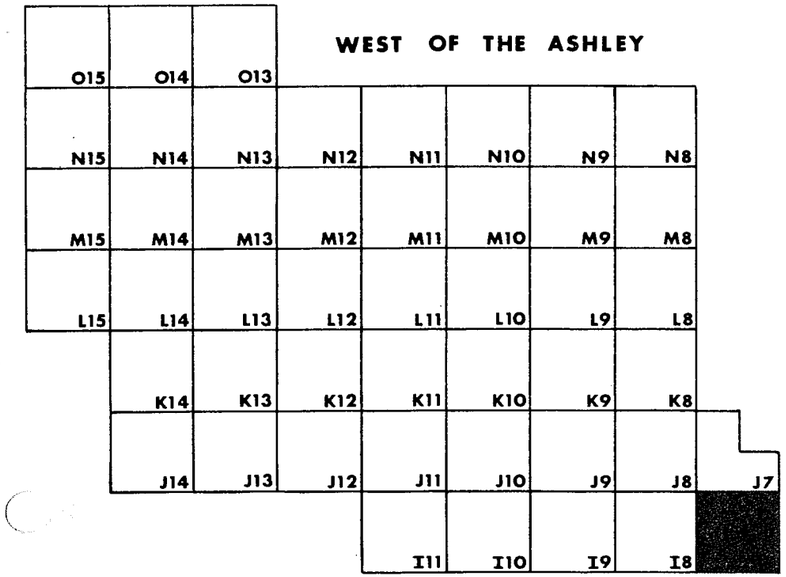
EXISTING DRAINAGE FACILITIES

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-7	1A	18" Iron	-	C
I-7	2A	24" VCP	-	C
I-7	3A	18" RCP	-	HFS
I-7	4A	15" RCP	-	C
I-7	5A	8" RCP	-	C
I-7	1	15" RCP	-	FWT
I-7	2	12" RCP	-	C
I-7	3	15" RCP	-	C
I-7	4	15" RCP	-	C
I-7	5	18" RCP (N)	-	C
I-7	6	18" RCP (S)	-	C
I-7	7	18" RCP	-	FWT
I-7	8	18" RCP	-	FWT
I-7	9	24" RCP	-	C
I-7	10	24" RCP	-	C
I-7	11	18" RCP	-	C
I-7	12	18" RCP	-	C
I-7	13	30" CMP	-	C
I-7	14	30" CMP	-2.02	C
I-7	15	5.3' x 6.0' BOX (N)	2.22	C
I-7	16	5.3' x 6.0' BOX (S)	1.98	C
I-7	17	12" RCP	-	C

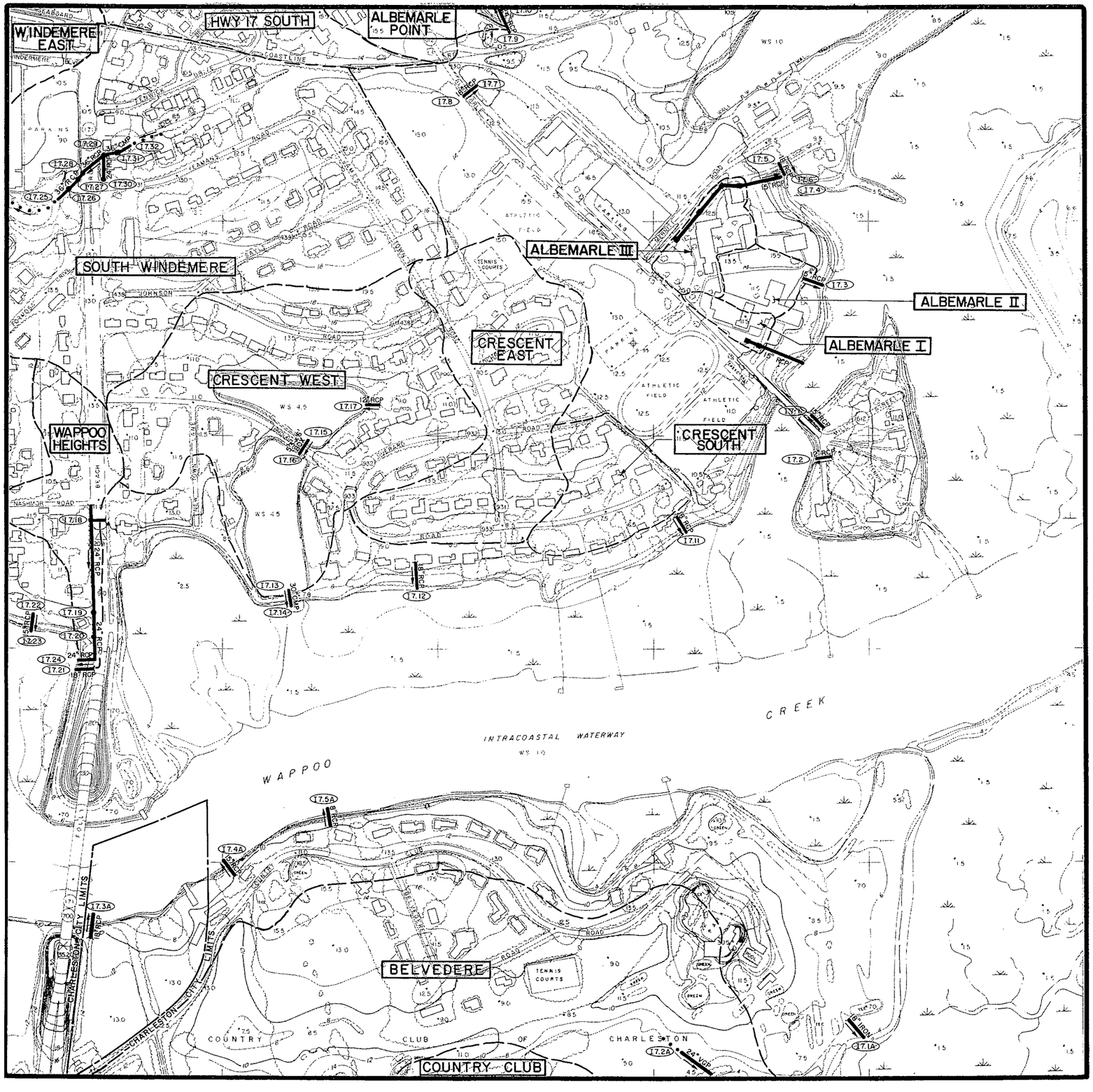
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-7	18	18" RCP (N) 24" RCP (S) 18" RCP (E)	3.30 3.30 3.30	C
I-7	19	24" RCP (N) 24" RCP (S)	2.80 2.80	C
I-7	20	24" RCP (N) 24" RCP (S)	2.52 2.52	C
I-7	21	18" RCP	-	HFS
I-7	22	15" RCP	-	C
I-7	23	15" RCP	-	C
I-7	24	24" RCP	1.78	FWT
I-7	25	36" RCP	1.01	C
I-7	26	36" RCP (N) 36" RCP (S)	0.97 0.93	C
I-7	27	36" RCP (N/E) 36" RCP (S/W)	1.04 0.80	C
I-7	28	36" RCP (S/W) 36" RCP (N/E)	1.14 1.21	C
I-7	29	36" RCP (W) 36" CMP (E) 24" RCP (S)	1.81 2.60 3.65	C
I-7	30		-	PO
I-7	31	36" CMP (W) 36" CMP (E)	3.56 3.56	C
I-7	32	36" CMP	3.72	C

INVENTORY | MAP I7

existing drainage facilities
CITY OF CHARLESTON







LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

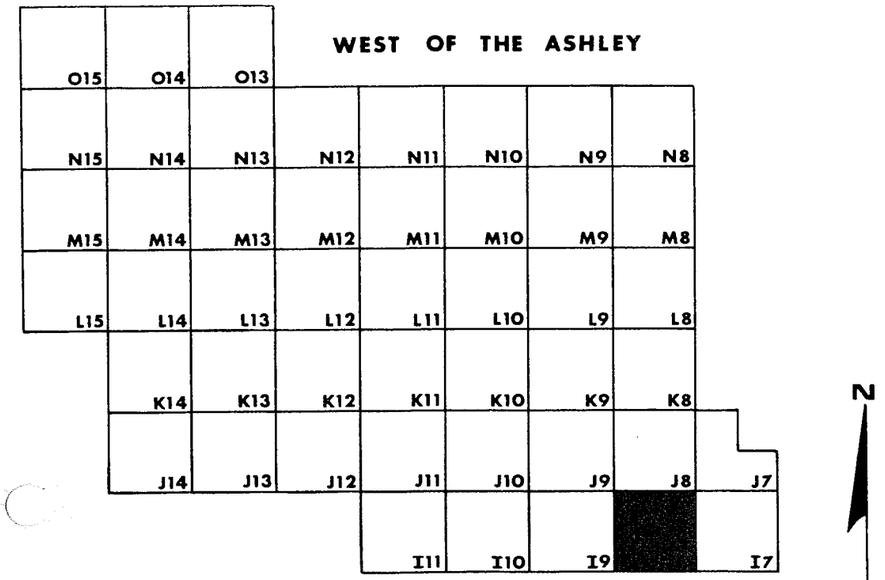
GRAPHIC SCALE 500 0 500 1000 1500 FEET

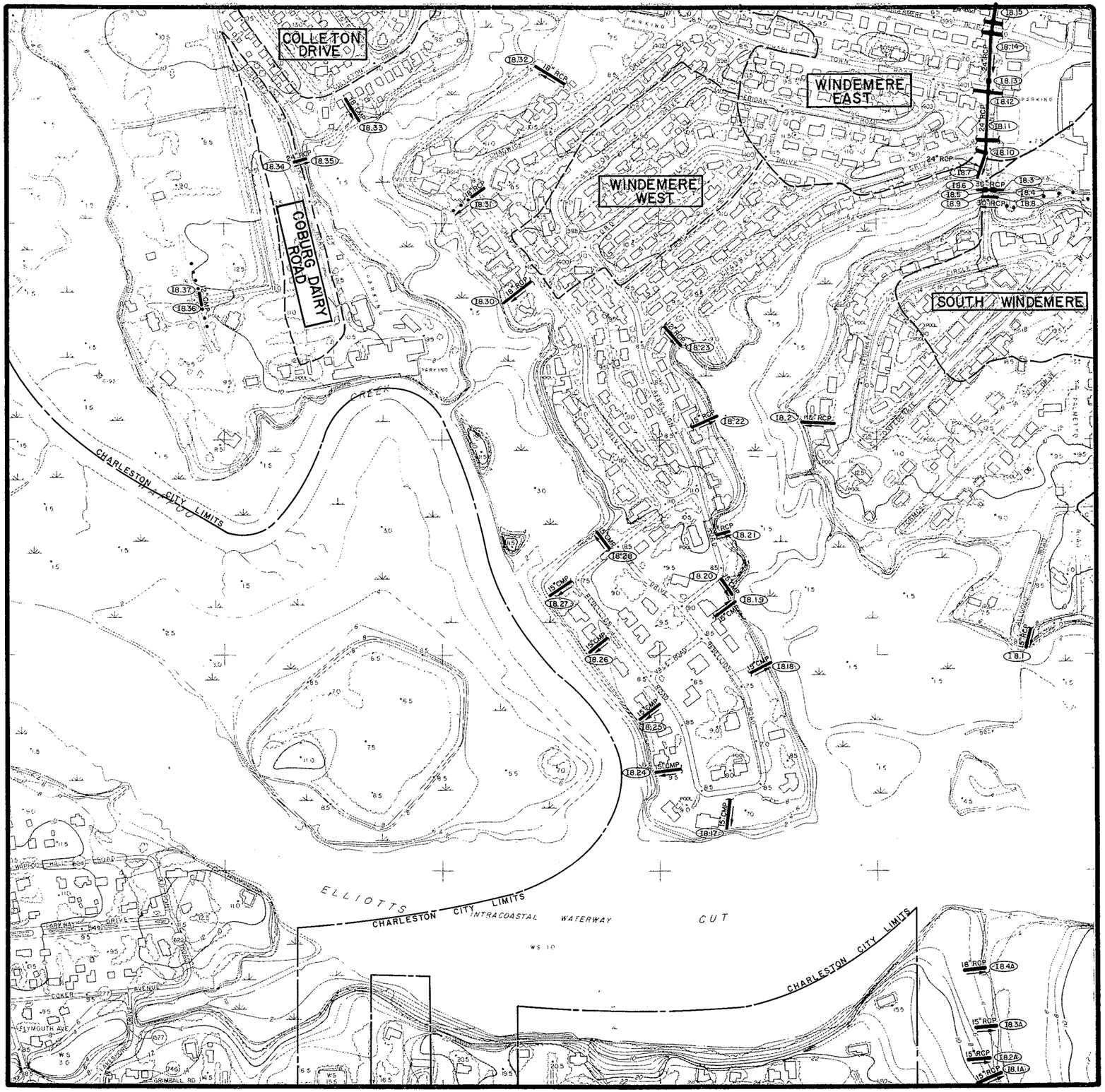
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-8	1A	15" RCP	-	C
I-8	2A	15" RCP	-	C
I-8	3A	15" RCP	-	C
I-8	4A	18" RCP	-	C
I-8	1	15" RCP	-	C
I-8	2	15" RCP	-	C
I-8	3	36" RCP	0.36	C
I-8	4	36" RCP (E) 36" RCP (W)	0.18 0.18	C
I-8	5	36" RCP (E) 36" RCP (W)	-0.22 -0.22	C
I-8	6	36" RCP	0.14	C
I-8	7	24" RCP	-0.62	FS
I-8	8	30" RCP	-0.22	HFS
I-8	9	30" RCP	0.05	C
I-8	10	24" RCP (N) 24" RCP (S) 12" RCP (W)	-0.21 -0.33 3.22	C
I-8	11	24" RCP (N) 24" RCP (S) 18" RCP (E) 18" RCP (W)	0.37 0.39 2.58 2.56	C
I-8	12	24" RCP (N) 24" RCP (S) 18" RCP (W) 18" RCP (E)	1.23 1.22 1.99 2.01	C
I-8	13	24" RCP (N) 24" RCP (S)	1.26 1.11	C
I-8	14	24" RCP (N) 24" RCP (S) 15" RCP (E) 15" RCP (W)	1.24 1.24 3.08 2.60	C
I-8	15	24" RCP (S) 12" RCP (E) 12" RCP (W) 24" RCP (N)	1.33 3.21 2.96 1.29	HFS
I-8	17	15" CMP	-	C
I-8	18	15" CMP	-	C
I-8	19	15" CMP	-	C
I-8	20	15" CMP	-	C
I-8	21	12" RCP	-	FWT
I-8	22	15" RCP	-	C
I-8	23	12" RCP	-	C
I-8	24	15" CMP	-	C
I-8	25	15" CMP	-	HFS
I-8	26	15" CMP	-	C
I-8	27	15" CMP	-	C
I-8	28	15" CMP	-	C
I-8	30	18" RCP	-	C
I-8	31	18" RCP	-	C
I-8	32	18" RCP	-	C
I-8	33	18" CMP	-	C
I-8	34	24" RCP	-	C
I-8	35	24" RCP	-	C
I-8	36	12" CMP	-	C
I-8	37	12" CMP	-	C

INVENTORY

MAP I8

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

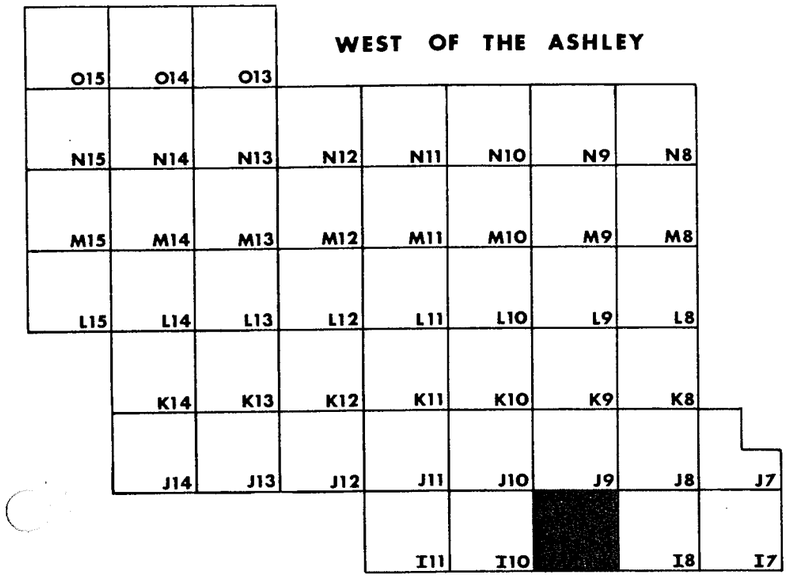
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-9	1	15" RCP	-	C
I-9	2	15" RCP	-	C
I-9	3	11" x 18" CMP	-	HFS
I-9	5	15" RCP	-	C
I-9	6	30" RCP	2.34	C
I-9	7	12" RCP	-	C
I-9	8	18" RCP	-	C
I-9	9	18" RCP	-	C
I-9	10	18" RCP	-	C
I-9	11	15" RCP	-	HFS
I-9	12	15" RCP	-	C
I-9	13	15" RCP	-	C
I-9	14	24" RCP	2.87	C

INVENTORY

MAP I9

existing drainage facilities
CITY OF CHARLESTON



N



LEGEND

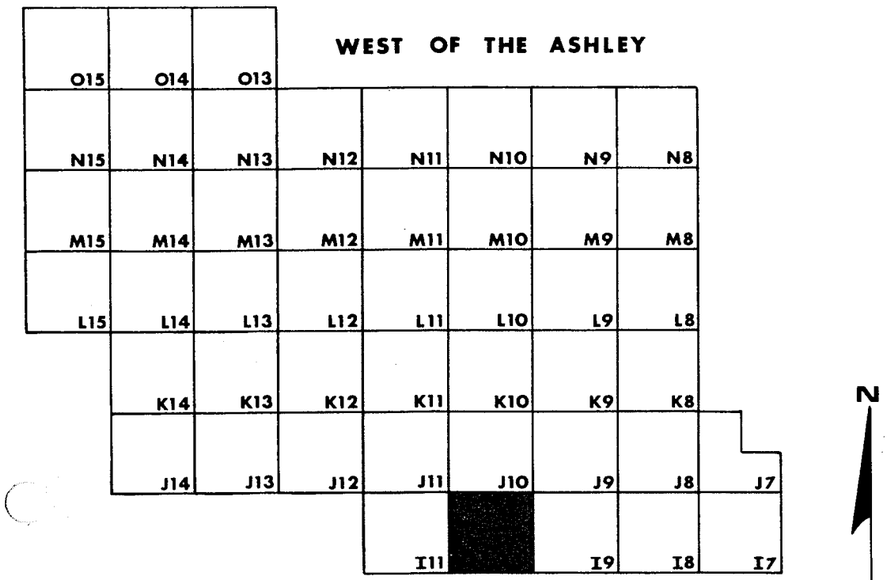
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE
500 0 500 1000 1500
FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
I-10	1	12" RCP	-	C
I-10	2	15" RCP	-	C
I-10	3	36" RCP	0.07	C
I-10	4	36" RCP	-0.06	C

INVENTORY | MAP I10

existing drainage facilities
CITY OF CHARLESTON





LEGEND

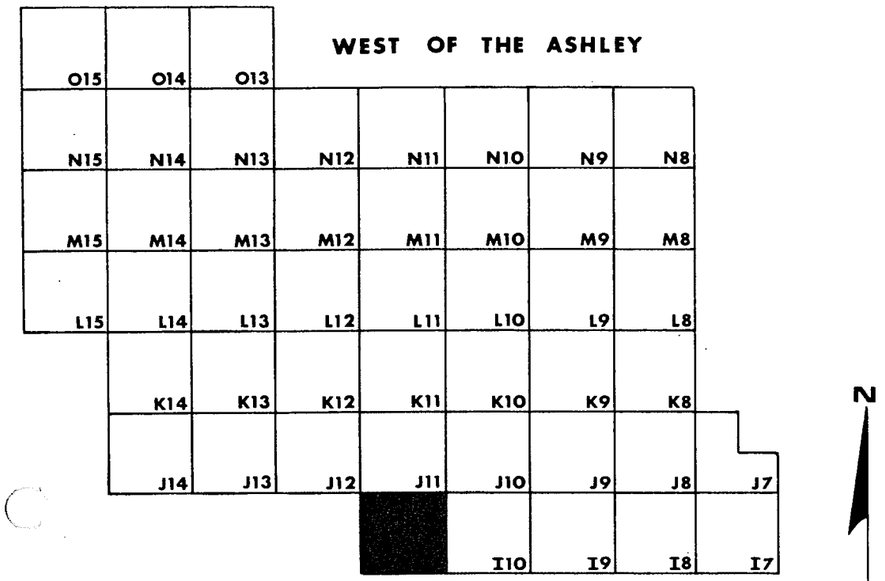
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

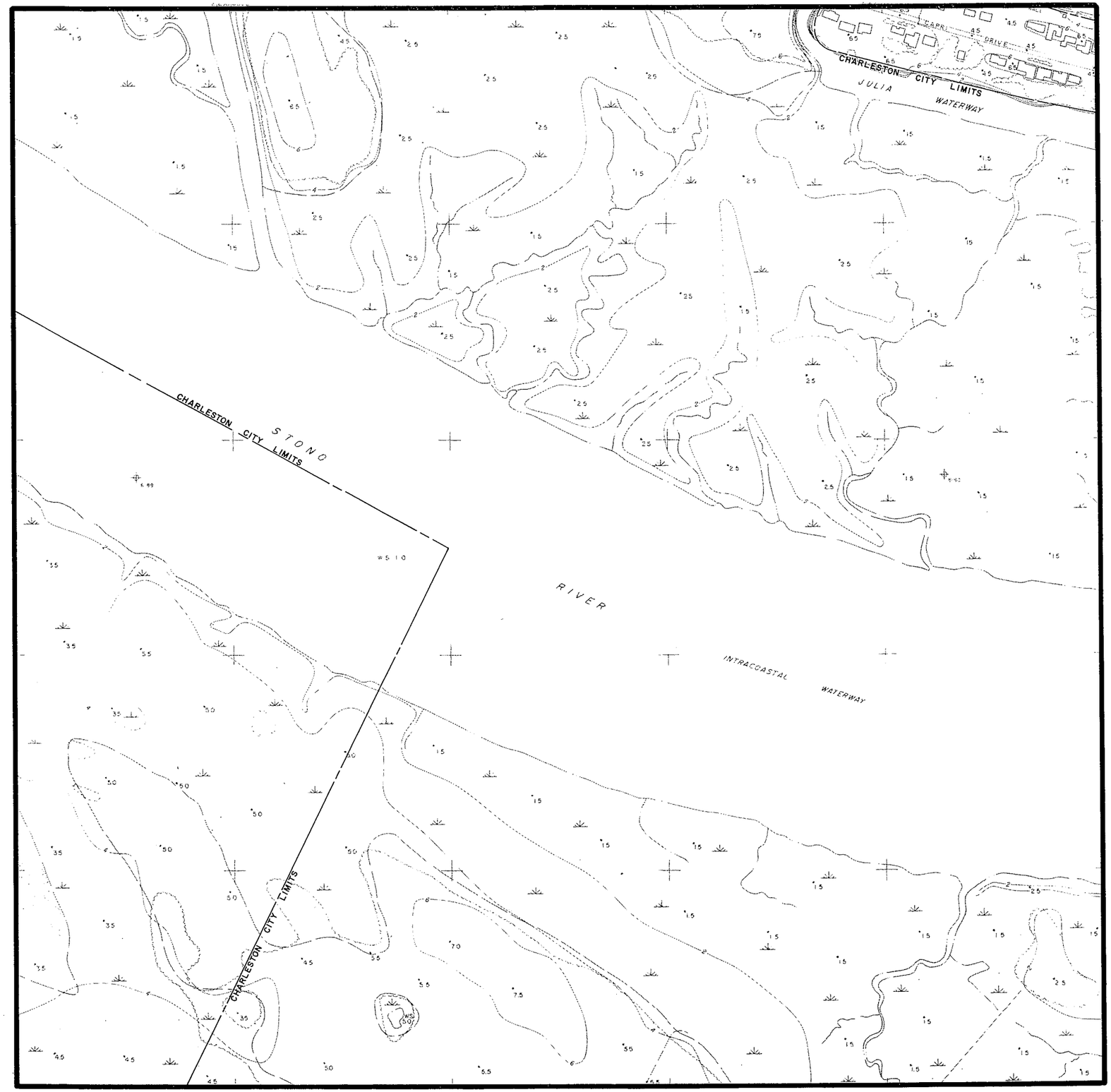
GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY

MAP I11

existing drainage facilities
CITY OF CHARLESTON





N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-7	1	42" RCP	-0.45	C
J-7	2	42" RCP	-0.11	C
J-7	3	24" RCP	1.45	C
J-7	4	24" RCP	1.55	C
J-7	5		-	FWT
J-7	6		-	Outfall submerged
J-7	7		-	CNO
J-7	8		-	FWT
J-7	9	18" RCP (N)	-	C
J-7	10	24" RCP	-	C
J-7	11	24" RCP (S) 18" RCP (E) 18" (W)	- - -	C
J-7	12	18" RCP	-	C
J-7	13	18" RCP	3.52	C
J-7	14	36" RCP	1.42	FWT
J-7	15	36" RCP (N) 36" RCP (S)	2.51 2.63	C
J-7	16	36" RCP (N) 18" RCP (S) 30" RCP (W)	4.72 6.67 6.22	C
J-7	17		-	CNO
J-7	18	30" RCP (E) 24" RCP (W)	7.91 7.91	C
J-7	19	24" RCP (E) 24" RCP (W)	8.00 8.03	C
J-7	20	1.7' x 2.4' BOX	8.89	C
J-7	21	15" RCP (N) 24" RCP (E) 18" RCP (W)	8.61 8.64 8.76	C
J-7	22	24" RCP (E) 24" RCP (W)	8.97 8.92	C
J-7	23	24" RCP (E) 24" RCP (W)	8.86 8.88	C
J-7	24		-	Buried
J-7	25	24" RCP (E) 24" RCP (W)	8.41 8.39	C
J-7	26	24" RCP (N) 18" RCP (S) 24" RCP (W)	8.20 8.24 8.31	C
J-7	27	24" RCP (E) 24" RCP (S)	7.97 8.14	C
J-7	28	24" RCP (E) 24" RCP (W) 15" RCP (S)	7.79 7.65 7.83	C
J-7	29	24" RCP (W) 24" RCP (S) 18" RCP (E)	7.82 7.90 8.08	C
J-7	30	24" RCP (N) 24" RCP (S)	7.62 7.52	C
J-7	31	24" RCP (N) 24" RCP (S)	7.51 7.39	C
J-7	32	24" RCP (N) 24" RCP (S) 15" RCP (E)	7.21 7.23 7.49	C
J-7	32A		-	PO
J-7	33	36" RCP (N) 30" RCP (S) 24" RCP (W)	7.08 5.85 6.10	C
J-7	34	30" RCP (N) 30" RCP (E)	- -	C
J-7	35	30" RCP (E) 30" RCP (W)	5.50 5.50	C
J-7	36	30" RCP (E) 30" RCP (W) 15" RCP (N)	5.22 5.38 7.28	C
J-7	37	30" RCP (E) 30" RCP (W)	4.69 4.67	C
J-7	38	18" RCP	9.23	C
J-7	39	18" RCP	8.83	C
J-7	40	24" RCP (E) 15" RCP (W) 18" RCP (N)	6.07 7.05 6.11	C
J-7	41	24" RCP	5.20	C
J-7	42	24" RCP (N) 18" RCP (S) 18" RCP (W)	5.41 5.73 5.23	C
J-7	43	12" RCP	-	FWT
J-7	44	30" CMP	0.52	C
J-7	45	30" CMP	3.72	C
J-7	46	24" RCP	5.05	C
J-7	47	24" RCP	4.77	C

INVENTORY

MAP J7

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

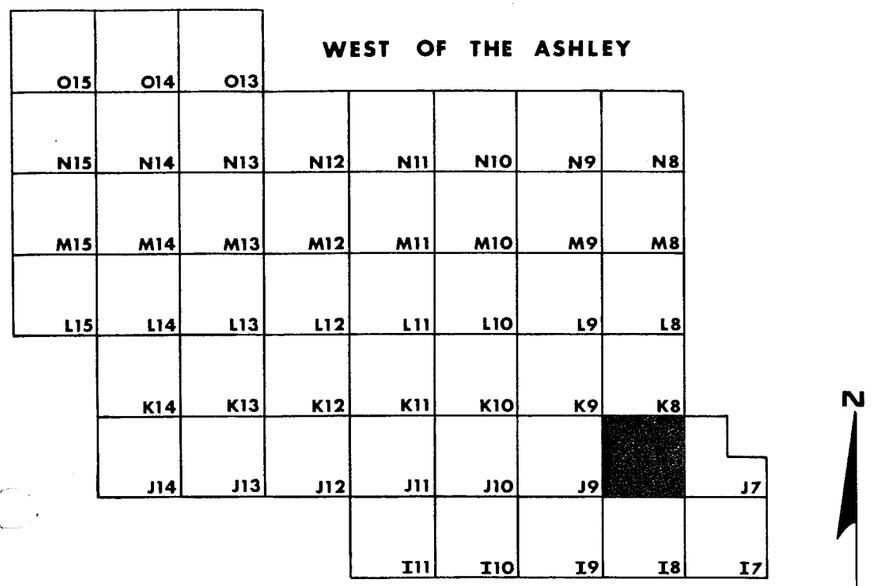
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-8	1	24" RCP (N) 24" RCP (S) 18" RCP (E) 18" RCP (W)	5.18 5.18 5.66 6.01	C
J-8	2	24" RCP (S) 24" RCP (N)	5.19 5.24	C
J-8	3	24" RCP (N) 24" RCP (S) 12" RCP (E)	5.19 5.14 5.67	C
J-8	4	24" RCP (N) 24" RCP (S) 12" RCP (W)	5.27 5.27 6.57	C
J-8	5	36" RCP (N/E) 24" RCP (S) 15" RCP (E) 24" RCP (W)	4.79 4.83 5.94 5.22	C
J-8	6	36" RCP (S) 42" RCP (N)	3.91 3.81	C
J-8	7	42" RCP (N)	3.45	C
J-8	8	24" RCP (N) 24" RCP (S) 18" RCP (E)	5.58 5.63 6.17	C
J-8	9	30" RCP (W) 30" RCP (S) 18" RCP (E)	4.38 4.33 4.93	C
J-8	10		-	PO
J-8	11	30" RCP (N) 30" RCP (E)	2.98 2.78	C
J-8	12	30" RCP (W) 30" RCP (S)	2.96 2.72	C
J-8	13	30" RCP (N) 30" RCP (S)	3.10 3.20	C
J-8	14	30" RCP (N) 30" RCP (S)	3.10 2.96	C
J-8	15	30" RCP (N) 30" RCP (S)	2.96 3.00	C
J-8	16	30" RCP (N) 30" RCP (S)	2.83 2.66	C
J-8	17	30" RCP (N) 15" RCP (E) 30" RCP (W)	3.07 3.58 2.96	C
J-8	18	30" RCP (E) 30" RCP (W)	2.40 2.38	C
J-8	19	30" RCP	1.88	C
J-8	20	48" RCP (N)	1.19	C
J-8	21	48" RCP (S)	1.64	C
J-8	22	24" RCP (E)	7.50	C
J-8	23	24" RCP (W)	7.41	C
J-8	24	36" RCP (E)	-	C
J-8	25	36" RCP (E) 36" RCP (W) 18" RCP (N)	1.37 1.39 2.58	C
J-8	26	36" RCP (N) 36" RCP (S)	4.42 4.42	C
J-8	27	36" RCP (N) 36" RCP (S) 12" RCP (E) 12" RCP (N/E)	4.41 4.11 6.72 8.69	C
J-8	28	36" RCP (N) 36" RCP (S)	4.01 4.01	C
J-8	29	36" RCP (N) 36" RCP (S)	4.12 4.12	C
J-8	30	36" RCP (N) 36" RCP (S)	2.90 2.86	C
J-8	31	36" RCP (N) 36" RCP (S)	2.88 2.88	C
J-8	32	36" RCP (N) 36" RCP (E) 15" RCP (W)	2.77 2.72 4.42	C
J-8	33	18" RCP (N) 24" RCP (S) 18" RCP (W)	5.60 5.88 6.90	C
J-8	34		-	PO
J-8	35	18" RCP (N) 36" RCP (S#1) 36" RCP (S#2) 36" RCP (E)	3.49 2.30 2.88 2.37	C
J-8	36	36" RCP (W) 36" RCP (E)	2.65 2.72	C
J-8	37	36" RCP (W) 24" RCP (E)	2.90 3.96	C
J-8	38	24" RCP (W) 18" RCP (E)	4.11 4.66	C
J-8	39	36" RCP (N) 36" RCP (S)	1.80 1.72	C
J-8	40	36" RCP (N) 36" RCP (S)	1.83 1.71	C
J-8	41	36" RCP 36" RCP	1.41 -0.06	C
J-8	43	18" RCP	-	C
J-8	44	15" RCP	-	
J-8	45	15" RCP	-	
J-8	46		-	CNO
J-8	47	30" RCP	4.79	
J-8	48	30" RCP	3.89	
J-8	49		-	CNO

INVENTORY

MAP J8

existing drainage facilities
CITY OF CHARLESTON







LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-9	1	15" RCP	-	HFS
J-9	2	18" RCP	-	HFS
J-9	3	18" RCP	-	C
J-9	4	18" RCP	-	C
J-9	5	18" RCP 18" RCP	8.62 9.06	C
J-9	6	18" RCP 18" RCP	8.09 9.00	C
J-9	9	48" RCP 48" RCP	-0.83 -0.66	C
J-9	10	48" RCP 48" RCP	-1.12 -0.75	C
J-9	13	30" RCP (N) 30" RCP (S)	3.99 3.99	C
J-9	14	24" RCP (N) 30" RCP (S)	3.74 3.74	C
J-9	15	24" RCP	4.64	C
J-9	16	24" RCP	-	C
J-9	17	24" RCP	4.55	C
J-9	18		-	CNO
J-9	19	24" RCP	3.87	C
J-9	20	24" RCP	3.33	C
J-9	21	36" RCP	2.72	C
J-9	22	36" RCP (N) 36" RCP (W)	2.38 2.27	C
J-9	23	36" RCP (E) 36" RCP (W)	2.08 2.08	C
J-9	24	36" RCP (E) 15" RCP (W) 36" RCP (S) 15" RCP (N)	1.48 3.50 1.48 3.40	C
J-9	25	36" RCP	1.70	C
J-9	26	36" RCP	3.88	C
J-9	27	36" RCP	3.88	C
J-9	28	24" RCP	8.22	C
J-9	29	24" RCP	8.32	C
J-9	30	24" RCP	5.91	FWT
J-9	31	24" RCP	6.19	FWT
J-9	32	24" RCP	3.64	C
J-9	33	24" CMP	3.52	C
J-9	34	24" RCP (N) 24" RCP (S) 12" RCP (W)	4.12 4.05 5.31	C
J-9	35	24" CMP (N) 24" CMP (S) 15" RCP (E)	3.91 3.91 5.01	C
J-9	36	24" RCP (N) 15" RCP (W)	3.73 4.37	C
J-9	37	24" CMP (N) 15" CMP (E)	3.60 4.32	C
J-9	38	24" CMP	1.94	C
J-9	39	18" RCP	0.95	C
J-9	40	24" CMP (N/E) 24" CMP (S/W) 15" RCP (N)	3.13 3.13 5.63	C
J-9	41		-	CNO
J-9	42	18" RCP	2.60	C
J-9	43	18" RCP (N) 18" CMP (N) 24" CMP (S/E)	2.81 3.79 3.17	C
J-9	44	18" RCP (N) 18" RCP (S) 15" RCP (E) 15" CMP (W)	4.21 3.56 4.37 4.38	C
J-9	45	18" CMP (N) 18" CMP (S) 15" CMP (E) 15" CMP (W)	4.20 4.02 4.28 4.27	C
J-9	46	18" RCP (S) 15" RCP (E) 18" RCP (W)	4.42 4.96 4.35	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-9	47	15" RCP	-	C
J-9	48	18" RCP	-	C
J-9	49	24" RCP	-	C
J-9	50	48" RCP (S#1) 48" RCP (S#2) 48" RCP (S#3) 48" RCP (N/W) 54" RCP (N/W) 18" RCP (N) 42" RCP (E)	2.88 2.26 2.67 1.97 2.17 5.42 3.17	C
J-9	51	42" RCP	5.51	C
J-9	52	18" RCP	5.64	C
J-9	53	48" RCP 48" RCP 48" RCP	2.81 1.69 2.54	C
J-9	56	24" CMP	1.65	C
J-9	57	24" CMP	4.34	C
J-9	58	18" RCP	4.04	C
J-9	59	48" RCP 54" RCP	2.64 1.84	C
J-9	61	24" RCP	5.52	C
J-9	62	24" RCP (S) 18" RCP (N) 18" RCP (W)	6.72 6.76 6.73	C
J-9	63	30" RCP	3.30	C
J-9	64	30" RCP (N) 30" RCP (S)	1.60 1.60	C
J-9	65	30" RCP (N) 30" RCP (S) 15" RCP (E)	1.93 1.86 3.45	C
J-9	66	30" RCP (N) 30" RCP (S)	2.19 2.20	C
J-9	67	30" RCP (N) 30" RCP (S) 18" RCP (E)	2.84 2.84 4.68	C
J-9	68	24" RCP (N) 30" RCP (S) 15" RCP (E)	3.27 3.12 5.12	C
J-9	69	4.0' x 4.0' BOX	-0.43	C
J-9	70	4.0' x 4.0' BOX (N) 4.0' x 4.0' BOX (S) 24" RCP (W)	-0.41 -0.41 0.96	C
J-9	71	4.0' x 4.0' BOX (N) 4.0' x 4.0' BOX (S) 24" RCP (W)	-1.06 -1.06 -	C
J-9	72	4.0' x 4.0' BOX	-1.00	C
J-9	73	48" RCP 48" RCP	-1.24 -1.30	C
J-9	75	48" RCP 48" RCP	-1.15 -1.21	C
J-9	77	24" CMP	3.65	C
J-9	78	24" CMP	6.27	C
J-9	79	24" CMP	7.26	C
J-9	80	24" CMP	7.44	C
J-9	81	24" RCP (E) 24" RCP (W)	3.85 3.90	C
J-9	82	24" RCP (E) 24" RCP (W)	5.95 5.95	C
J-9	83	24" RCP (E) 24" RCP (W)	6.22 6.22	C
J-9	84	24" RCP (E) 24" RCP (W)	7.20 7.20	C
J-9	85	24" RCP (E) 24" RCP (W)	8.59 8.60	C
J-9	86	18" RCP (E) 18" RCP (W)	8.75 8.75	C
J-9	87	24" RCP (E) 18" RCP (W) 15" RCP (N)	5.06 6.76 7.10	C
J-9	88	24" RCP (E) 24" RCP (W)	4.33 4.60	C
J-9	89	24" RCP (E) 24" RCP (W) 18" RCP (N)	3.57 3.83 3.38	C
J-9	90	12" RCP	-	C
J-9	91	18" RCP (E) 18" RCP (S/E) 24" RCP (S/W)	4.30 4.06 2.50	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-9	92	36" RCP (N) 36" RCP (S) 24" RCP (E)	0.60 0.40 1.75	C
J-9	93	36" RCP 36" RCP	1.64 1.64	C
J-9	95	36" RCP (N) 36" RCP (S)	0.63 0.90	C
J-9	96	18" RCP (N) 36" RCP (S) 36" RCP (W)	2.86 0.65 0.50	C
J-9	97	36" RCP (S) 36" RCP (W)	0.17 0.91	C
J-9	98	36" RCP (N) 36" RCP (E)	1.82 1.96	C
J-9	99	36" RCP (E) 36" RCP (W)	1.66 1.77	C
J-9	100	36" RCP (N) 15" RCP (S) 36" RCP (E)	1.91 4.59 1.99	C
J-9	101	36" RCP (N) 36" RCP (S)	2.11 2.11	C
J-9	102	36" RCP	2.51	C
J-9	103	36" RCP (S) 36" RCP (W) 15" RCP (N)	1.93 2.20 3.72	C
J-9	104	36" RCP	2.58	C
J-9	105	36" RCP (E) 36" RCP (W)	1.59 1.59	C
J-9	106	36" RCP	3.41	C
J-9	107	36" RCP	3.25	C
J-9	108	48" RCP	3.96	C
J-9	109	48" RCP	4.23	C
J-9	110	24" RCP	4.86	C
J-9	111	24" RCP	4.81	C
J-9	112	30" RCP	5.00	C
J-9	113	30" RCP	5.41	C
J-9	114	30" RCP	4.25	C
J-9	115	30" RCP (N) 30" RCP (S) 18" RCP (E) 18" RCP (W)	4.23 4.10 6.15 6.16	C
J-9	116	30" RCP (N) 30" RCP (S) 18" RCP (E) 18" RCP (W)	4.31 4.17 6.06 6.23	C
J-9	117	30" RCP	4.51	C
J-9	118	30" RCP	3.77	C
J-9	119	30" RCP (N) 30" RCP (S) 18" RCP (E) 18" RCP (W)	3.86 3.60 5.68 5.69	C
J-9	120	30" RCP (N) 30" RCP (S) 18" RCP (E) 18" RCP (W)	3.60 3.58 5.84 5.80	C
J-9	121	30" RCP	3.57	C
J-9	122	24" RCP	4.32	C
J-9	123	24" RCP	4.42	C
J-9	124	24" RCP	6.05	C
J-9	125	24" RCP	6.02	C
J-9	126	24" RCP	6.07	C
J-9	127	24" RCP	5.94	C
J-9	128	24" RCP	5.98	C
J-9	129	24" RCP	5.60	C
J-9	130	18" RCP 18" RCP	10.76 10.33	HFS
J-9	132	18" RCP 18" RCP	10.54 10.57	HFS
J-9	134	18" RCP	-	C

INVENTORY

MAP J9

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-10	1	24" RCP (N) 24" RCP (W) 18" RCP (E)	5.88 5.88 5.08	C
J-10	2	24" RCP	5.72	C
J-10	3	24" RCP 24" RCP	5.69 5.52	C
J-10	5	24" RCP 24" RCP	5.94 5.79	C
J-10	7	36" CMP	6.04	C
J-10	8	36" CMP	–	C
J-10	9	18" RCP	3.34	C
J-10	10	24" RCP (S) 12" RCP (E) 12" RCP (W)	2.41 4.10 3.36	C
J-10	11	24" RCP	3.13	C
J-10	12	24" RCP (S) 18" RCP (N) 12" RCP (E) 15" RCP (W)	5.94 6.02 6.79 7.04	C
J-10	13	36" CIP	12.16	FS
J-10	14	36" RCP	12.04	FS
J-10	15	36" RCP	-	C
J-10	16	30" RCP	8.87	HFS
J-10	17	30" CMP	5.74	C
J-10	18	36" RCP	6.41	C
J-10	19	36" RCP	6.27	C
J-10	20	36" CMP	4.03	C
J-10	21	30" RCP (N) 36" CMP (E) 36" RCP (S/W)	3.90 3.82 3.62	C
J-10	22	36" RCP (N) 36" RCP (S)	3.86 3.86	C
J-10	23	36" RCP (N) 36" RCP (S) 12" RCP (W)	3.54 3.54 4.57	C
J-10	24	36" RCP (N) 36" CMP (S)	3.13 2.93	C
J-10	25	36" CMP (N) 36" CMP (S)	2.10 2.10	C
J-10	26	36" CMP (N) 36" CMP (S)	2.36 2.36	C
J-10	27	36" CMP (N) 36" RCP (S)	1.85 1.85	C
J-10	28	36" RCP (N) 42" CMP (S) 30" RCP (W)	1.74 1.25 1.84	C
J-10	29		-	CNO
J-10	30		-	CNO
J-10	31	42" CMP (N) 42" CMP (S)	0.56 0.58	C
J-10	32	42" CMP	0.50	C

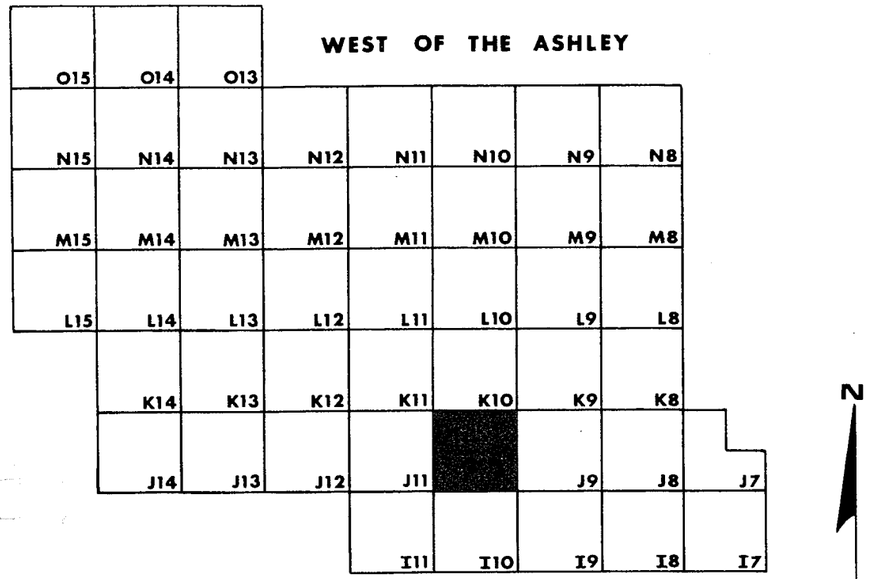
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-10	33	24" RCP (S) 18" RCP (W)	7.04 7.29	C
J-10	34	24" RCP	8.72	C
J-10	35	30" RCP	5.51	C
J-10	36	30" RCP (E) 30" RCP (W)	6.81 6.24	C
J-10	37	24" RCP (E) 30" RCP (W)	7.38 7.19	C
J-10	38	24" RCP (E) 24" RCP (W)	7.78 7.78	C
J-10	39	18" RCP (E) 24" RCP (W)	8.11 8.11	C
J-10	40	18" RCP (E) 24" RCP (W)	8.13 8.07	C
J-10	41	24" RCP (E) 24" RCP (W)	7.86 7.86	C
J-10	42	24" RCP (E) 30" RCP (W)	7.46 7.32	C
J-10	43	30" RCP (E) 30" RCP (W)	6.66 6.66	C
J-10	44	55" x 73" CMP (N) 55" x 73" CMP (S) 30" RCP (E)	2.80 2.66 2.73	C
J-10	45	55" x 73" CMP	2.49	C
J-10	46	55" x 73" CMP (N) 55" x 73" CMP (S)	2.54 2.42	C
J-10	47	55" x 73" CMP (S) 48" RCP (N) 42" RCP (N/W)	1.92 2.22 2.22	C
J-10	48	48" RCP (N) 42" RCP (S/E) 30" RCP (W) 18" RCP (E)	- 1.08 2.31 -	C
J-10	49	48" RCP (N) 48" RCP (S)	5.00 4.94	C
J-10	50	48" RCP	4.53	C
J-10	51	48" RCP	3.65	C
J-10	52	30" RCP (E) 30" RCP (W) 18" RCP (N)	4.73 5.35 4.94	C
J-10	53	18" x 29" CMP (N) 13" x 22" CMP (E)	7.92 7.90	C
J-10	54	18" x 29" CMP (N) 18" x 29" CMP (S) 18" CMP (W)	7.36 7.38 8.42	C
J-10	55	30" RCP (W) 18" RCP (N) 18" x 29" CMP (S) 30" RCP (E)	6.62 6.65 7.59 6.00	C
J-10	56	30" RCP (E) 30" RCP (W)	6.02 5.97	C
J-10	57	18" RCP (N) 30" RCP (E) 24" RCP (W) 12" RCP (S/W)	8.67 8.76 9.08 9.93	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-10	58	18" RCP (N) 24" RCP (E) 12" RCP (S) 24" RCP (W)	9.62 9.14 10.39 9.16	C
J-10	59	24" RCP (E) 24" RCP (W) 18" RCP (N)	9.53 9.62 9.91	C
J-10	60	24" RCP (E) 18" RCP (W) 18" RCP (N)	10.21 10.21 10.68	C
J-10	61	24" RCP	10.85	C
J-10	62	24" RCP (N) 24" RCP (S) 18" RCP (E) 24" RCP (W)	10.43 10.43 10.43 10.43	C
J-10	63	18" RCP (N) 24" RCP (S) 18" RCP (E)	11.21 11.21 11.21	C
J-10	64	36" RCP	7.95	C
J-10	65	36" RCP	7.28	C
J-10	66	30" RCP	7.78	C
J-10	67	30" RCP	7.53	C
J-10	68	30" RCP	7.80	C
J-10	69	30" RCP	8.07	C
J-10	70	30" RCP	7.50	C
J-10	71	30" RCP	7.69	C
J-10	72	24" RCP 24" RCP	6.88 6.89	C
J-10	74	24" RCP 24" RCP	6.52 6.64	C
J-10	76	36" RCP	7.41	C
J-10	77	36" RCP	7.44	C
J-10	78	24" RCP 24" RCP	7.35 7.35	C
J-10	80	24" RCP 24" RCP	7.49 7.59	C
J-10	82	24" RCP 24" RCP	6.61 6.57	C
J-10	84	24" RCP 24" RCP	6.73 6.69	C
J-10	86	24" RCP 24" RCP	6.56 6.65	C
J-10	88	24" RCP 24" RCP	6.47 6.26	C
J-10	90	24" RCP 24" RCP	6.50 6.61	C
J-10	92	24" RCP 24" RCP	6.20 6.04	C
J-10	94	24" RCP	8.95	HFW
J-10	95	24" RCP	8.77	HFW

INVENTORY

MAP J10

existing drainage facilities
CITY OF CHARLESTON







LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

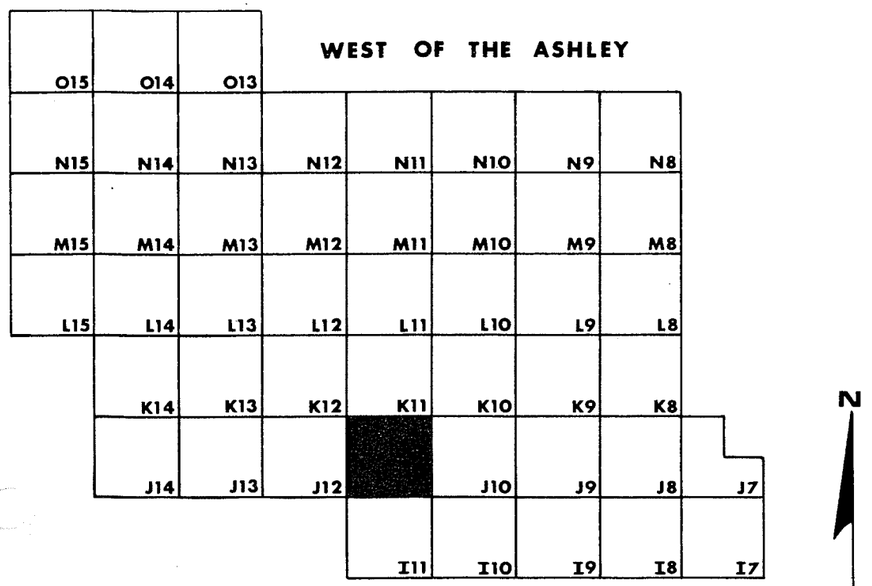
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-11	1	18" RCP	1.77	C
J-11	2	18" RCP	1.03	C
J-11	3	24" RCP	1.63	C
J-11	4	18" RCP (N) 24" RCP (S) 15" RCP (E) 15" RCP (W)	2.73 2.46 7.00 7.00	C
J-11	5	15" RCP 15" RCP	6.41 6.48	C
J-11	7	15" RCP 15" RCP	6.50 6.29	C
J-11	9	24" RCP	4.73	C
J-11	10	24" RCP (N) 24" RCP (S)	4.74 4.74	C
J-11	11	24" RCP (N) 24" RCP (S) 18" RCP (W)	4.22 4.47 4.82	C
J-11	12	30" RCP (N) 24" RCP (S) 18" RCP (E)	4.03 4.18 4.81	C
J-11	13	42" RCP (N) 30" RCP (S)	3.79 3.81	C
J-11	14	42" RCP	3.58	C
J-11	81	42" RCP 42" RCP	3.05 2.95	C

INVENTORY

MAP J11

existing drainage facilities
CITY OF CHARLESTON





LEGEND

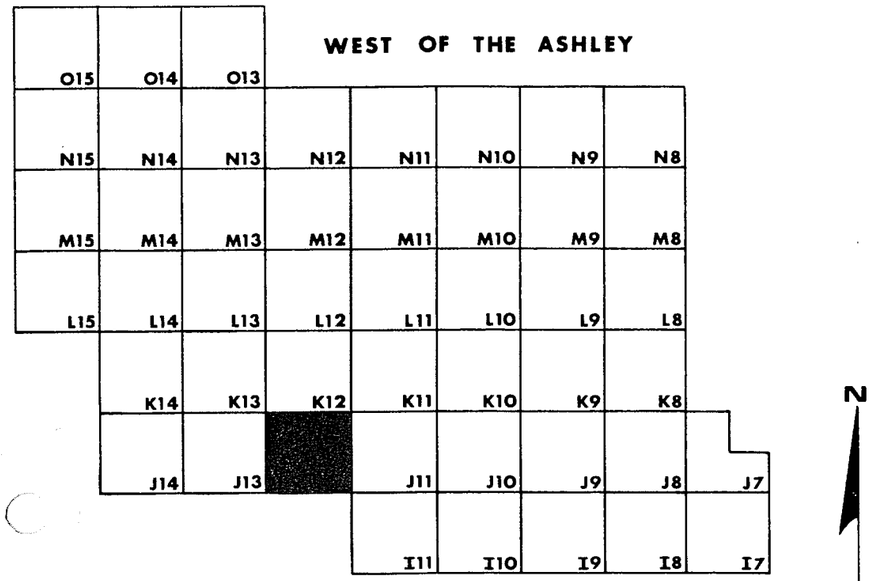
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-12	1	48" RCP 48" RCP 48" RCP	-2.14 -2.32 -1.54	C
J-12	4	48" RCP 48" RCP 48" RCP	-2.64 -3.00 -2.36	C
J-12	7	18" RCP	2.72	C
J-12	8	18" RCP (N) 24" RCP (S)	1.47 1.40	C
J-12	9	24" RCP	0.57	C
J-12	10	18" RCP	1.70	C
J-12	11	18" CMP	-0.48	C, with tide gate
J-12	12	18" CMP	-0.28	C
J-12	13	42" RCP	-0.06	C
J-12	14	42" RCP	0.10	C
J-12	15	Bridge	11.62 -2.5	Top of bridge Bottom of channel
J-12	16	8.0' x 8.0' BOX	-3.20	C

INVENTORY | MAP J12

existing drainage facilities
CITY OF CHARLESTON







LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
J-13	1	24" RCP	2.11	C
J-13	2	24" RCP	2.19	C
J-13	3	18" CMP	1.64	C
J-13	4	18" CMP	1.68	C
J-13	5	24" RCP	4.10	C
J-13	6	24" RCP	3.96	C
J-13	7	30" CMP	-0.82	C
J-13	8	30" CMP	-1.50	C

INVENTORY

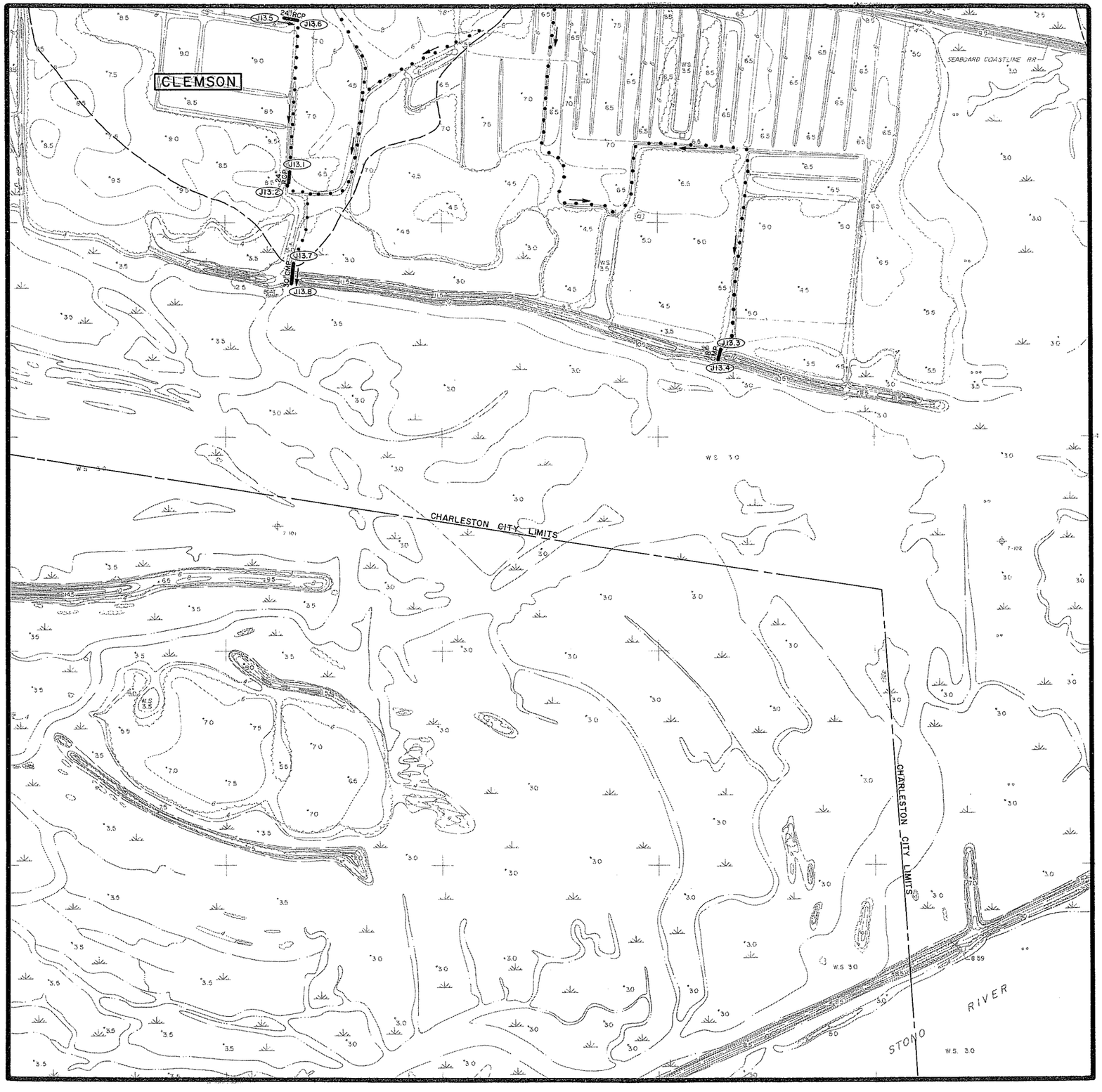
MAP J13

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14		J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

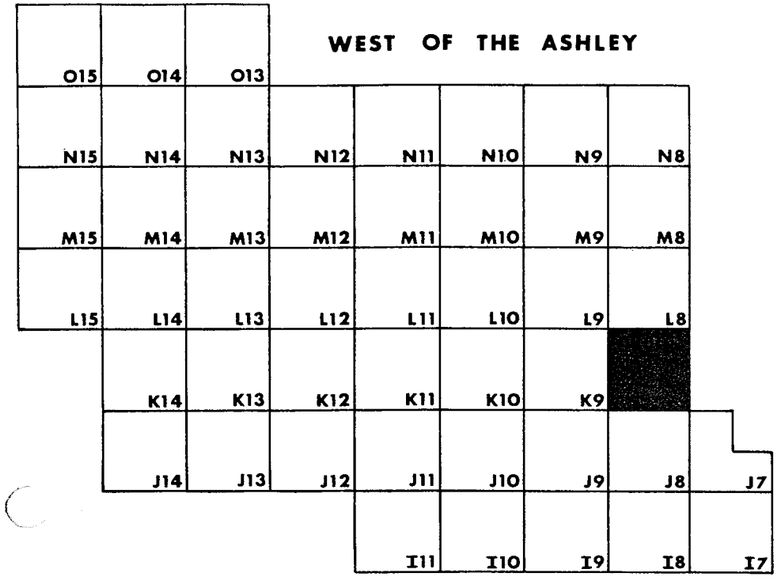
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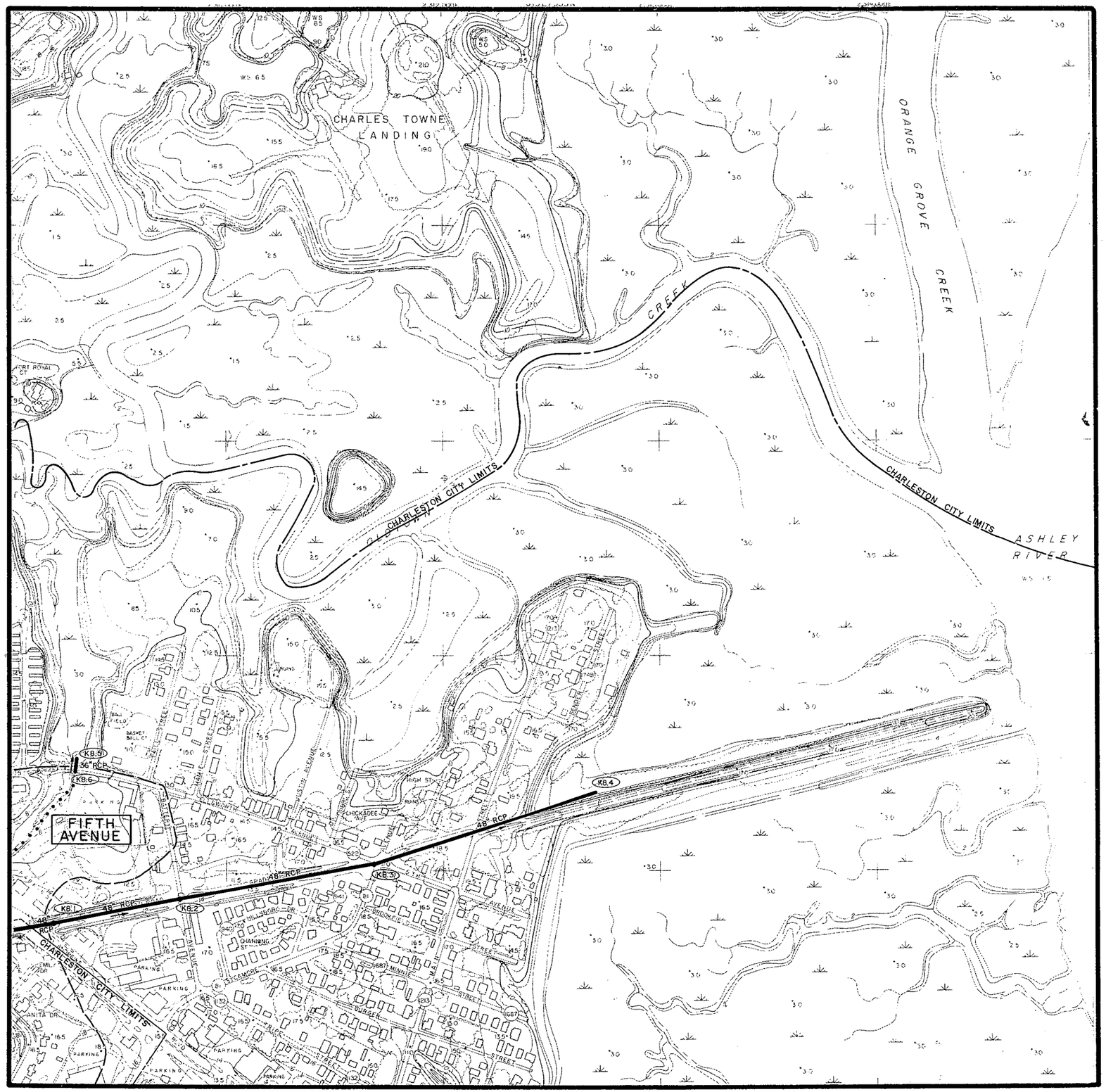
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-8	1	48" RCP (E) 48" RCP (W)	6.32 6.39	C
K-8	2	48" RCP (E) 48" RCP (W)	5.74 5.85	C C
K-8	3	48" RCP (E) 48" RCP (W)	5.16 5.16	C C
K-8	4	48" RCP	-	C
K-8	5	36" RCP	2.14	C
K-8	6	36" RCP	1.54	C

INVENTORY

MAP K8

existing drainage facilities
CITY OF CHARLESTON





N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

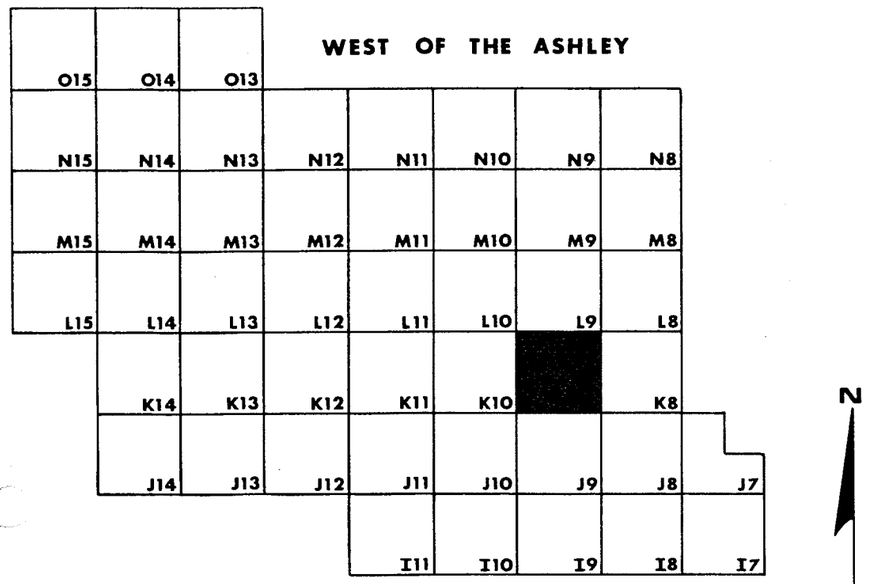
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-9	1	36" RCP (N) 42" RCP (E) 42" RCP (S/E)	1.42 2.29 1.45	C
K-9	2	42" RCP	1.10	C
K-9	3	42" RCP (N) 42" RCP (W) 42" RCP (S)	0.88 2.18 1.48	C
K-9	4	42" RCP	1.34	C
K-9	5	72" RCP	-0.88	C
K-9	6	24" RCP (N) 15" RCP (W) 18" RCP (S)	4.98 7.41 7.46	C
K-9	7	36" RCP (N) 36" RCP (S)	2.58 2.58	C
K-9	8	42" RCP (S) 42" RCP (W)	3.23 3.19	C
K-9	9			CNO
K-9	10			PO
K-9	11			PO
K-9	12			PO
K-9	13	36" CMP (N) 36" CMP (S)	5.21 5.21	C
K-9	14	36" CMP (W) 36" CMP (S)	6.05 6.05	C
K-9	15	30" CMP (N) 36" CMP (S)	6.80 6.36	C
K-9	16	24" RCP (N) 30" CMP (S)	8.40 7.71	C
K-9	17	18" CMP (N) 24" RCP (S)	8.43 8.43	C
K-9	18	42" RCP (E-1) 42" RCP (E-2) 42" RCP (W-1) 42" RCP (W-2)	4.65 4.59 4.48 4.42	C
K-9	19	36" RCP (W) 42" RCP (E-1) 42" RCP (E-2) 18" RCP (S/W) 15" RCP (S)	5.19 5.39 5.39 7.94 7.94	C
K-9	20	36" RCP (S/E) 36" RCP (W) 18" CMP (E)	5.78 5.48 7.80	C
K-9	21	48" RCP (N) 48" RCP (S)	4.14 4.14	C
K-9	22	48" RCP (N) 48" RCP (S)	3.46 3.21	C
K-9	23	54" RCP (N) 54" RCP (S/E)	1.31 1.85	C
K-9	24	36" RCP (N) 36" RCP (S)	6.89 6.95	C
K-9	24.1	24" RCP	10.20	C
K-9	25	36" RCP (E) 36" RCP (W)	6.85 6.56	C
K-9	26	36" RCP (E) 36" RCP (W)	6.83 6.83	C
K-9	27	36" RCP	7.14	C
K-9	28	30" RCP	7.60	C
K-9	29	30" RCP	7.60	C
K-9	30	24" RCP 24" RCP	7.75 7.52	C

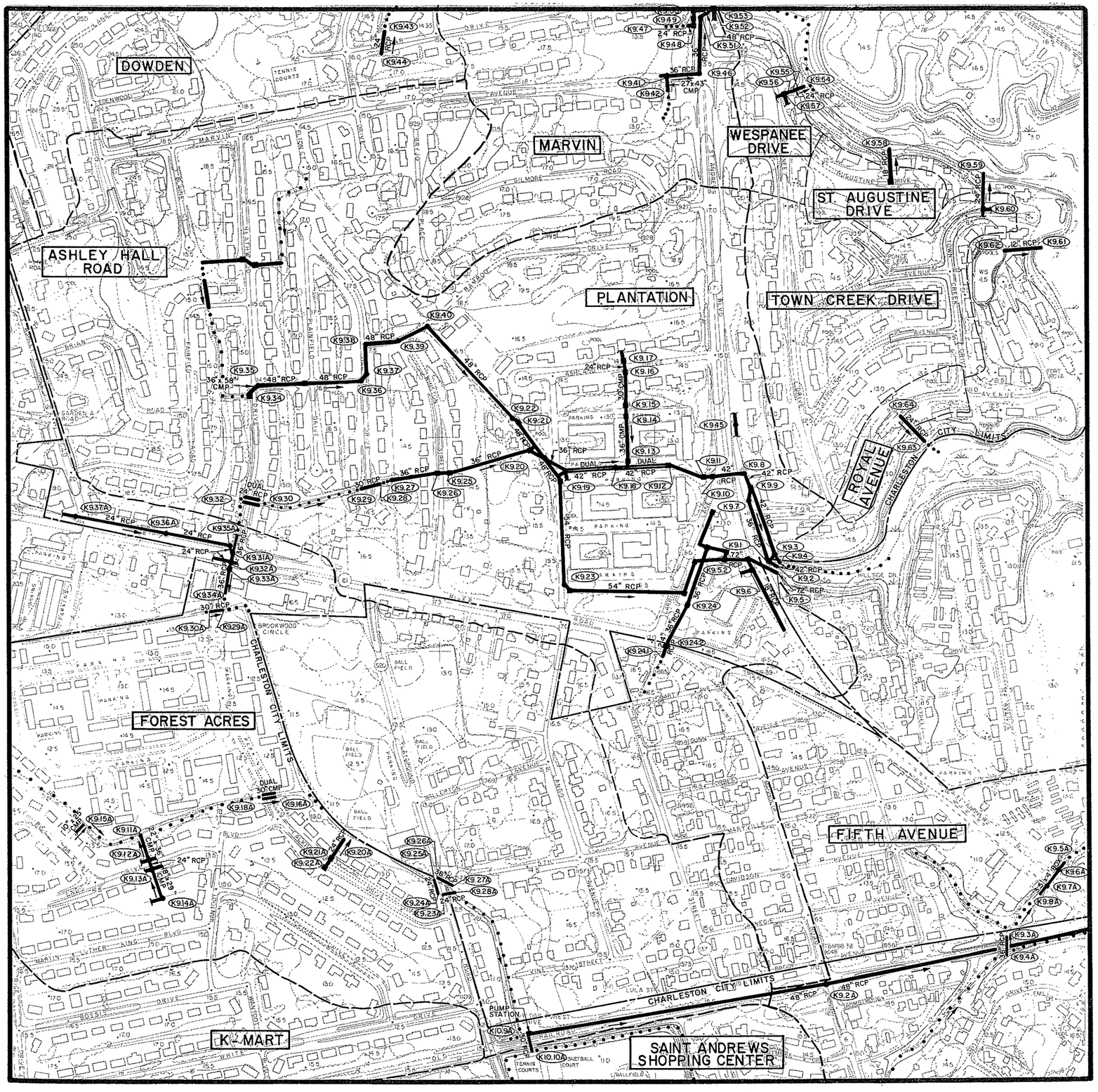
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-9	3A	36" RCP	3.72	C
K-9	4A	36" RCP	3.40	C
K-9	5A	3.5' x 4.0' BOX	2.70	C
K-9	6A	3.5' x 4.0' BOX 3.5' x 4.0' BOX	2.17 2.17	C
K-9	7A	3.5' x 4.0' BOX 3.5' x 4.0' BOX	2.88 2.88	C
K-9	8A	3.5' x 4.0' BOX	2.76	C
K-9	9A	Pump Station	-	
K-9	10A	30" RCP	9.94	C
K-9	11A	22" x 36" CMP	8.24	HFS
K-9	12A	22" x 36" CMP (N) 24" RCP (S) 15" RCP (E) 15" RCP (W)	8.45 8.33 9.06 9.23	HFS
K-9	13A	24" RCP (N) 18" x 29" CMP (S) 15" RCP (E) 15" RCP (W)	8.66 8.75 9.60 9.56	C
K-9	14A	18" x 29" CMP (N) 16" x 25" CMP (W)	9.98 9.98	C
K-9	15A	16" x 25" CMP	9.68	C
K-9	16A	30" CMP 30" CMP	7.48 7.40	C
K-9	18A	30" CMP 30" CMP	7.49 7.44	C
K-9	20A	24" RCP	8.63	C
K-9	21A		-	CNO
K-9	22A		-	CNO
K-9	23A	24" RCP	7.42	C
K-9	24A	24" RCP	8.17	C
K-9	25A	24" RCP	7.12	C
K-9	26A	36" RCP	7.57	C
K-9	27A	36" RCP	6.73	C
K-9	28A	24" RCP	7.53	C
K-9	29A	30" RCP	7.83	HFS
K-9	30A	30" RCP	8.14	HFS
K-9	31A	36" RCP (N) 36" RCP (S) 24" RCP (N/W)	8.72 9.38 9.98	FS HFS HFS
K-9	32A	36" RCP (N) 36" RCP (S) 18" RCP (E) 24" RCP (W)	8.33 8.54 9.86 9.96	C
K-9	33A	36" RCP (N) 36" RCP (S)	8.93 8.93	HFS
K-9	34A	36" RCP	8.90	HFS
K-9	35A	24" RCP (S/E) 24" RCP (W)	10.57 10.64	C
K-9	36A	24" RCP (E) 24" RCP (W)	11.61 11.62	C
K-9	37A	24" RCP (E) 18" RCP (W)	14.08 14.32	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-9	32	24" RCP 24" RCP	7.75 7.90	C
K-9	34	36" x 58" CMP	8.69	C
K-9	35	48" RCP (E) 36" x 58" CMP (W)	7.83 8.44	C
K-9	36	48" RCP (E) 48" RCP (W)	6.54 6.58	C
K-9	37	48" RCP (N) 48" RCP (W)	6.28 6.50	C
K-9	38	48" RCP (E) 48" RCP (S)	5.82 5.95	C
K-9	39	48" RCP (E) 48" RCP (W)	5.38 5.53	C
K-9	40	48" RCP (W) 48" RCP (S)	4.86 4.79	C
K-9	41	27" x 43" CMP (S) 36" RCP (E) 18" RCP (W)	7.43 6.56 7.49	C
K-9	42	27" x 43" CMP	7.72	C
K-9	43	24" RCP	10.54	C
K-9	44	24" RCP	10.88	C
K-9	45	18" RCP (N) 18" RCP (S)	5.72 5.72	C
K-9	46	36" RCP (N) 36" RCP (W)	5.96 6.16	C
K-9	47	24" RCP	5.89	C
K-9	48	24" RCP (N) 24" RCP (W)	5.92 5.98	C
K-9	49	24" RCP (N) 24" RCP (S)	4.33 6.18	C
K-9	50	24" RCP (E) 24" RCP (S)	4.33 4.59	C
K-9	51	36" RCP (S) 36" RCP (E)	4.27 4.27	C
K-9	52	48" RCP (E) 24" RCP (W) 36" RCP (W) 15" AIP (N) 15" RCP (S)	3.45 3.64 3.91 5.27 5.40	C
K-9	53	48" RCP	4.16	C
K-9	54	24" RCP	5.49	C
K-9	55	24" RCP	6.86	C
K-9	56	24" RCP	7.02	C
K-9	57	24" RCP (E) 18" RCP (W) 18" RCP (S)	4.84 7.72 7.09	C
K-9	58	18" RCP	4.02	HFS
K-9	59	24" RCP	2.77	C
K-9	60	24" RCP (N) 15" RCP (S) 15" RCP (E)	3.45 5.02 4.99	C
K-9	61	12" RCP	2.58	C
K-9	62	12" RCP	3.99	C
K-9	63	24" RCP	4.11	C
K-9	64	24" RCP	5.30	C
K-9	2A	48" RCP (E) 48" RCP (W)	8.59 8.53	C

INVENTORY | MAP K9

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

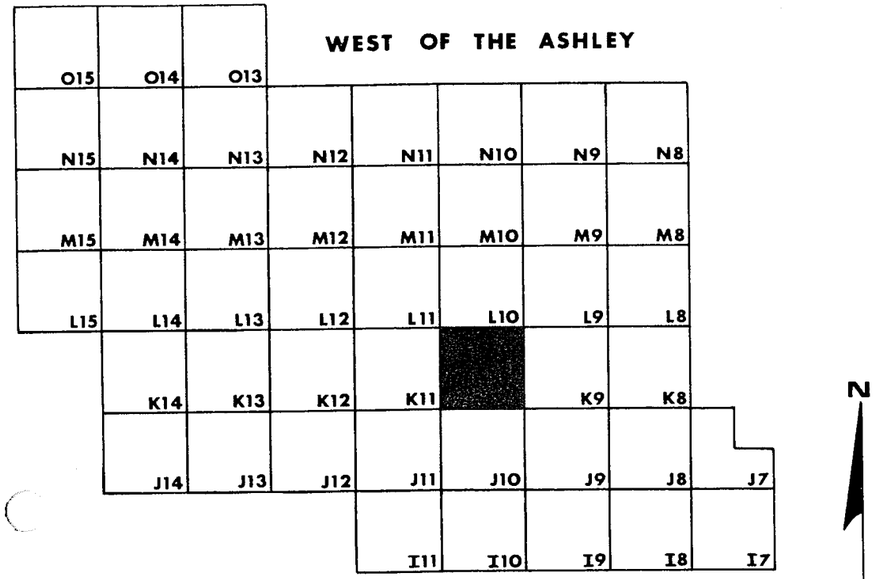
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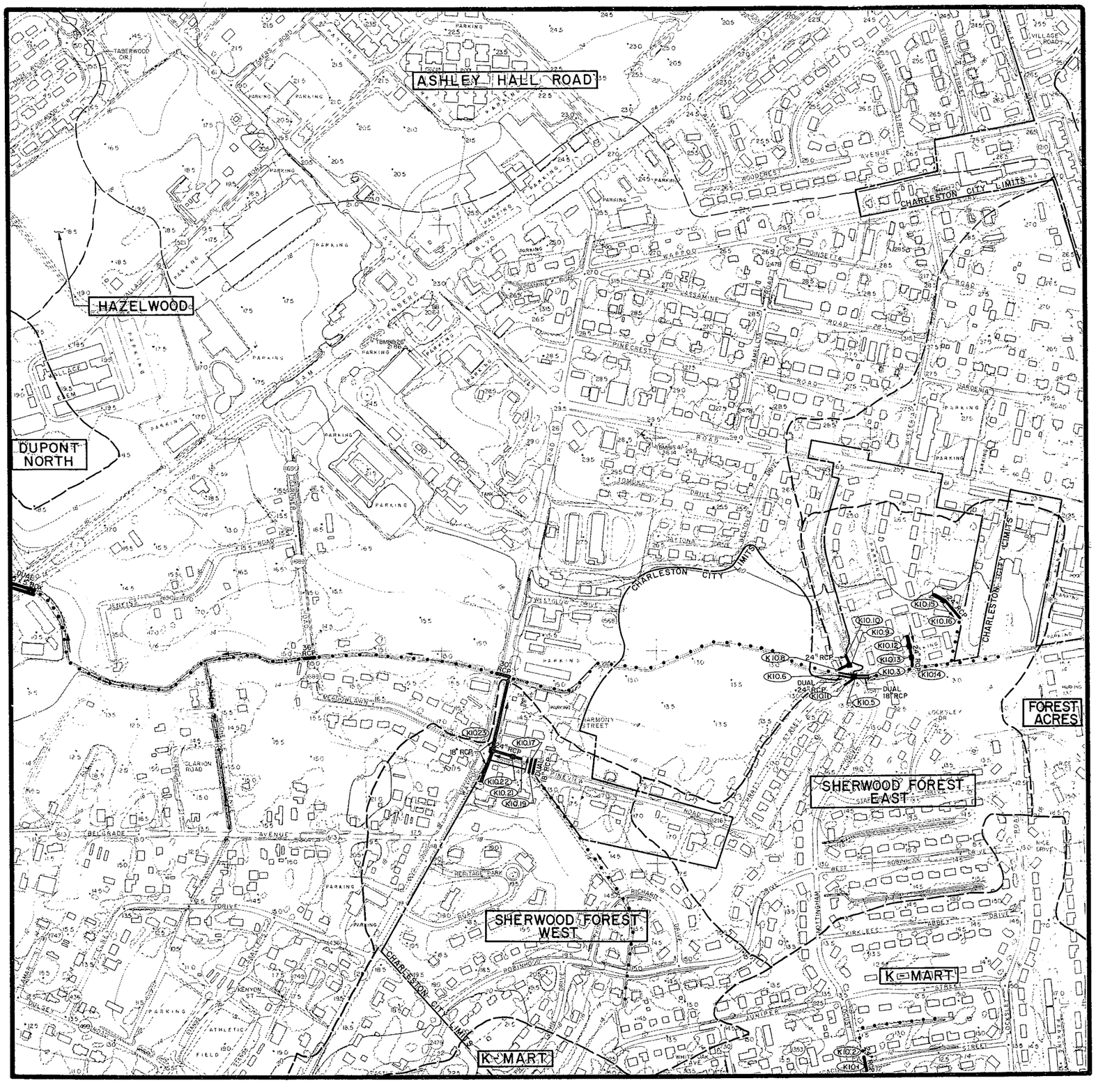
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-10	1	24" RCP	9.28	C
K-10	2	24" RCP	9.64	C
K-10	3	18" RCP 18" RCP	8.78 8.87	C
K-10	5		-	CNO
K-10	6	24" RCP 24" RCP	8.65 8.63	C
K-10	8	24" RCP	8.70	C
K-10	9		-	CNO
K-10	10	24" RCP	9.29	C
K-10	11	18" RCP	9.13	C
K-10	12	18" RCP (N) 24" RCP (S)	11.78 11.78	C
K-10	13	24" RCP (N) 24" RCP (S)	10.99 10.97	C
K-10	14	24" RCP	9.90	C
K-10	15	18" RCP 24" RCP	15.01 15.01	C
K-10	16	24" RCP	9.91	C
K-10	17	18" RCP 18" RCP	9.08 9.12	C
K-10	19	18" RCP 18" RCP	9.17 9.11	C
K-10	21	24" RCP	9.56	C
K-10	22	24" RCP (E) 24" RCP (W)	9.22 9.35	C
K-10	23	18" RCP (N) 18" RCP (S) 24" RCP (E)	9.06 9.43 9.21	C

INVENTORY

MAP K10

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

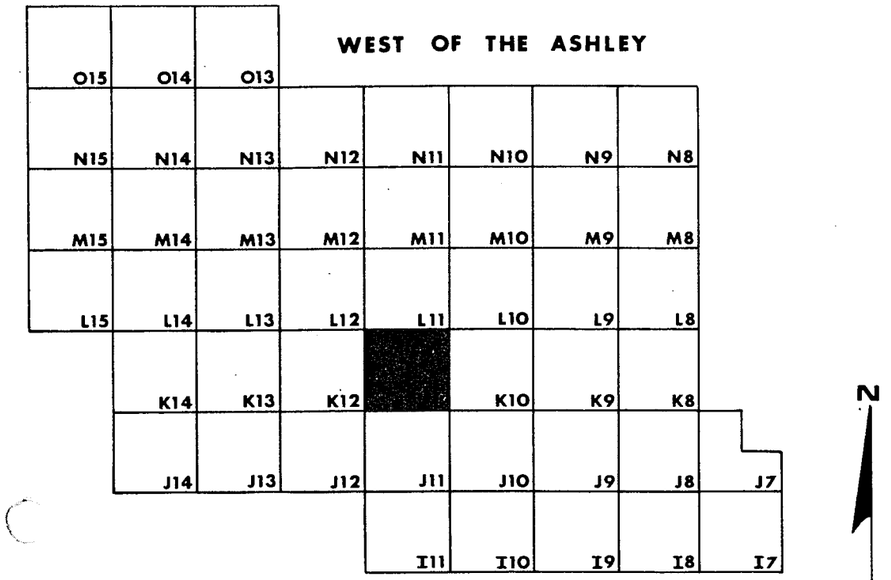
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-11	1	18" RCP (N)	-	C
		18" RCP (S)	-	
		36" RCP (E)	5.25	
		36" RCP (W)	-	
K-11	2	36" RCP	9.06	HFS
K-11	3	36" RCP (E)	5.37	C
		42" RCP (N)	5.23	C
		36" RCP (W#1)	5.27	C
		36" RCP (W#2)	5.26	FWT
K-11	4	42" RCP	5.16	C
K-11	5		-	CNO
K-11	6		-	CNO
K-11	7	36" RCP (E)	4.89	C
		36" RCP (W)	4.83	
		12" RCP (N)	-	
K-11	8	36" RCP (E)	-	CNO
		36" RCP (W)	-	
		24" RCP (N)	-	
K-11	9	24" RCP	5.47	C
K-11	10	42" RCP (S#1)	-	C
		42" RCP (S#2)	-	
		30" RCP (W)	-	
		36" RCP (E#1)	-	
		36" RCP (E#2)	-	
K-11	11	42" RCP	4.76	C
		42" RCP	4.93	
K-11	13	30" RCP	5.83	C
K-11	14	18" RCP	-	HFS
		18" RCP	6.02	
K-11	16	18" RCP (E#1)	6.07	HFS
		18" RCP (E#2)	6.08	
		18" RCP (W#1)	6.13	
		18" RCP (W#2)	6.13	
K-11	17	24" RCP (S)	6.50	HFS
		18" RCP (N)	9.13	C
		18" RCP (E#1)	-	FWT
		18" RCP (E#2)	-	FWT
K-11	18	24" RCP	8.84	C
K-11	19	24" RCP	9.01	C
K-11	20	48" RCP	3.29	C
		48" RCP	3.25	
K-11	22	48" RCP	3.43	C
		48" RCP	3.35	
K-11	24	24" RCP (N)	7.73	C
		18" RCP (S)	7.72	
		15" RCP (W)	7.78	
K-11	25	24" RCP	7.95	C
K-11	26	24" RCP	7.87	C
K-11	27	24" RCP	7.45	C
K-11	28	24" RCP	7.60	C
K-11	29	24" RCP	7.60	C
K-11	30	24" RCP	7.95	C
K-11	31	36" RCP (N)	4.70	C
		36" RCP (S)	4.70	
		18" RCP (S/W)	5.30	
		15" RCP (N/E)	-	
K-11	32	36" RCP	4.44	C

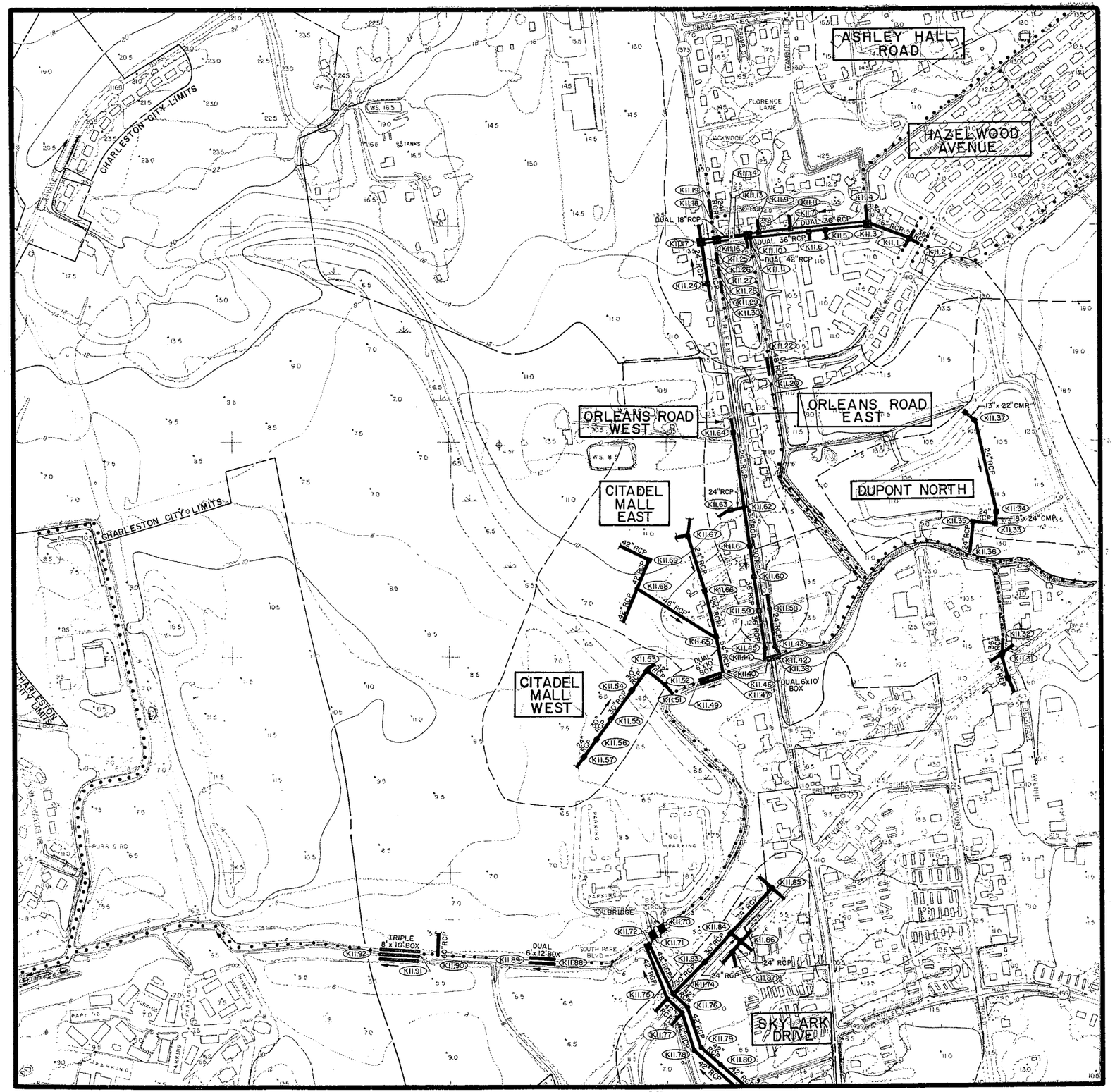
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-11	33	24" RCP (W)	4.67	C
		18" x 29" CMP (N)	4.56	
K-11	34	24" RCP (N)	4.82	C
		18" x 29" CMP (S)	4.82	
K-11	35	24" RCP (E)	4.44	C
		24" RCP (S)	4.44	
K-11	36	24" RCP	4.20	C
K-11	37	24" RCP (S)	5.40	C
		13" x 22" CMP (N)	5.38	
K-11	38	6' x 10' BOX	2.58	C
		6' x 10' Box	2.60	
K-11	40	6' x 10' BOX	2.73	C
		6' x 10' Box	2.73	
K-11	42	24" RCP	7.94	C
K-11	43	24" RCP (S/E)	2.79	C
		24" RCP (N)	2.82	
K-11	44	36" RCP	2.60	C
K-11	45	36" RCP (S/W)	2.46	C
		36" RCP (N)	2.41	
K-11	46	54" RCP	6.40	C
K 11	47	6' x 10' BOX	1.13	C
		6' x10' Box	1.10	HFS
K-11	49	6' x 10' BOX	1.37	C
		6' x 10' Box	1.34	HFS
K-11	51	42" RCP	1.99	C
K-11	52	42" RCP (E)	1.68	C
		42" RCP (W)	1.89	
K-11	53	42" RCP (S/E)	1.95	C
		30" RCP (W)	2.09	
		15" RCP (E)	3.61	
K-11	54	30" RCP (E)	2.67	C
		30" RCP (W)	2.72	
K-11	55	30" RCP (E)	3.05	C
		30" RCP (W)	3.14	
K-11	56	30" RCP (E)	3.35	C
		24" RCP (W)	3.85	
K-11	57	24" RCP (E)	3.66	C
		18" RCP (W)	3.71	
K-11	58	18" RCP (N)	3.05	C
		24" RCP (S)	2.99	
K-11	59	36" RCP (N)	2.80	C
		36" RCP (S)	2.74	
K-11	60	30" RCP (N)	3.57	C
		36" RCP (S)	3.52	
K-11	61	30" RCP (N)	4.07	C
		30" RCP (S)	3.97	
K-11	62	24" RCP (N)	4.69	C
		30" RCP (S)	4.61	
		24" RCP (W)	4.37	
K-11	63	24" RCP (E)	4.56	C
		18" RCP (W)	4.56	
K-11	64	18" RCP (N)	5.13	C
		24" RCP (S)	5.05	
K-11	65	54" RCP (S)	2.57	C
		24" RCP (N/E)	2.53	
		48" RCP (N/W)	2.64	

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-11	66	24" RCP (N)	4.22	C
		24" RCP (S)	3.62	
K-11	67	15" RCP (N)	5.50	C
		24" RCP (S)	4.89	
		18" RCP (W)	5.18	
K-11	68	42" RCP (E)	3.77	C
		42" RCP (W)	3.69	
		48" RCP (S)	3.50	
K-11	69	42" RCP (N)	3.98	C
		42" RCP (W)	3.81	
K-11	70	BRIDGE	7.09	Top of bridge
			0.91	Bottom of channel
K-11	71	BRIDGE	7.96	Top of bridge
			1.11	Bottom of channel
K-11	72	48" RCP	0.83	C
		42" RCP	0.96	
K-11	74	48" RCP (N)	1.25	C
		42" RCP (S)	1.60	
		30" RCP (E)	1.18	
K-11	75	42" RCP (N)	1.31	C
		42" RCP (S)	1.39	
		18" RCP (W)	4.23	
K-11	76	42" RCP (N)	1.13	C
		42" RCP (S)	1.61	
K-11	77	42" RCP (N)	1.20	C
		42" RCP (S)	1.43	
		18" RCP (W)	3.94	
K-11	78	42" RCP (N)	2.36	C
		42" RCP (S)	2.26	
K-11	79	42" RCP (N)	2.41	C
		42" RCP (S)	2.31	
K-11	80	42" RCP (N)	2.61	C
		42" RCP (S)	2.61	
K-11	83	30" RCP (E)	1.98	C
		30" RCP (W)	1.74	
K-11	84	30" RCP (W)	2.59	C
		24" RCP (S)	3.46	
		24" RCP (E)	2.65	
K-11	85	18" RCP (N)	3.02	C
		18" RCP (S)	2.91	
		24" RCP (W)	2.83	
K-11	86	24" RCP (N)	3.87	C
		15" RCP (S)	4.12	
		18" RCP (E)	3.77	
		24" RCP (W)	3.94	
K-11	87	24" RCP (E)	4.06	C
		15" RCP (W)	4.02	
		15" RCP (S)	5.21	
K-11	88	DUAL 6' x 12' BOXES	-1.53	C
K-11	89	DUAL 6' x 12' BOXES	0.03	C
K-11	90	60" RCP	0.69	C
K-11	91	3 - 8' x 10' BOXES	-0.77	C
K-11	92	3 - 8' x 10' BOXES	-1.63	C

INVENTORY | MAP K11

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

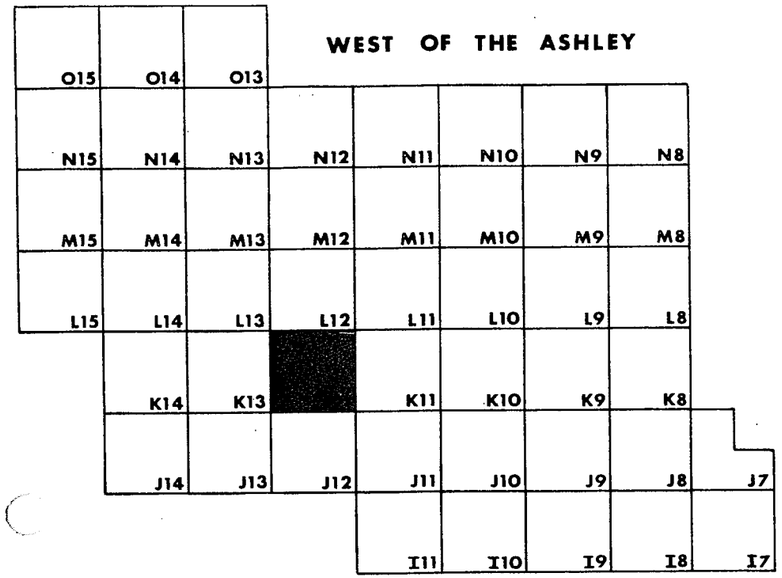
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-12	1	8' x 8' BOX	-3.06	C

INVENTORY

MAP K12

existing drainage facilities
CITY OF CHARLESTON





N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
K-13	1	30" RCP 18" RCP 36" RCP	6.56 3.56 2.56	C
K-13	4	18" RCP 30" RCP 36" RCP	- 6.19 2.81	
K-13	7	18" RCP	-	C
K-13	8	18" RCP	-	C
K-13	9	24" RCP	7.75	C
K-13	10	24" RCP	7.97	C
K-13	11	30" RCP	5.22	C
K-13	12	30" RCP	5.26	C
K-13	13	36" RCP	4.18	C
K-13	14	36" RCP	4.97	C
K-13	15	18" RCP	6.35	C
K-13	16	18" RCP	6.20	C
K-13	17	24" RCP	4.34	C
K-13	18	24" RCP	3.92	C
K-13	19	24" RCP	2.26	C
K-13	20	24" RCP	2.19	C
K-13	21	8' x 8' BOX	-3.68	C
K-13	22	8' x 8' BOX	-3.78	C
K-13	23	24" RCP	4.41	C
K-13	24	24" RCP	4.32	C

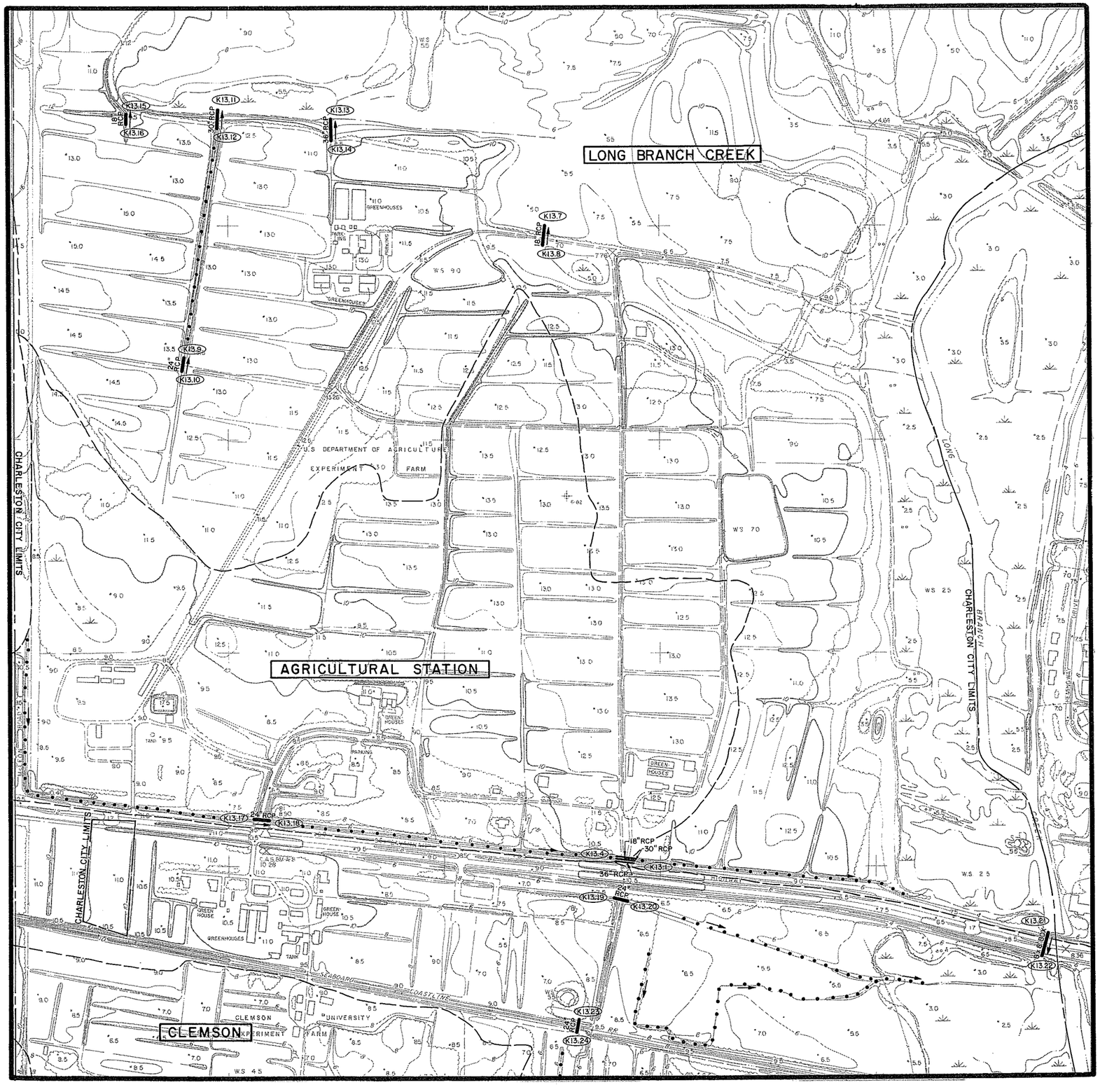
INVENTORY | MAP K13

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14		K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

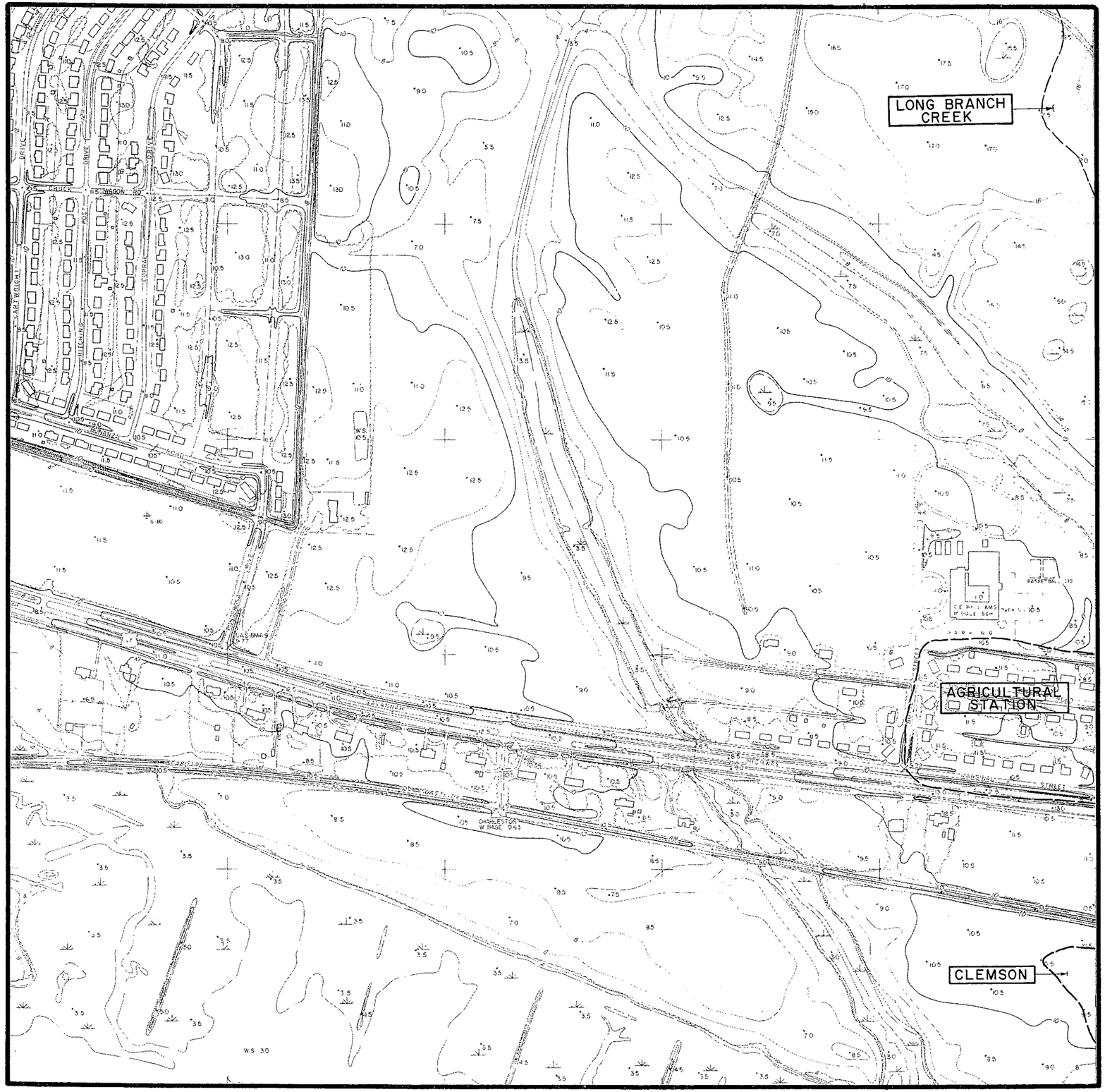
INVENTORY | MAP K14

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
		K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-8	1	24" RCP	6.11	C
L-8	2	15" RCP	6.62	C
L-8	3	18" RCP	4.94	C
L-8	4	36" RCP	2.16	C
L-8	5	24" RCP	2.92	HFS
L-8	6	24" RCP (N)	3.93	C
L-8	7	36" RCP (E) 36" RCP (S)	2.64 2.62	C
L-8	8	48" RCP 48" RCP	1.88 1.96	C
L-8	10	48" RCP 48" RCP	1.93 2.25	C
L-8	12	36" RCP (N) 36" RCP (S)	3.14 3.14	C
L-8	13	36" RCP (N) 36" RCP (S)	5.42 5.42	C
L-8	14	36" RCP (N) 36" RCP (S)	5.65 5.65	C
L-8	15	36" RCP (N) 36" RCP (S) 36" RCP (W)	6.92 7.05 7.04	C
L-8	16	36" RCP (S)	7.19	HFS
L-8	17	36" RCP (E) 36" RCP (S)	9.89 9.83	C
L-8	18	36" RCP	10.06	C
L-8	19	24" RCP	12.62	C
L-8	20	24" RCP (N) 18" RCP (S) 24" RCP (E)	12.26 12.23 12.46	C
L-8	21	24" RCP (N) 24" RCP (S)	13.50 13.50	C
L-8	22	24" RCP (N) 24" RCP (S)	13.93 13.93	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-8	23	24" RCP	13.95	C
L-8	24	24" RCP	12.95	C
L-8	25	24" RCP	12.94	C
L-8	26	24" RCP	13.31	C
L-8	27	24" RCP	13.53	C
L-8	28	24" RCP	14.53	C
L-8	29	24" RCP	13.99	C
L-8	30	24" RCP	14.12	C
L-8	31	18" RCP (E) 18" RCP (W) 24" RCP	13.92 13.99 14.06	C
L-8	32	24" RCP	14.19	C
L-8	33	24" RCP	14.29	C
L-8	34	24" RCP	14.56	C
L-8	35	24" RCP	8.07	C
L-8	36	18" RCP	3.71	C
L-8	37	30" RCP	2.66	C
L-8	38	30" RCP	1.63	C
L-8	39	36" RCP	2.56 2.92	C
L-8	40	36" RCP (N) 30" RCP (S)	4.59 4.51 6.55 6.82	C
L-8	41	30" RCP (N) 24" RCP (S) 15" RCP (E) 15" RCP (W)	4.53 4.48 5.73	C
L-8	42	24" RCP (N) 24" RCP (S) 15" RCP (W)	6.77 6.62	C
L-8	43	24" RCP (N) 18" RCP (W)	3.49	C
L-8	44	15" RCP	3.82	C
L-8	45	15" RCP		

INVENTORY

MAP L8

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-9	1	24" RCP	14.50	C
L-9	2	24" RCP	14.80	C
L-9	3	24" RCP	15.20	C
L-9	4	24" RCP	15.03	C
L-9	5	24" RCP	15.06	C
L-9	6	24" RCP	15.18	C
L-9	7	24" RCP	15.10	C
L-9	8	24" RCP	15.30	C
L-9	9	40" x 65" CMP	5.00	C
L-9	10	24" RCP (N/W) 18" RCP (N-1) 18" RCP (N-2) 18" RCP (E) 24" RCP (W) 40" x 65" CMP (S)	7.38 8.06 8.26 8.56 6.51 6.53	C
L-9	11	15" RCP (N) 24" RCP (W) 24" RCP (S/E) 24" RCP (S)	7.77 6.92 7.58 6.70	C
L-9	12	24" RCP	7.08	C
L-9	13	24" RCP (N) 24" RCP (S)	6.71 6.49	C
L-9	14			CNO
L-9	15	36" CMP	-	C
L-9	16	36" CMP (N) 36" CMP (S)	0.76 0.76	C
L-9	17	36" CMP	0.78	C
L-9	18	18" RCP	5.55	C
L-9	19	18" RCP (N) 18" RCP (S)	4.45 4.45	C
L-9	20	18" RCP	4.06	C
L-9	21	42" RCP 42" RCP 48" RCP 30" RCP 30" RCP	0.77 1.97 - 0.5 0.54	C C C HFS HFS
L-9	26	42" RCP (E) 42" RCP (E) 36" RCP (N) 30" RCP (E) 30" RCP (E)	2.74 2.74 3.05 - -	C
L-9	27	5' x 26' BOX	2.74	C
L-9	28	36" RCP (N) 36" RCP (S) 48" RCP (E)	3.12 3.06 1.86	C
L-9	29	27" x 43" CMP 24" RCP	8.84 8.67	C
L-9	30	27" x 43" CMP 24" RCP	9.23 8.98	C
L-9	33	27" x 43" CMP 24" RCP	7.08 7.04	C
L-9	34	27" x 43" CMP 24" RCP	8.12 7.60	C
L-9	37			CNO
L-9	38			CNO

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-9	39	18" x 29" (S/E) 18" RCP (N) 18" RCP (W)	13.10 13.31 13.26	C
L-9	40	24" CMP (W) 12" RCP (S/E)	14.72 15.76	C
L-9	41	24" CMP (E) 27" CMP (S)	14.08 14.28	C
L-9	42	27" CMP (N) 30" CMP (S) 12" RCP (E)	13.94 13.69 15.23	C
L-9	43	30" CMP (N) 36" CMP (E)	13.06 12.90	C
L-9	44	36" CMP (N/W) 36" CMP (S/E)	12.75 12.55	C
L-9	45	36" CMP (W) 36" CMP (E)	12.01 11.72	C
L-9	46	36" CMP (E) 36" CMP (W)	11.13 11.18	C
L-9	47	36" CMP (N) 36" RCP (E) 36" RCP (S)	8.89 8.89 8.89	C
L-9	48	36" RCP	8.85	C
L-9	49	36" RCP	8.55	C
L-9	50	22" x 36" CMP 27" x 43" CMP	6.68 6.90	C
L-9	52	22" x 36" CMP (N) 27" x 43" CMP (N) 48" CMP (S) 12" RCP (E) 12" RCP (W)	5.55 5.55 5.55 - -	C
L-9	53	48" CMP	5.60	C
L-9	54	24" RCP	13.23	C
L-9	55			CNO
L-9	56	24" RCP	12.26	C
L-9	57	24" RCP	14.14	C
L-9	58	15" RCP (N) 15" RCP (S) 24" RCP (E)	14.50 14.35 14.57	C
L-9	59	24" RCP (E) 24" RCP (W)	20.41 20.28	C
L-9	60	24" RCP (E) 24" RCP (W)	20.22 20.15	C
L-9	61	18" RCP (W) 12" RCP (E)	21.63 21.63	C
L-9	62	18" RCP	15.56	C
L-9	63	36" RCP	18.12	C
L-9	64	36" RCP (N) 36" RCP (S) 12" RCP (W)	18.06 18.16 20.64	C
L-9	65	36" RCP (N) 36" RCP (S) 12" RCP (E) 12" RCP (W)	17.75 17.61 18.83 20.00	C
L-9	66	36" RCP (N) 36" RCP (S)	18.11 18.11	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-9	67	24" RCP (E) 24" RCP (S)	20.27 20.28	C
L-9	68	24" RCP (W) 24" RCP (S)	20.47 20.39	C
L-9	69	24" RCP (N) 24" RCP (W)	20.63 20.56	C
L-9	70	24" RCP	20.30	C
L-9	71	24" RCP	19.70	C
L-9	72	12" RCP (N) 12" RCP (S) 24" RCP (E)	21.13 21.59 20.69	C
L-9	73	24" RCP	14.36	C
L-9	74	18" RCP	13.88	C
L-9	75	24" RCP (N) 24" RCP (S) 15" RCP (W) 18" RCP (N)	16.90 - 14.43 14.43	C
L-9	76	18" RCP (N) 18" RCP (S) 15" RCP (E)	16.20 16.20 16.20	C
L-9	77	24" RCP	16.72	C
L-9	78	18" RCP	16.14	C
L-9	79	18" RCP	11.78	C
L-9	80	18" x 29" CMP	17.90	C
L-9	81	18" x 29" CMP	18.18	C
L-9	84	24" RCP (E) 24" RCP (W)	8.84 8.84	C
L-9	85	24" RCP (E) 30" CMP (N) 18" RCP (S)	8.26 8.13 8.14	C
L-9	86	30" CMP	6.36	C
L-9	88	24" RCP (N)	8.05	C
L-9	89	24" RCP (E) 18" RCP (W) 18" RCP (S)	7.85 8.23 8.16	C
L-9	91	36" CMP	7.16	C
L-9	92	36" RCP (N/W) 36" CMP (E) 24" RCP (W)	7.03 7.03 7.05	C
L-9	93	18" RCP (E) 15" RCP (W)	8.19 8.64	C
L-9	94			CNO
L-9	95			CNO
L-9	96	42" RCP	5.86	C
L-9	97	24" RCP	9.02	C
L-9	98	24" RCP 24" RCP	9.06 9.16	C
L-9	100	18" RCP	-	C

INVENTORY

MAP L9

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10		L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

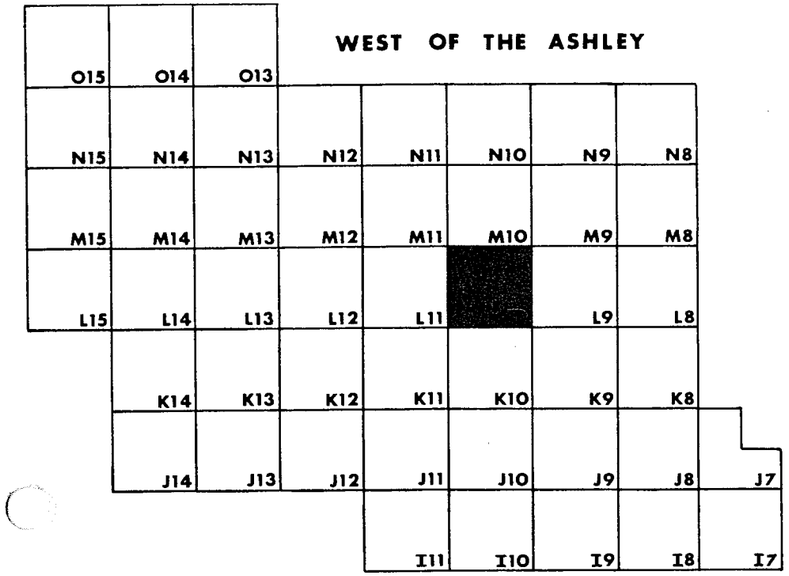
GRAPHIC SCALE 500 0 500 1000 1500 FEET

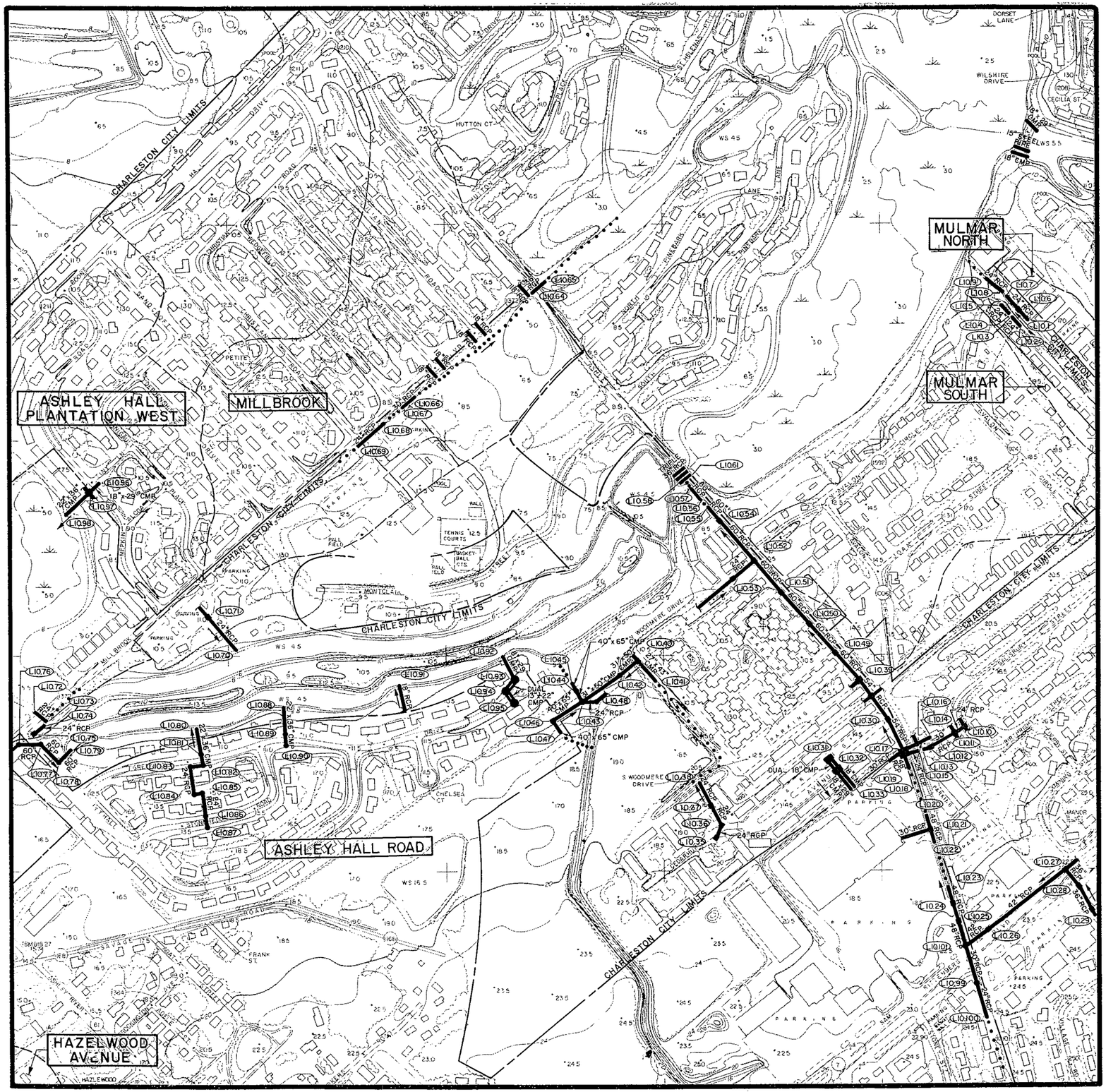
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-10	1	24" RCP	10.92	C
L-10	2	24" RCP	12.47	C
L-10	3	24" RCP	12.21	C
L-10	4	24" RCP	11.14	C
L-10	5	24" RCP	10.85	C
L-10	6	24" RCP (N) 24" RCP (S)	10.28 10.28	C
L-10	7	24" RCP	9.59	C
L-10	8	24" RCP	8.99	C
L-10	9	24" RCP	8.44	C
L-10	10	12" RCP (N) 12" RCP (S) 24" RCP (W)	11.49 11.42 10.93	C
L-10	11	18" RCP (N) 18" RCP (S) 24" RCP (E) 30" RCP (W)	11.21 11.11 10.88 10.75	C
L-10	12	30" RCP (E) 30" RCP (N/W)	9.32 9.59	C
L-10	13	30" RCP	9.21	C
L-10	14	24" RCP	9.61	C
L-10	15	24" RCP	9.34	C
L-10	16	15" RCP (N) 24" RCP (E) 24" RCP (W)	9.64 9.51 9.41	C
L-10	17			CNO
L-10	18	48" RCP	8.77	C
L-10	19	30" RCP	7.39	C
L-10	20	48" RCP	10.77	C
L-10	21	48" RCP (N) 48" RCP (S) 30" RCP (W)	10.66 10.66 11.41	C
L-10	22	48" RCP	10.52	C
L-10	23	48" RCP	13.13	C
L-10	24	48" RCP (N) 48" RCP (S)	13.22 13.30	C
L-10	25	48" RCP (N) 48" RCP (S)	13.58 13.55	C
L-10	26	42" RCP (E) 42" RCP (W)	14.53 14.43	C
L-10	27	18" RCP (E) 42" RCP (W) 36" RCP (S)	17.76 15.97 16.32	C
L-10	28			CNO
L-10	29	36" RCP (N) 36" RCP (S)	17.89 17.92	C
L-10	30	54" RCP (N) 54" RCP (S)	6.93 6.98	C
L-10	31	18" CMP (S-1) 18" CMP (S-2)	11.05 11.16	C
L-10	32	18" CMP (N) 18" CMP (N) 18"x29" CMP (S-1) 18" CMP (S-2)	10.97 10.97 10.79 10.82	C
L-10	33	18" CMP 18" x 29" CMP	10.97 10.84	C
L-10	35	24" RCP (N)	12.53	C
L-10	36	24" RCP (N) 24" RCP (S)	12.40 12.40	C
L-10	37	24" RCP (N) 24" RCP (S)	11.68 11.70	C
L-10	38	24" RCP	10.66	C
L-10	39	60" RCP (N) 54" RCP (S) 18" RCP (W)	5.08 5.09 5.62	C
L-10	40	15" RCP (N) 27" x 43" CMP (S) 31" x 50" CMP (W)	5.55 5.96 5.54	C
L-10	41	27" x 43" CMP	5.61	C
L-10	42	31" x 50" CMP (E) 31" x 50" CMP (W)	4.27 4.45	HFS
L-10	43	49" x 65" CMP (N) 24" RCP (S) 31" x 50" CMP (E) 40" x 65" CMP (W)	3.66 4.40 4.38 3.66	C
L-10	44	40" x 65" CMP (N) 40" x 65" CMP (S)	2.96 3.00	C
L-10	45	40" x 65" CMP	2.79	C
L-10	46	40" x 65" CMP (E) 40" x 65" CMP (S)	5.18 5.33	C
L-10	47	40" x 65" CMP	5.85	C
L-10	48	24" RCP (N/W) 15" RCP (E)	6.07 6.03	C
L-10	49			CNO
L-10	50			CNO
L-10	51			CNO
L-10	52	60" RCP (N) 60" RCP (S) 24" RCP (W)	2.37 2.66 3.46	C
L-10	53			CNO
L-10	54	60" RCP (N) 60" RCP (S)	0.63 0.63	C
L-10	55	60" RCP	0.59	C
L-10	56	60" RCP	0.88	C
L-10	57	60" RCP	0.53	C
L-10	58	36" RCP 36" RCP 36" RCP	-0.23 1.73 -0.12	C
L-10	61	36" RCP 36" RCP 36" RCP	-0.74 1.50 -0.24	C
L-10	64	36" RCP	0.67	C
L-10	65	36" RCP	0.67	C
L-10	66	30" RCP	3.99	C
L-10	67	30" RCP	4.16	C
L-10	68	24" RCP	4.52	C
L-10	69	24" RCP	5.87	C
L-10	70	24" RCP	2.74	C
L-10	71	18" RCP (N) 24" RCP (S)	4.16 3.36	C
L-10	72	24" RCP	3.15	C
L-10	73	24" RCP	3.33	C
L-10	74	24" RCP	2.93	C
L-10	75	24" RCP	3.44	C
L-10	76	60" RCP (W) 60" RCP (E)	0.69 0.76	C
L-10	77	60" RCP (W) 60" RCP (S)	0.86 0.86	C
L-10	78	60" RCP (N) 60" RCP (E)	0.62 0.77	C
L-10	79	60" RCP	0.21	C
L-10	80	22" x 36" CMP	5.00	C
L-10	81	22" x 36" CMP (N) 22" x 36" CMP (S)	6.64 6.54	C
L-10	82	22" x 36" CMP (N) 22" x 36" CMP (W)	6.70 6.83	C
L-10	83	22" x 36" CMP (E) 24" RCP (S)	7.23 7.37	C
L-10	84	24" RCP (N) 24" RCP (E)	7.77 7.84	C
L-10	85	24" RCP (W) 24" RCP (S)	7.82 7.82	C
L-10	86	24" RCP (N) 24" RCP (S)	8.41 8.46	C
L-10	87	24" RCP (N)	8.39	C
L-10	88	22" x 36" CMP	4.75	C
L-10	89	22" x 36" CMP (N) 22" x 36" CMP (S)	6.14 6.14	C
L-10	90	22" x 36" CMP (N)	6.16	C
L-10	91	18" RCP	5.11	C
L-10	92	18" x 29" CMP	5.26	C
L-10	93	18" x 29" CMP (N) 13" x 22" CMP (W-1) 13" x 22" CMP (W-2)	5.80 5.75 5.80	C
L-10	94	13" x 22" CMP (E-1) 13" x 22" CMP (E-2) 13" x 22" CMP (S-1) 13" x 22" CMP (S-2)	6.03 5.85 6.18 5.96	C
L-10	95	13" x 22" CMP (N-1) 13" x 22" CMP (N-2)	6.24 6.04	C
L-10	96	18" x 29" CMP	4.93	C
L-10	97	18" RCP (N) 18" RCP (S) 18" x 29" CMP (E) 22" x 36" CMP (W)	- - - -	CNO
L-10	98	22" x 36" CMP	-	Could not find outlet end
L-10	99	30" RCP (N) 24" RCP (S)	16.19 18.10	C
L-10	100	24" RCP	20.24	C
L-10	101			CNO

INVENTORY

MAP L10

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-11	1	42" RCP	0.07	C
L-11	2	42" RCP	-0.40	C
L-11	3	48" CMP	1.23	C
L-11	4	48" CMP (N) 48" CMP (S)	1.16 1.16	C
L-11	5	48" CMP	0.97	C
L-11	6	36" RCP	2.33	C
L-11	7	36" RCP (E) 36" RCP (W)	2.29 2.29	C
L-11	8	36" RCP	1.97	C
L-11	9	30" RCP	2.48	C
L-11	10	24" RCP (E) 30" RCP (W) 18" RCP (S)	2.91 2.47 3.01	C
L-11	11	24" RCP (N) 24" RCP (S)	3.81 3.81	C
L-11	12	24" RCP	4.31	C
L-11	13	24" RCP	2.84	C
L-11	14	24" RCP (N) 18" RCP (S) 24" RCP (W)	2.78 2.88 2.54	C
L-11	15	24" RCP (W) 18" RCP (N) 24" RCP (E)	2.82 3.00 2.50	C
L-11	16	24" RCP (E) 24" RCP (W)	1.34 1.34	C
L-11	17	24" RCP (W) 24" RCP (E)	1.24 1.14	C
L-11	18	24" RCP	0.53	C
L-11	19	36" RCP	0.86	FS
L-11	20	36" RCP	0.57	C
L-11	21	18" x 29" CMP	4.97	C
L-11	22		-	PO
L-11	23	36" RCP	3.73	C
L-11	24	22" x 36" CMP (E) 13" x 22" CMP (S)	4.28 4.30	C
L-11	25	22" x 36" CMP (E) 22" x 36" CMP (W) 18" RCP (S)	4.02 4.05 4.16	C
L-11	26	22" x 36" CMP (W) 24" RCP (E)	3.76 3.70	C
L-11	27	24" RCP (N) 24" RCP (W)	3.33 3.33	C
L-11	28	15" CMP	4.11	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-11	29	24" CMP (E) 15" RCP (W) 15" RCP (S/W)	4.05 4.58 4.95	C
L-11	30	24" CMP	3.63	C
L-11	31	12" CMP	3.81	C
L-11	32	15" CMP	9.09	C
L-11	33	24" CMP	2.10	C
L-11	34	24" CMP (E) 24" RCP (W)	2.90 2.93	C
L-11	35	24" RCP (E) 24" CMP (W)	2.97 2.94	C
L-11	36	24" CMP (E) 18" CMP (W)	3.81 3.81	C
L-11	37	18" RCP (E) 24" CMP (W)	3.13 3.11	C
L-11	38	24" CMP (E) 27" x 43" CMP (W) 27" x 43" CMP (S)	2.58 2.63 2.79	C
L-11	39	27" x 43" CMP	2.97	C
L-11	40	27" x 43" CMP	2.29	C
L-11	41	36" RCP	1.91	C
L-11	42	36" RCP	1.79	C
L-11	43	36" RCP	3.04	C
L-11	44		-	CNO
L-11	45	30" RCP	2.77	C
L-11	46	60" RCP (N) 60" RCP (S)	1.18 1.18	C
L-11	47	60" RCP (N) 60" RCP (S)	2.12 2.57	C
L-11	48	60" RCP (N) 60" RCP (S) 24" RCP (E)	3.86 4.21 6.63	C
L-11	49	60" RCP (N) 60" RCP (S)	5.24 6.08	C
L-11	50	30" RCP (E) 60" RCP (W) 60" RCP (S/E)	6.72 6.47 6.62	C
L-11	51	30" RCP (E) 30" RCP (W)	8.12 7.69	C
L-11	52	24" RCP (E) 30" RCP (W)	8.62 8.35	C

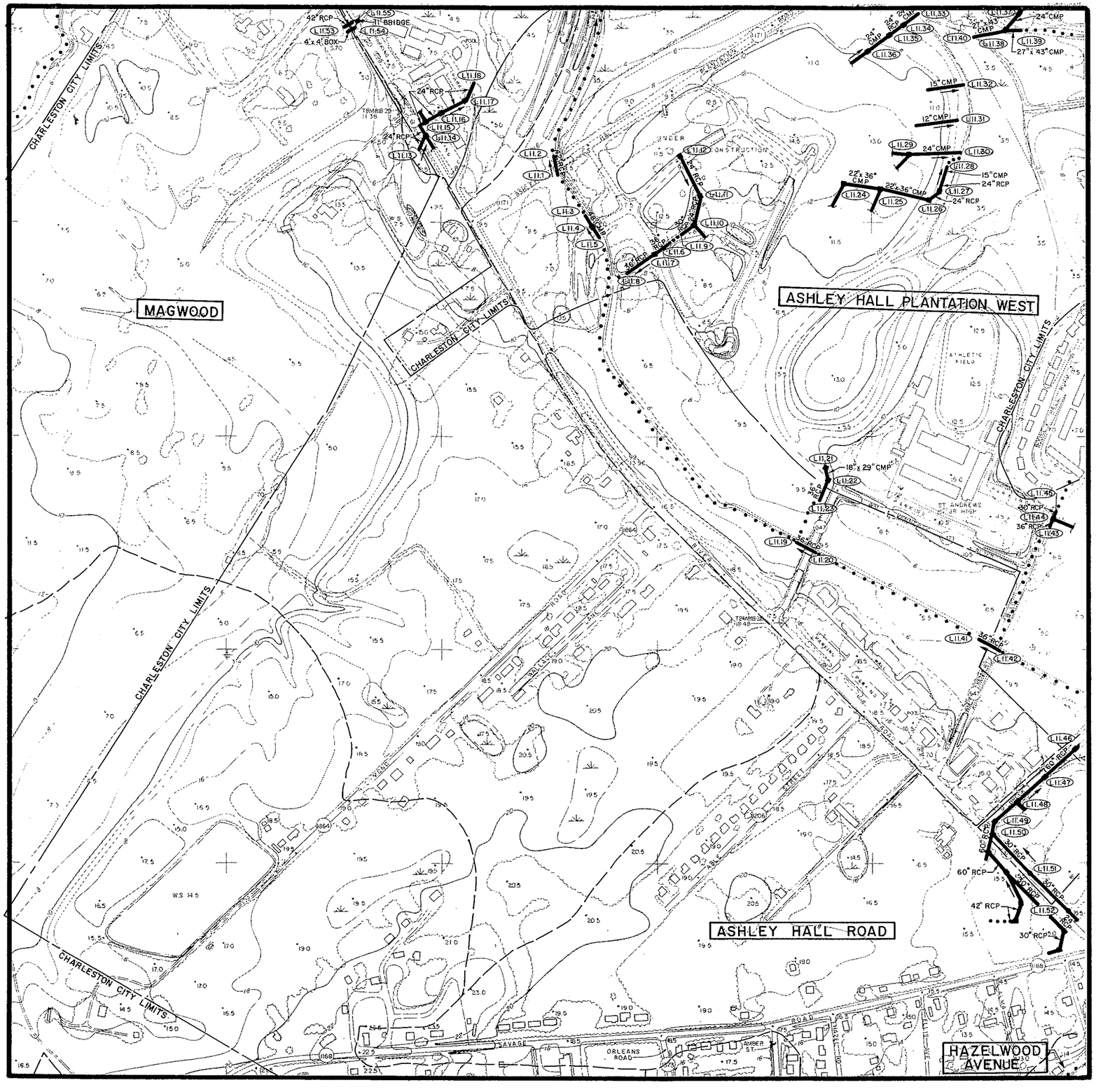
INVENTORY | MAP L11

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12		L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

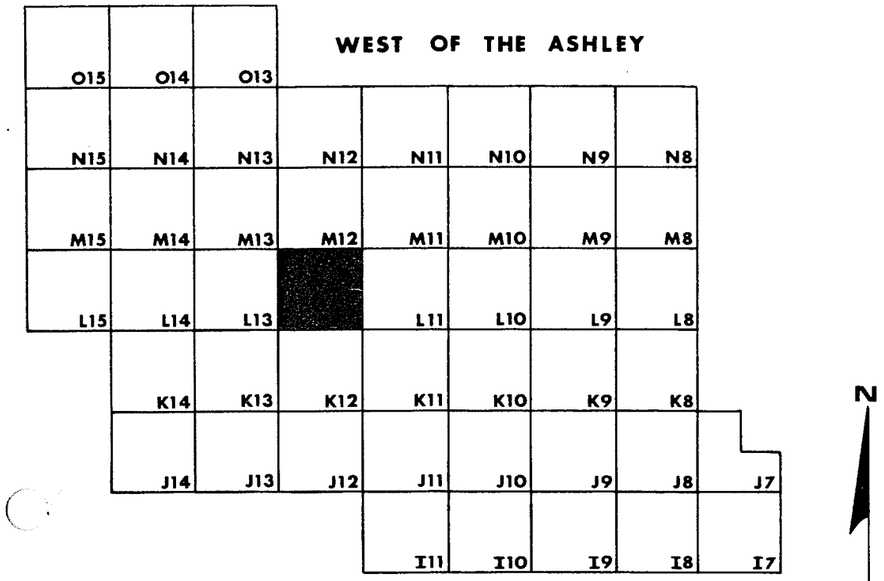
GRAPHIC SCALE 500 0 500 1000 1500 FEET

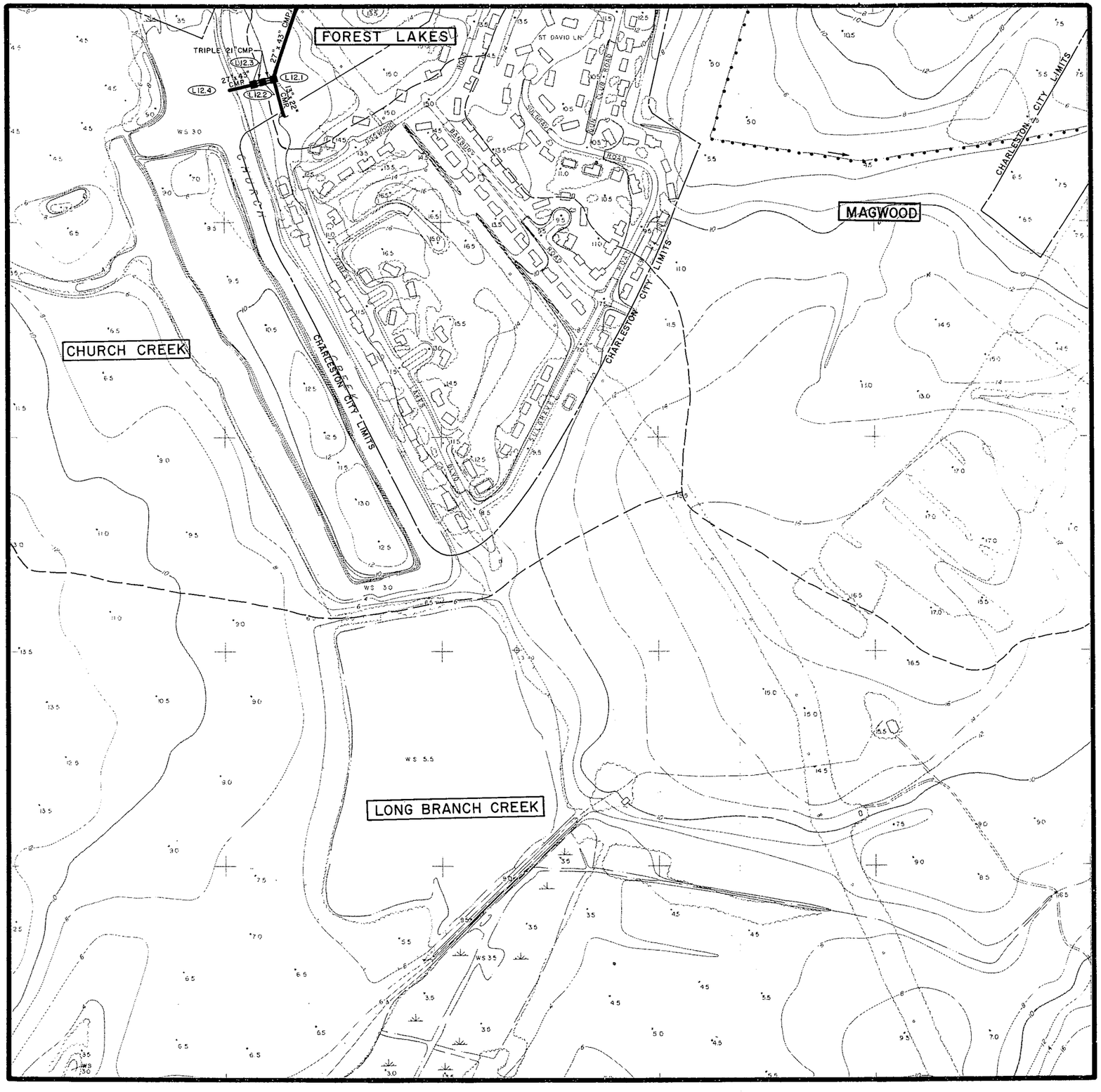
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
L-12	1	27" x 43" CMP (N)	2.66	C
		13" x 22" CMP (S)	4.62	
		21" CMP (W #1)	2.80	
		21" CMP (W #2)	2.79	
		21" CMP (W #3)	2.90	
L-12	2	21" CMP (E #1)	2.57	C
		21" CMP (E #2)	2.57	
		21" CMP (E #3)	2.57	
		21" CMP (W #1)	2.57	
		21" CMP (W #2)	2.57	
		21" CMP (W #3)	2.57	
L-12	3	21" CMP (E #1)	2.42	C
		21" CMP (E #2)	2.42	
		21" CMP (E #3)	2.42	
		27" x 43" CMP (W)	2.42	
L-12	4	27" x 43" CMP	1.96	C

INVENTORY

MAP L12

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY

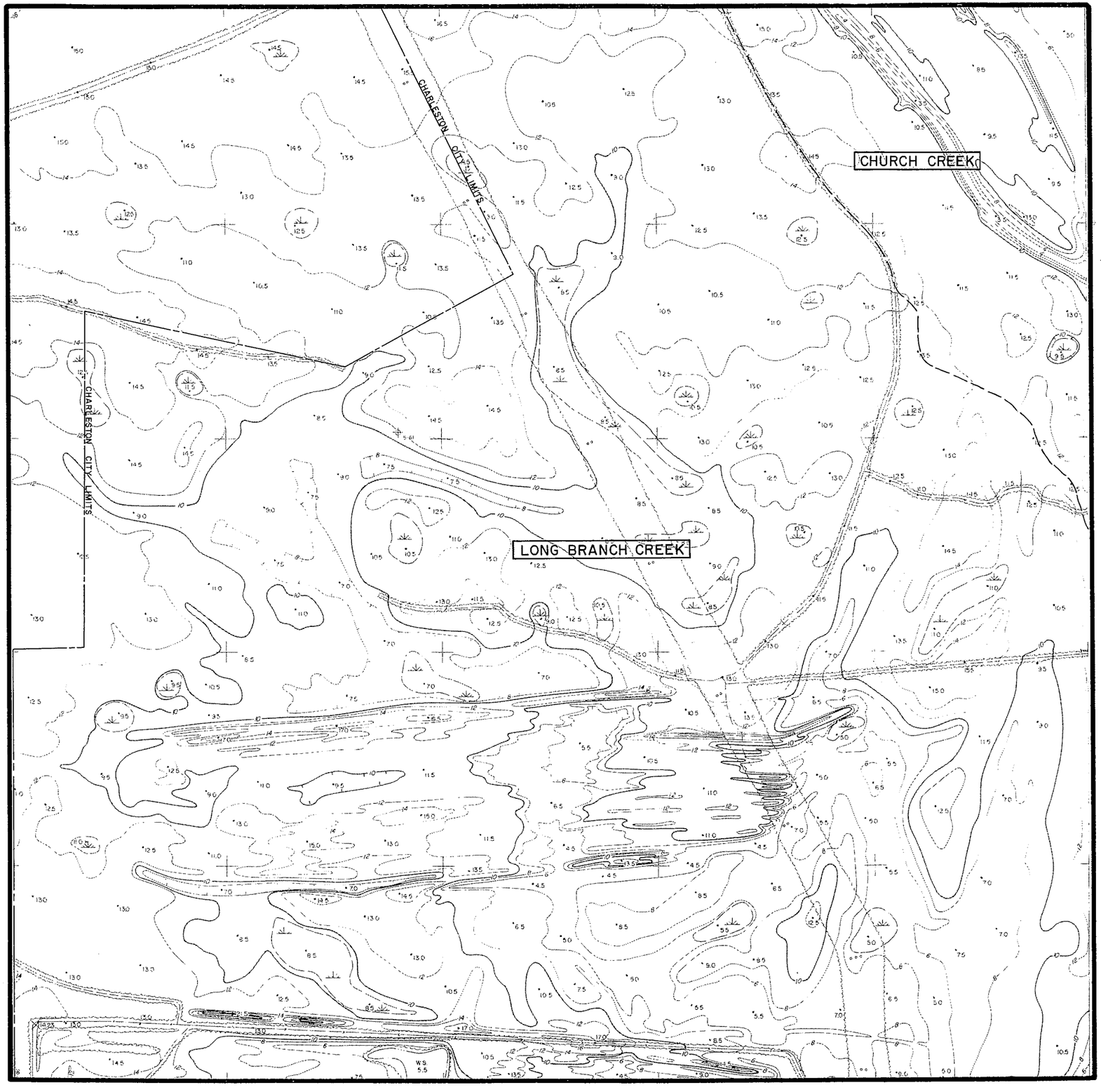
MAP L13

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14		L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

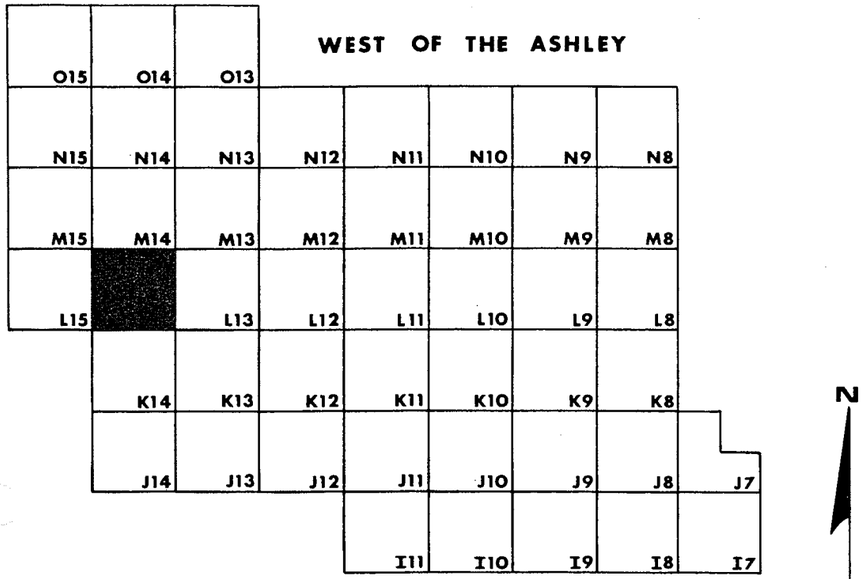
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

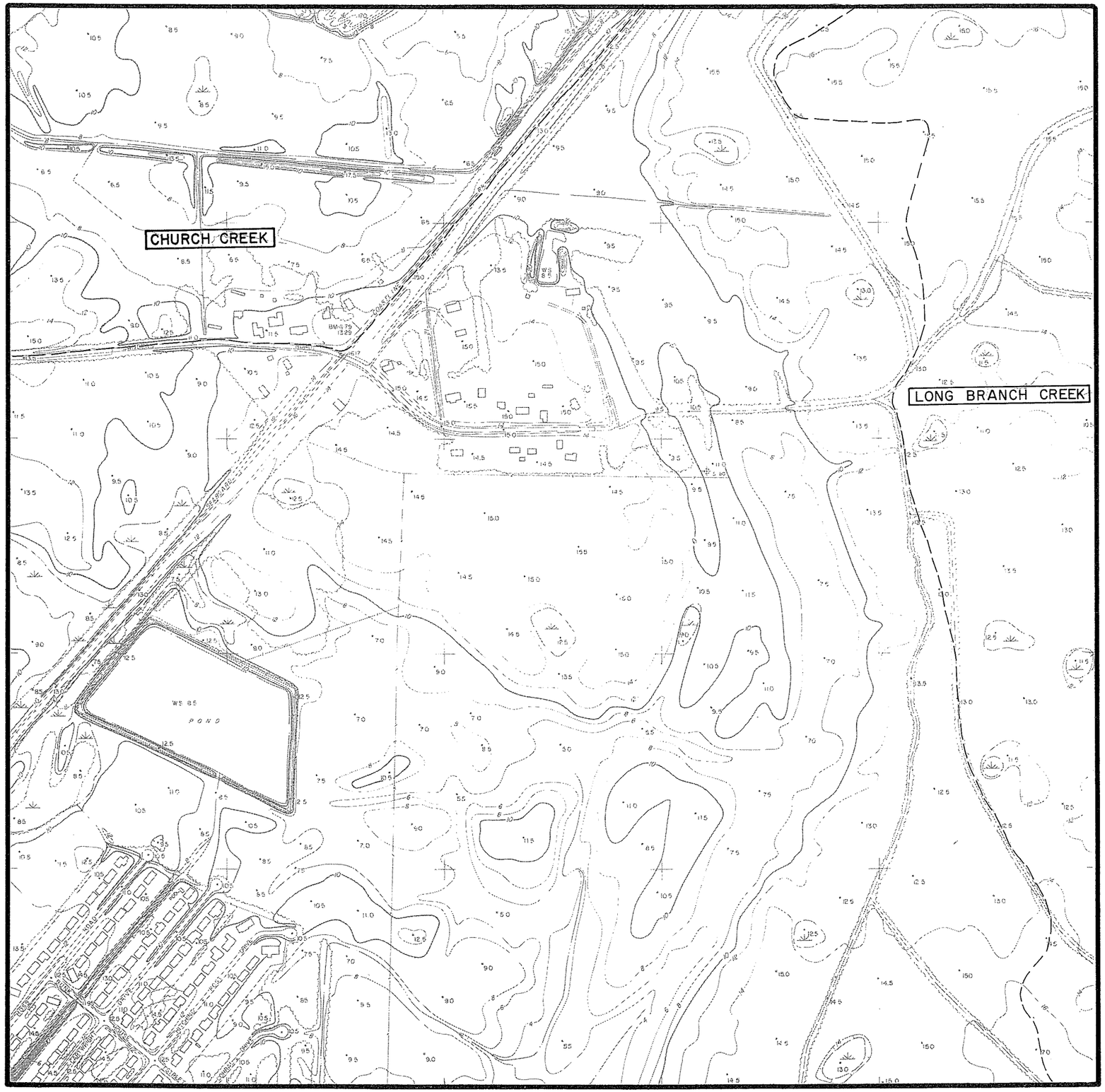
INVENTORY

MAP L14

existing drainage facilities
CITY OF CHARLESTON







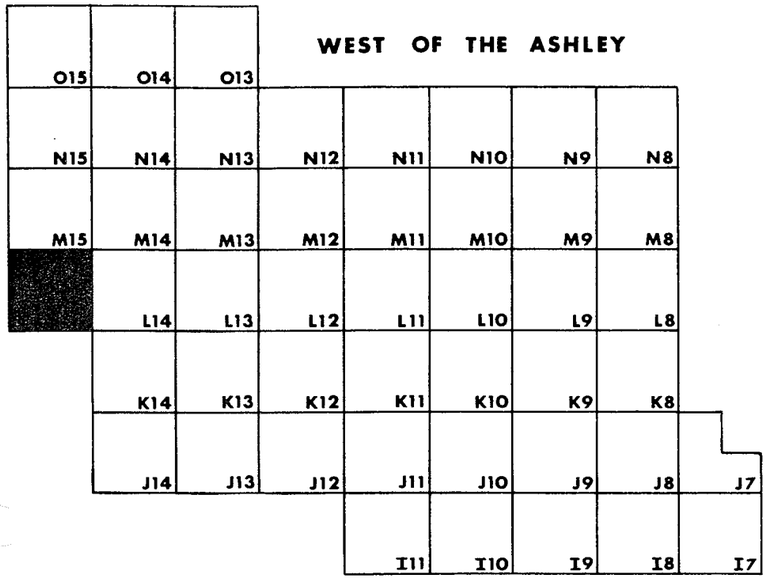
LEGEND

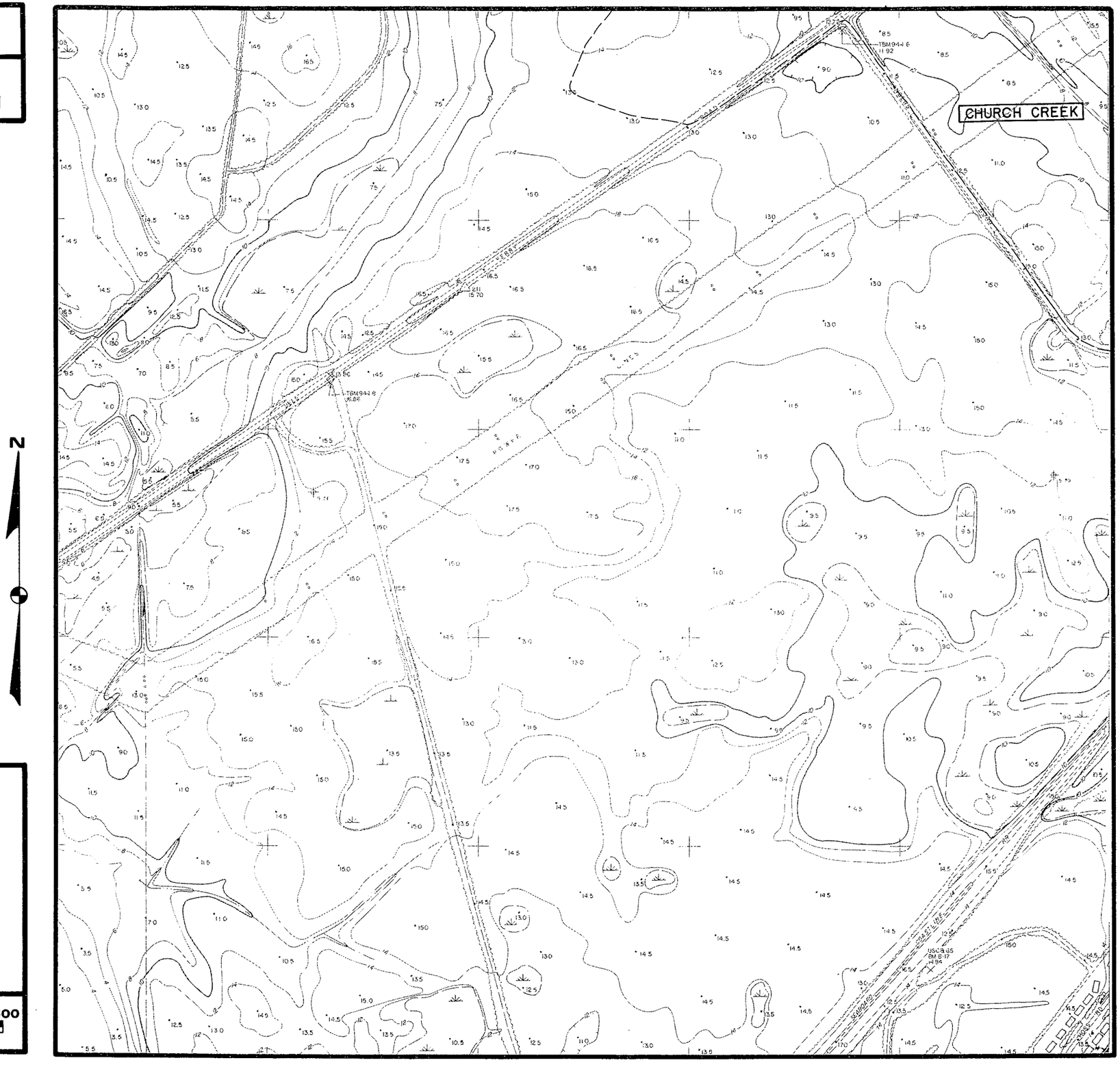
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY | MAP L15

existing drainage facilities
CITY OF CHARLESTON





LEGEND

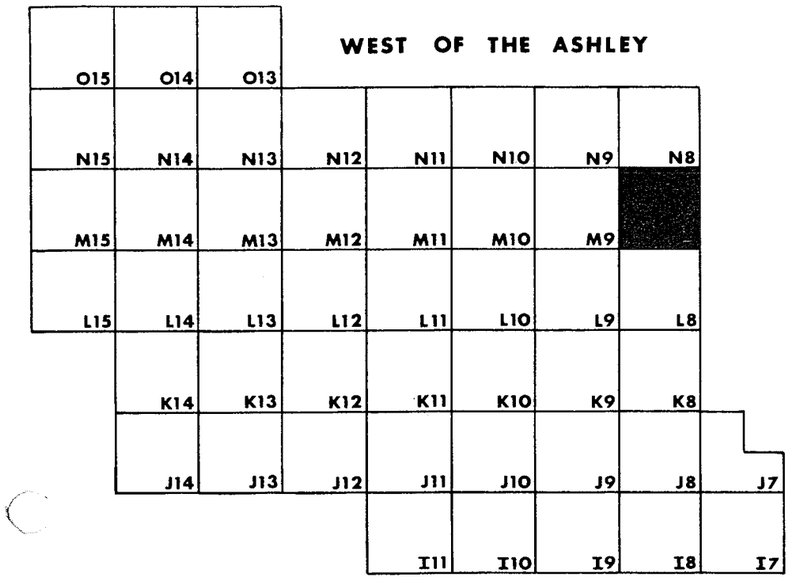
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

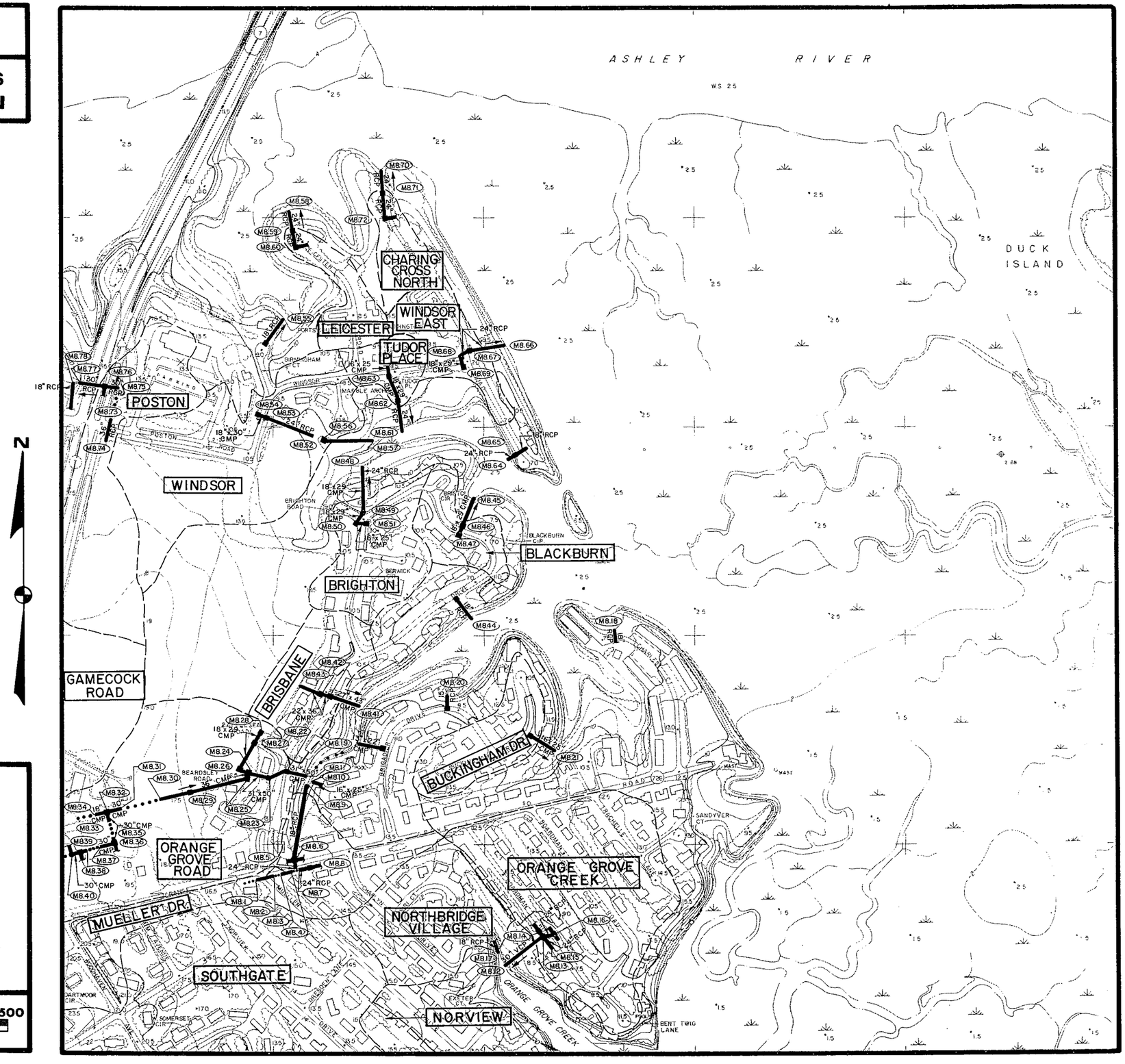
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-8	1	24" RCP	10.84	C
M-8	2	24" RCP	10.55	C
M-8	3	24" RCP	10.19	C
M-8	4	24" RCP	10.12	C
M-8	5	24" RCP	8.96	C
M-8	6	15" RCP (E) 18" RCP (W) 24" RCP (S) 18" RCP (N)	9.99 10.78 8.76 9.88	C
M-8	7	24" RCP	9.30	C
M-8	8	15" RCP (E) 15" RCP (W)	10.40 10.40	C
M-8	9	18" RCP	5.62	C
M-8	10	16" x 25" CMP	6.03	C
M-8	11	31" x 50" CMP	5.55	C
M-8	12	30" VCP	2.78	C
M-8	13	24" VCP (N) 24" RCP (E) 30" VCP (W) 24" RCP (S)	3.90 4.05 3.81 4.00	C
M-8	14	15" RCP (N) 24" VCP (S)	4.30 3.97	C
M-8	15	15" RCP	4.92	C
M-8	16	15" RCP (N) 15" RCP (S) 24" RCP (W)	- - -	CNO
M-8	17	18" RCP	3.97	C
M-8	18	18" RCP	2.87	C
M-8	19	13" x 22" CMP	6.18	C
M-8	20	15" RCP	6.08	C
M-8	21	16" x 25" CMP	5.23	C
M-8	22	31" x 50" CMP (E) 31" x 50" CMP (W)	6.74 7.06	C
M-8	23	31" x 50" CMP (E) 31" x 50" CMP (W)	7.20 7.50	C
M-8	24	31" x 50" CMP (E) 18" x 29" CMP (W)	7.74 7.89	C
M-8	25	36" CMP (W)	8.27	C
M-8	26			CNO
M-8	27	18" x 29" CMP (N) 18" x 29" CMP (S)	8.71 8.51	C
M-8	28	18" x 29" CMP (S)	8.78	C
M-8	29	36" CMP (E) 36" CMP (W)	10.64 10.62	C
M-8	30	36" CMP	11.88	C
M-8	31	30" CMP	12.95	C
M-8	32	30" CMP (E) 18" CMP (W) 30" CMP (S)	13.05 14.21 13.12	C
M-8	33	30" CMP	13.25	C
M-8	34	18" CMP	14.23	C
M-8	35	30" CMP	14.35	C
M-8	36	30" CMP (N) 30" CMP (W) 18" CMP (S)	14.52 14.66 14.85	C
M-8	37	30" CMP	15.01	C
M-8	38	30" CMP	16.23	C
M-8	39	30" CMP (E) 30" CMP (W) 12" CMP (S)	16.21 16.27 16.22	C
M-8	40	30" CMP (E) 15" CMP (N)	16.36 16.49	Open to ditch
M-8	41	27" x 43" CMP	3.80	C
M-8	42	27" x 43" CMP (E) 22" x 36" CMP (W)	4.88 4.52	C
M-8	43	22" x 36" CMP (E) 22" x 36" CMP (W)	4.83 4.86	C
M-8	44	18" RCP	2.72	C
M-8	45	18" x 29" CMP	2.86	FS
M-8	46	18" x 29" CMP (E) 18" x 29" CMP (W)	3.59 3.61	C
M-8	47	18" x 29" CMP (E)	4.10	C
M-8	48	24" RCP	4.48	C
M-8	49	18" x 29" CMP (N) 18" x 29" CMP (S)	5.14 5.19	C
M-8	50	18" x 29" CMP (N) 16" x 25" CMP (E)	5.35 5.62	C
M-8	51	16" x 25" CMP (W)	6.15	C
M-8	52	24" RCP	5.00	C
M-8	53	24" RCP (E) 18" x 29" CMP (W)	6.45 6.49	C
M-8	54	18" x 29" CMP (E)	6.56	C
M-8	55	18" RCP	3.73	C
M-8	56	24" RCP (E)	4.73	C
M-8	57	24" RCP	4.30	C
M-8	58	24" RCP	3.92	C
M-8	59	24" RCP (S) 24" RCP (N)	4.63 4.47	C
M-8	60	24" RCP (N) 18" RCP (E)	4.64 4.58	C
M-8	61	24" RCP	4.85	C
M-8	62	18" x 29" CMP (N) 24" RCP (S)	5.49 5.40	C
M-8	63	16" x 25" CMP (N) 18" x 29" CMP (S)	5.79 5.71	C
M-8	64	24" RCP	3.86	C
M-8	65	18" RCP (E) 24" RCP (W)	4.39 4.17	C
M-8	66	24" RCP	3.94	C
M-8	67	24" RCP (E) 24" RCP (W)	4.34 4.23	C
M-8	68	24" RCP (E) 18" x 29" CMP (S)	4.82 4.87	C
M-8	69			FS
M-8	70	24" RCP	3.42	HFS
M-8	71	24" RCP (N) 24" RCP (S)	4.09 4.09	C
M-8	72	24" RCP (N) 16" x 25" CMP (E)	4.34 4.22	C
M-8	73	36" RCP	9.04	C
M-8	74	36" RCP	9.57	C
M-8	75	30" RCP	7.48	C
M-8	76	30" RCP (E) 30" RCP (W) 18" RCP (S)	- - -	CNO
M-8	77	30" RCP	6.41	HFS
M-8	78	18" RCP	6.81	HFS

INVENTORY | MAP M8

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

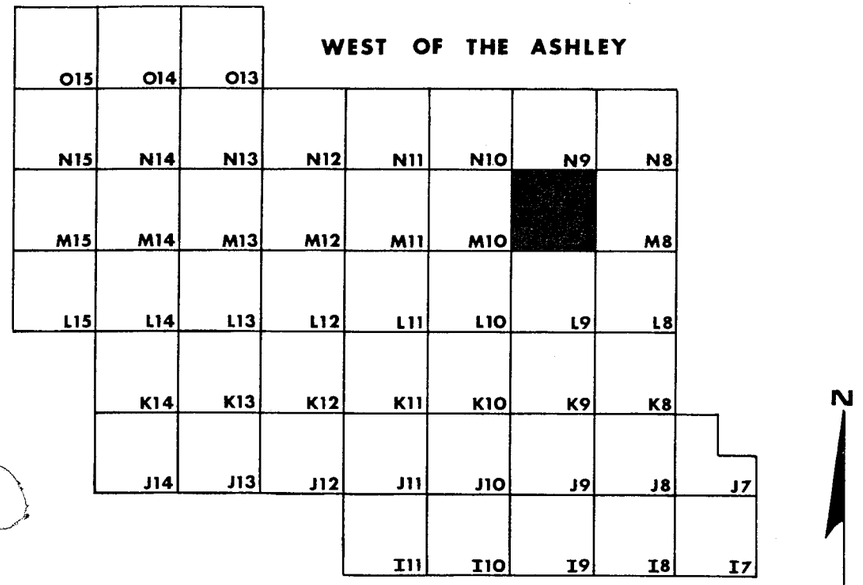
GRAPHIC SCALE 500 0 500 1000 1500 FEET

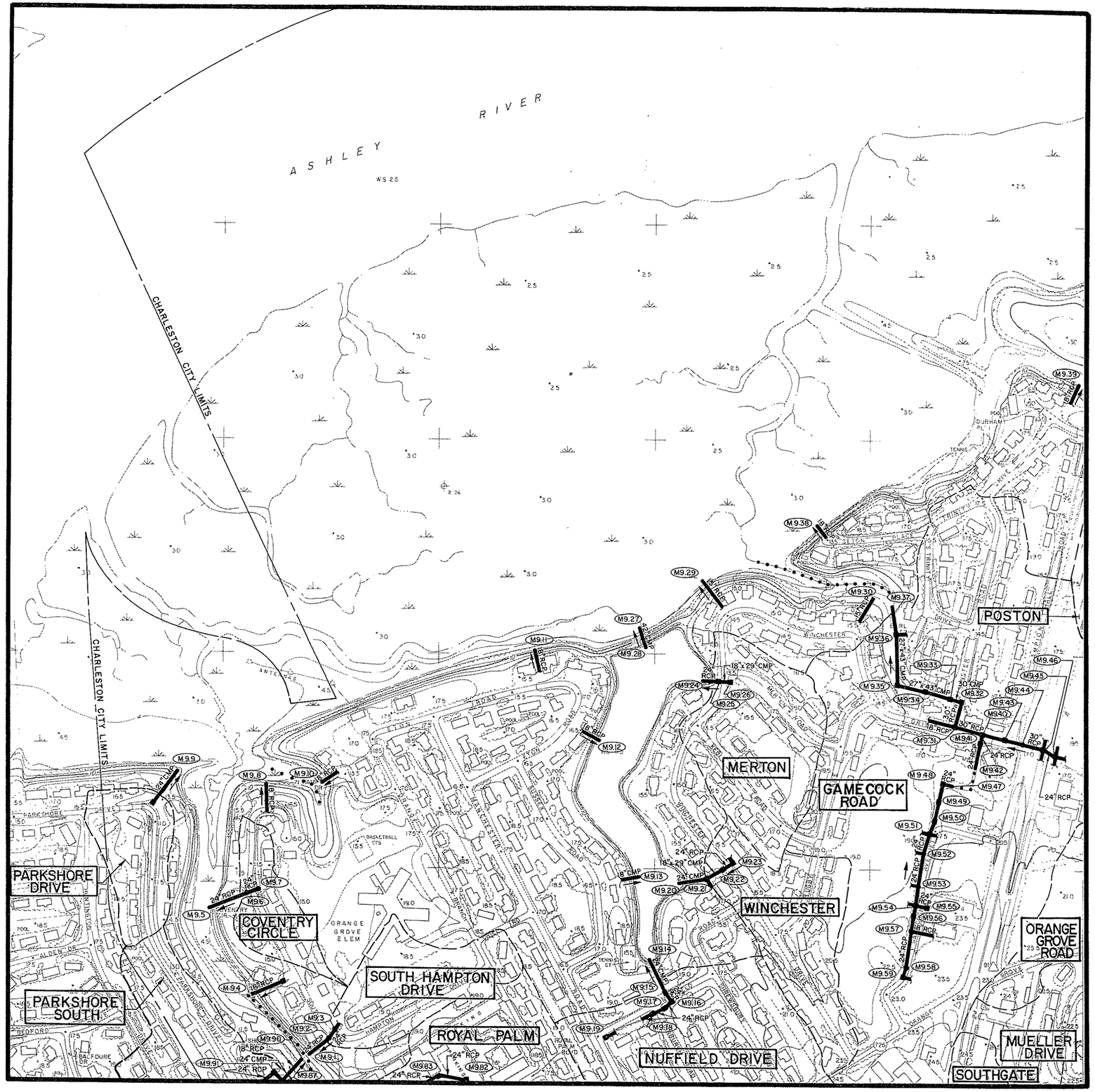
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-9	1	24". RCP	7.97	C
M-9	2	24" RCP (E) 24" RCP (W)	12.15 11.88	C
M-9	3	18" RCP (E) 24" RCP (W)	12.35 12.35	C
M-9	4	18" RCP	3.97	C
M-9	5	24" RCP	6.31	C
M-9	6	24" RCP (E) 24" RCP (W)	7.01 7.06	C
M-9	7	24" RCP (W)	7.07	C
M-9	8	18" RCP	4.38	C
M-9	9	24" CMP (W)	4.91	C
M-9	10	18" RCP	2.93	C
M-9	11	18" RCP	10.14	C
M-9	12	18" RCP	9.04	C
M-9	13	18" CMP	9.17	C
M-9	14	24" CMP	9.73	C
M-9	15	24" RCP (N) 24" RCP (S)	11.74 11.74	C
M-9	16	24" RCP (N) 24" RCP (W)	12.34 12.34	C
M-9	17	24" RCP (E) 24" RCP (W)	12.42 12.42	C
M-9	18	24" RCP (E) 24" RCP (W)	12.47 12.47	C
M-9	19	15" RCP	16.49	C
M-9	20	24" CMP	9.24	C
M-9	21	24" CMP (W) 18" RCP (S) 18" x 29" CMP (E)	9.22 9.84 9.98	C
M-9	22	24" RCP (E) 18" x 29" CMP (W)	- -	CNO
M-9	23	24" RCP (W) 15" RCP (N)	10.59 10.91	C
M-9	24	30" CMP	8.18	C
M-9	25	18" x 29" CMP (E) 24" RCP (W)	9.12 8.61	C
M-9	26	18" x 29" CMP (W)	9.72	C
M-9	27	42" CMP	-0.12	C
M-9	28	42" CMP	-	C
M-9	29	15" RCP	6.04	C
M-9	30	15" RCP	3.89	C
M-9	31	30" RCP (N) 18" RCP (W) 30" RCP (E)	7.05 7.02 7.07	C
M-9	32	30" CMP (W) 30" RCP (S)	- -	C
M-9	33	30" CMP (E) 27" x 43" CMP (W)	- -	CNO
M-9	34	27" x 43" CMP (E) 27" x 43" CMP (W)	4.98 5.02	C
M-9	35	27" x 43" CMP (E) 27" x 43" CMP (N)	4.03 3.70	C
M-9	36	27" x 43" CMP (N) 27" x 43" CMP (S) 18" RCP (E)	3.20 3.12 3.37	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-9	37	30" CMP	1.58	C
M-9	38	18" RCP	5.50	C
M-9	39	18" RCP	6.71	C
M-9	40	30" RCP (E) 30" RCP (W) 24" RCP (S)	8.83 8.87 8.92	C
M-9	41	24" RCP (N) 24" RCP (S)	9.45 9.24	C
M-9	42	24" RCP	-	C
M-9	43	30" RCP (E) 30" RCP (W)	10.13 10.13	C
M-9	44			PO
M-9	45	18" RCP (N) 18" RCP (S) 24" RCP (E) 30" RCP (W)	11.38 11.38 11.89 11.08	C
M-9	46	24" RCP (W) 18" CMP (S) 18" CMP (N) 18" CMP (E)	12.80 12.82 12.90 12.86	C
M-9	47	24" RCP	11.58	C
M-9	48	24" RCP (E) 24" RCP (S)	11.45 11.44	C
M-9	49	24" RCP (N) 24" RCP (S)	11.78 11.89	C
M-9	50	24" RCP (N) 24" RCP (S)	12.35 12.35	C
M-9	51	24" RCP (N) 24" RCP (S) 18" RCP (E) 15" RCP (W)	13.11 13.25 13.30 13.77	C
M-9	52	24" RCP (N) 24" RCP (S) 15" RCP (W)	14.99 14.99 15.05	C
M-9	53	24" RCP (N) 24" RCP (S) 15" RCP (W)	16.18 16.19 16.10	C
M-9	54	24" RCP (N) 24" RCP (S) 18" RCP (W) 24" RCP (E)	17.03 17.18 17.45 17.10	C
M-9	55	24" RCP (W)	17.57	C
M-9	56	24" RCP (N) 24" RCP (S)	17.25 17.32	C
M-9	57	24" RCP (N) 24" RCP (S) 18" RCP (E)	17.65 17.65 17.69	C
M-9	58	24" RCP (N) 24" RCP (S)	18.15 18.40	C
M-9	59	24" RCP (N) 18" RCP (E)	18.55 18.56	C
M-9	82	18" RCP (S) 24" RCP (W)	10.96 10.66	C
M-9	83	24" RCP (W) 24" RCP (E)	9.92 10.08	C
M-9	87	24" RCP (N) 24" CMP (E) 24" CMP (W) 24" RCP (S)	7.83 7.92 7.92 7.83	C
M-9	90	18" RCP	6.10	C
M-9	91	-	-	PO

INVENTORY | MAP M9

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-10	1	36" RCP (N) 22" x 36" CMP (S)	4.00 3.94	C
M-10	2	36" RCP (N) 36" RCP (S) 18" RCP (E) 18" RCP (W)	3.51 3.38 5.32 5.36	C
M-10	3	48" RCP (N) 36" RCP (S)	2.90 2.92	C
M-10	4	48" RCP (N) 48" RCP (S)	2.27 1.88	C
M-10	5	48" RCP	1.89	C
M-10	6	42" CMP	5.53	C
M-10	7	42" CMP	6.04	C
M-10	8	22" x 36" CMP (N) 30" RCP (S)	4.24 4.19	C
M-10	9		-	CNO
M-10	10	30" RCP (E) 30" RCP (W)	4.98 4.96	C
M-10	11		-	CNO
M-10	12	30" RCP (N) 18" RCP (S)	5.79 5.84	C
M-10	13	24" CMP (E)	4.41	C
M-10	14	24" CMP (W) 24" CMP (S)	3.83 3.89	C
M-10	15	24" CMP (S)	3.97	C

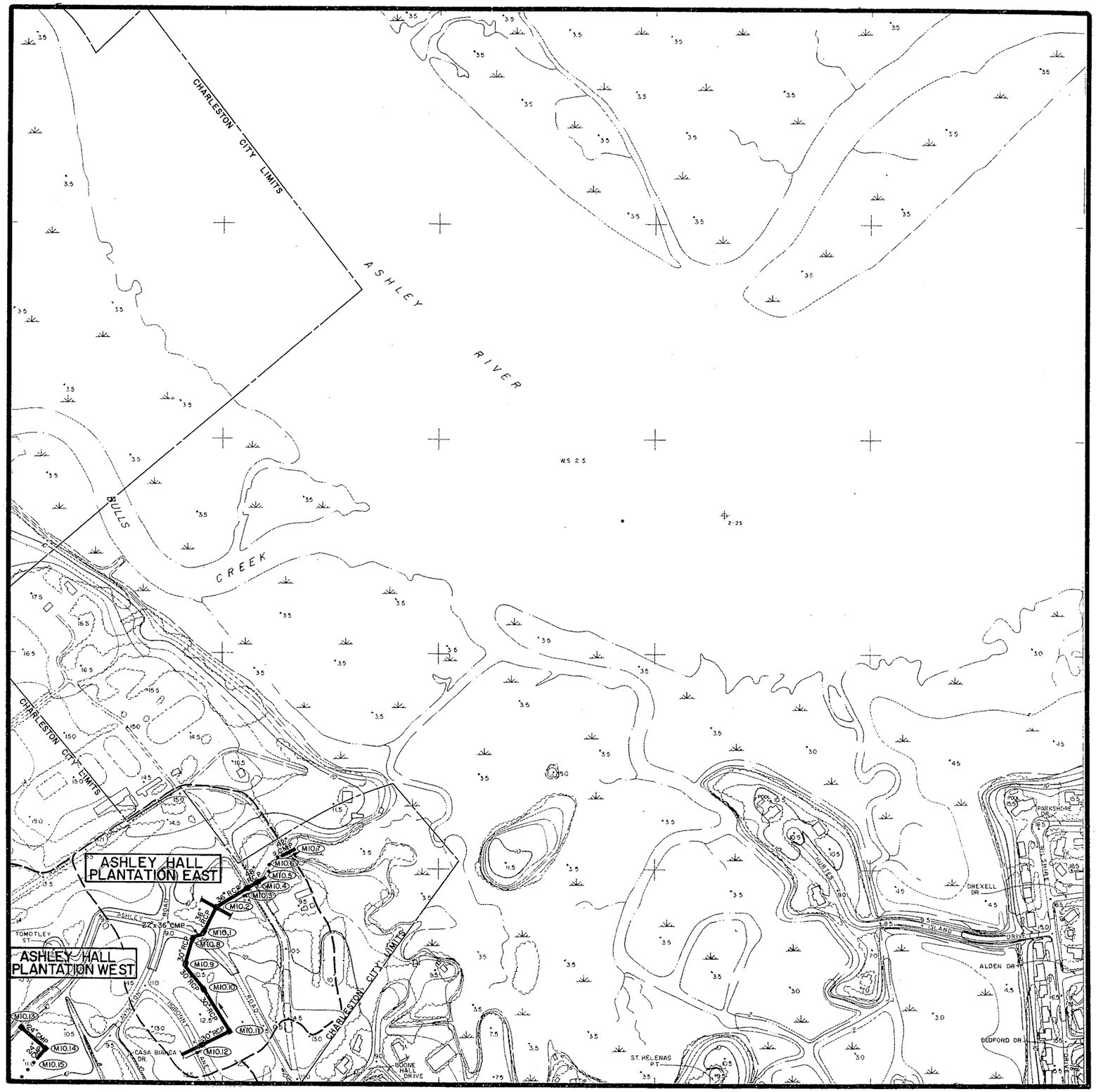
INVENTORY | MAP M10

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11		M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-11	1	30" RCP	-	C
M-11	2	30" RCP	-	C
M-11	3	24" RCP	3.64	C
M-11	4	25' BRIDGE	1.56	-
M-11	5	24" RCP (E) 24" RCP (W)	4.00 4.00	C
M-11	6	24" RCP (E) 24" RCP (W)	3.46 3.46	C
M-11	7	18" RCP (E) 24" RCP (W)	- -	CNO
M-11	8	4' x 6' BOX	-0.60	C
M-11	9	4' x 6' BOX	-0.52	C

INVENTORY

MAP M11

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12		M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

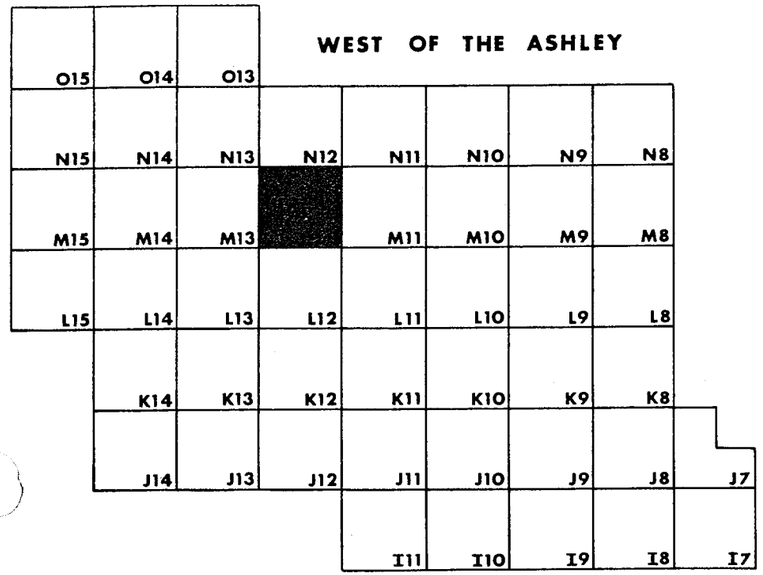
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

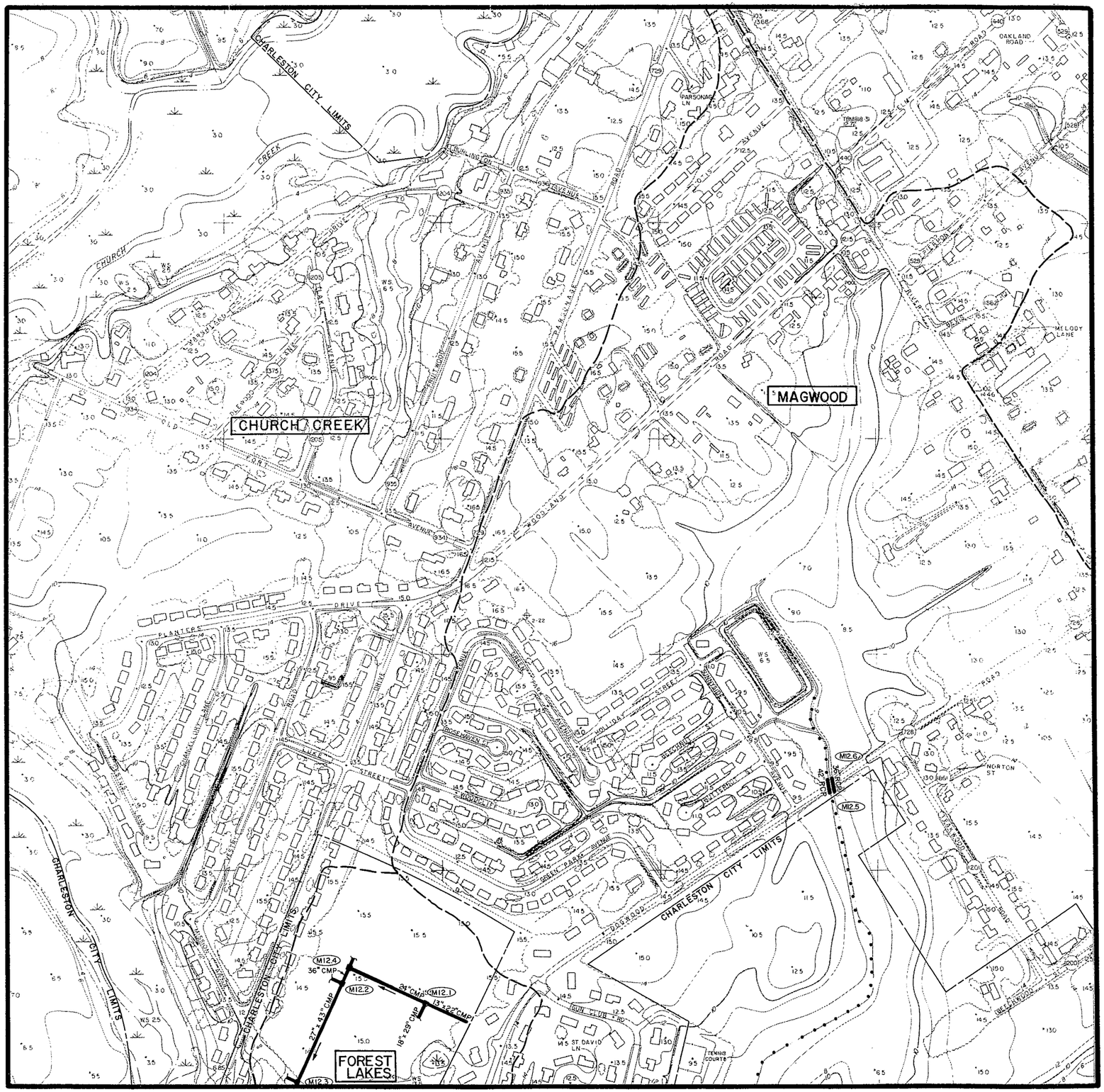
GRAPHIC SCALE 500 0 500 1000 1500
FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-12	1	13" x 22" CMP (E) 24" CMP (W) 18" x 29" (S)	9.00 8.95 9.10	C
M-12	2	36" CMP (N) 22" x 36" (S) 16" x 25" CMP (W)	7.90 7.74 7.75	C
M-12	3	27" x 43" CMP (N) 27" x 43" CMP (S) 16" x 25" CMP (W)	5.21 5.21 5.14	C
M-12	4	36" CMP (S) 24" CMP (E) 18" CMP (N)	- 7.99 7.96	C

INVENTORY | MAP M12

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY

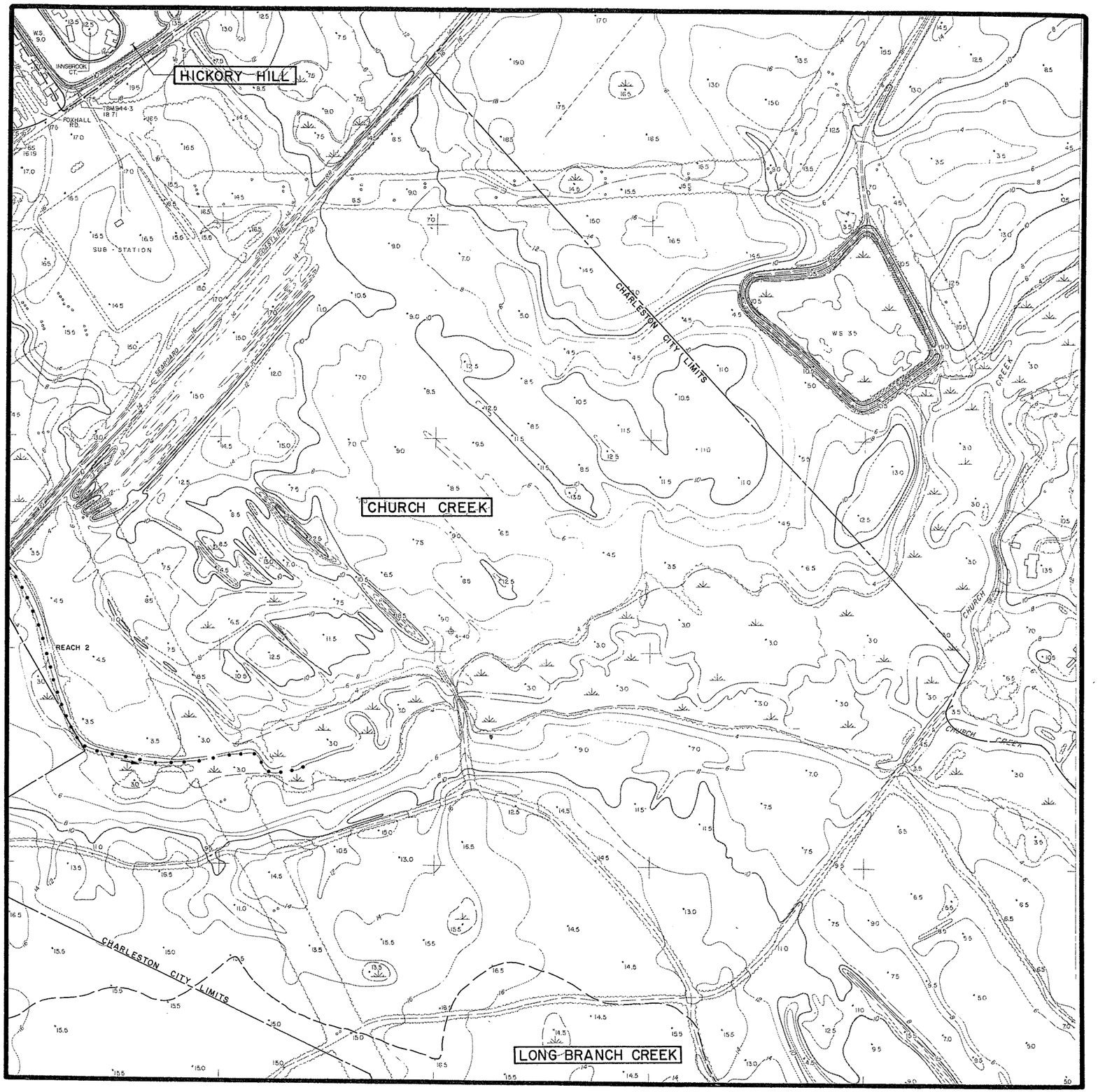
MAP M13

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14		M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

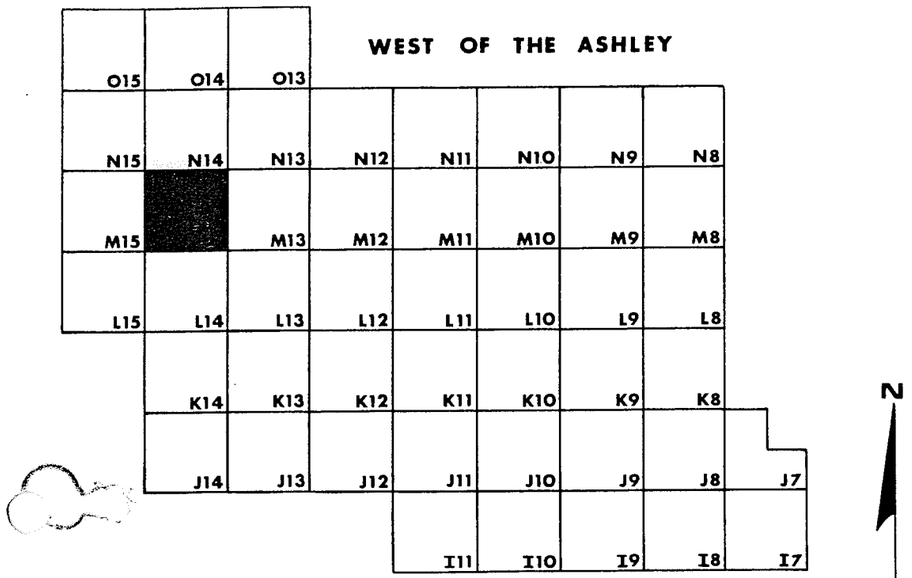
GRAPHIC SCALE 500 0 500 1000 1500 FEET

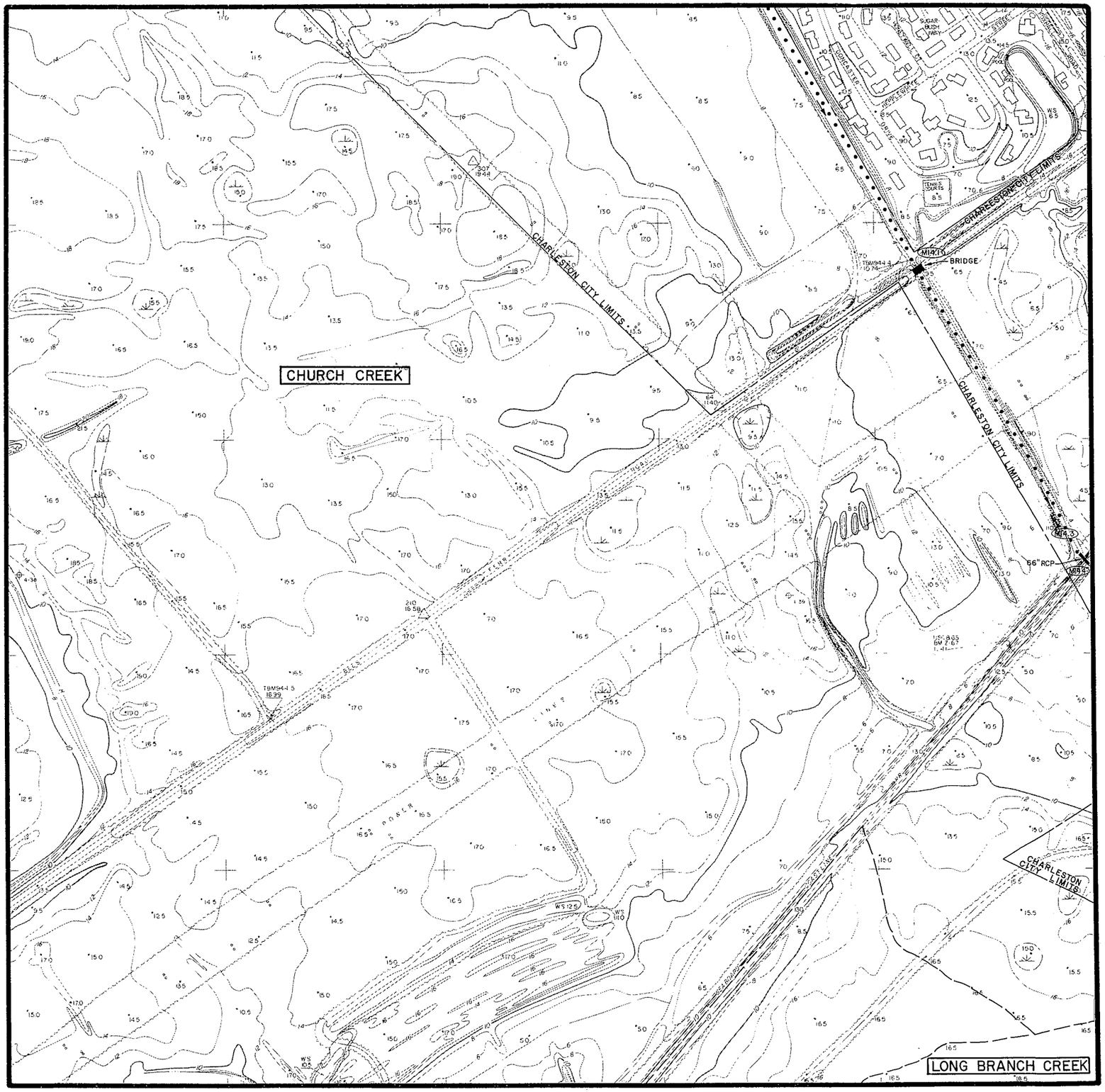
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
M-14	1	36' Wide Bridge	0.99	C
M-14	3	66" RCP	2.07	C
M-14	4	66" RCP	1.93	C

INVENTORY

MAP M14

existing drainage facilities
CITY OF CHARLESTON





LEGEND

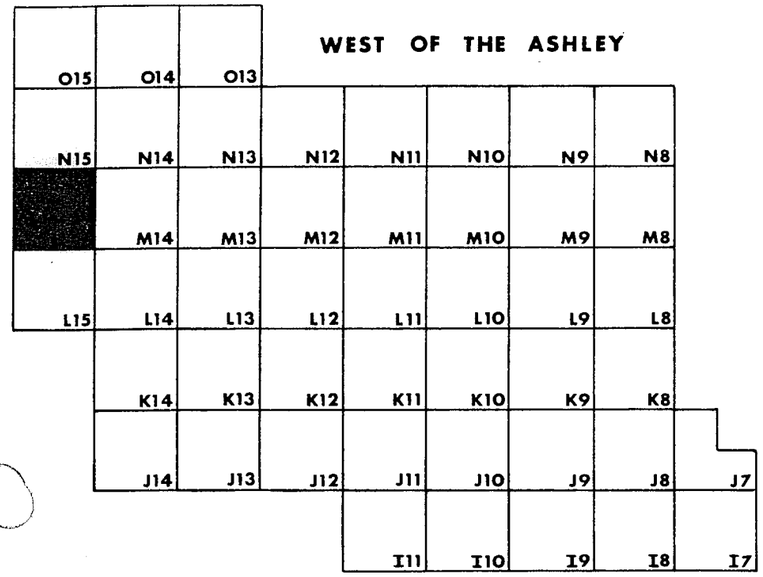
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

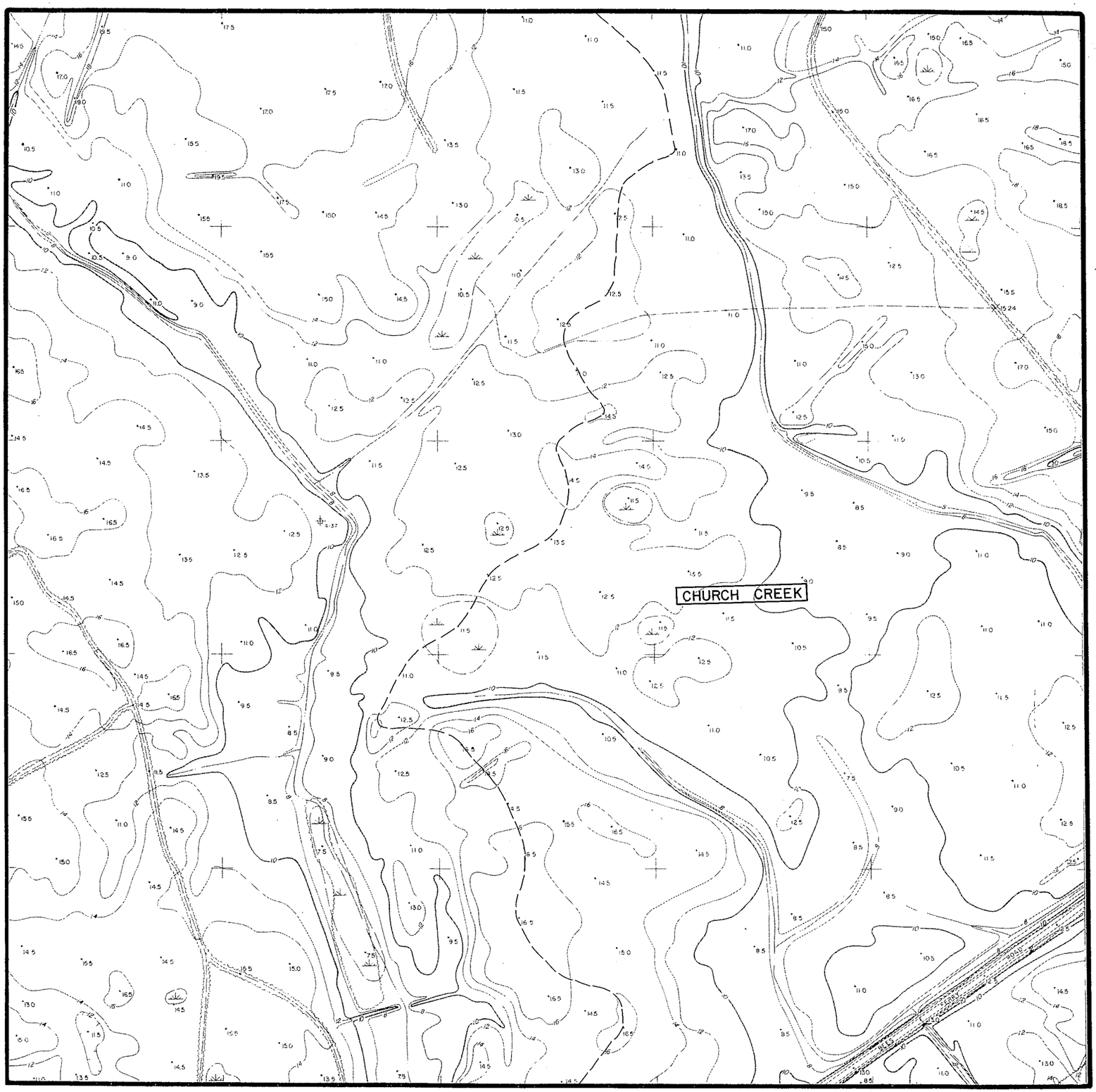
GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY

MAP M15

existing drainage facilities
CITY OF CHARLESTON





LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE
500 0 500 1000 1500
FEET

INVENTORY

MAP N11

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14	N13	N12		N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

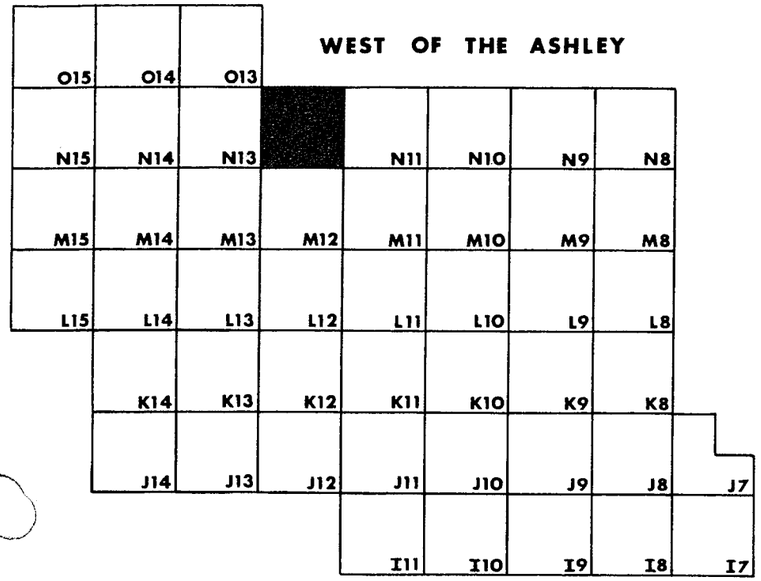
GRAPHIC SCALE 500 0 500 1000 1500 FEET

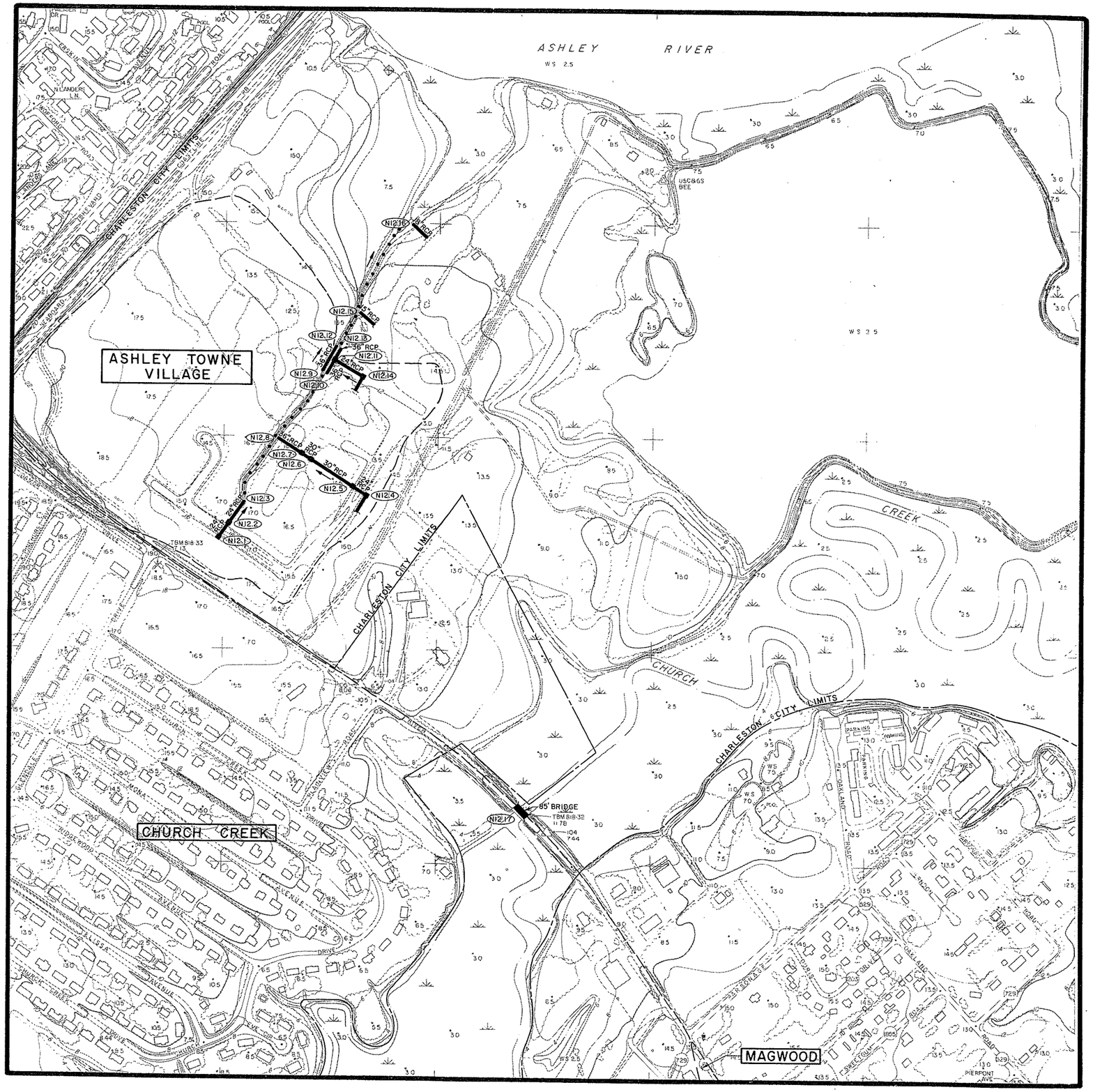
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
N-12	1	24" RCP (N)	8.68	C
N-12	2	24" RCP (N) 24" RCP (S)	8.48 8.50	C
N-12	3	24" RCP	7.47	C
N-12	4	24" RCP (W) 15" RCP (S)	7.71 7.67	C
N-12	5	24" RCP (E) 30" RCP (W)	7.47 7.53	C
N-12	6	30" RCP (E) 30" RCP (W)	6.96 6.85	C
N-12	7	30" RCP (E) 36" RCP (W)	6.85 6.78	C
N-12	8	36" RCP	6.39	C
N-12	9	36" RCP	9.01	C
N-12	10	36" RCP	8.98	C
N-12	11	36" RCP (N) 36" RCP (S) 24" RCP (E)	5.49 5.49 5.49	C
N-12	12	36" RCP	5.70	C
N-12	13	36" RCP	5.71	C
N-12	14	24" RCP (W) 18" RCP (S)	6.59 6.64	C
N-12	15	15" RCP	4.10	C
N-12	16	18" RCP	-	C
N-12	17	85' BRIDGE	-3.50	Bottom of channel

INVENTORY

MAP N12

existing drainage facilities
CITY OF CHARLESTON





N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
N-13	1	31" x 50" CMP 31" x 50" CMP	3.12 3.01	C
N-13	3	31" x 50" CMP 31" x 50" CMP	3.40 3.20	C
N-13	5	24" RCP	5.75	C
N-13	6	24" RCP	5.75	C
N-13	7	36" RCP 36" RCP	2.51 2.52	C
N-13	9	36" RCP 36" RCP	2.36 2.55	C
N-13	11	48" RCP 48" RCP	2.44 2.28	C
N-13	13	48" RCP 48" RCP	2.12 2.47	C
N-13	15	36" x 58" CMP 36" x 58" CMP	3.88 4.88	C
N-13	17	36" x 58" CMP 36" x 58" CMP	4.01 5.19	C
N-13	19	48" RCP 48" RCP	4.02 4.08	C
N-13	21	48" RCP 48" RCP	4.00 4.17	C
N-13	23	24" RCP (N) 18" RCP (S)	10.10 10.99	C
N-13	24	24" RCP	8.72	C
N-13	25	24" CMP	8.20	C
N-13	26	24" CMP	6.96	C
N-13	27	30" CMP (W) 15" RCP (N)	9.91 10.71	C
N-13	28	30" CMP (E) 30" CMP (W)	9.74 9.68	C
N-13	29	30" CMP (W) 30" CMP (E)	8.72 8.93	C
N-13	30	30" CMP	7.79	C
N-13	31	18" CMP	-	C
N-13	32	18" CMP	-	C
N-13	33	24" CMP (E)	14.64	HFS
N-13	34	24" CMP (W) 30" CMP (E)	14.43 14.63	C
N-13	35	30" CMP	13.74	C
N-13	36	42" CMP	12.92	C
N-13	37	42" CMP (E) 42" CMP (W)	12.53 12.53	C
N-13	38	42" CMP (E) 42" CMP (W)	12.34 12.29	C
N-13	39	42" CMP (E) 42" CMP (W)	11.84 12.05	C
N-13	40	42" CMP (E) 42" CMP (W)	12.03 12.03	C
N-13	41	42" CMP	15.34	C
N-13	42	40" x 65" CMP	4.11	C
N-13	43	40" x 65" CMP	4.26	C
N-13	44	40" x 65" CMP (E) 40" x 65" CMP (W)	4.69 4.69	C
N-13	45	40" x 65" CMP (E) 40" x 65" CMP (W)	4.74 4.74	C C
N-13	47	40" x 65" CMP	9.65	C
N-13	51		-	Unable to locate
N-13	52		3.46	C
N-13	53		3.38	C
N-13	54		-	Unable to locate
N-13	55	42" CMP	6.95	C
N-13	56	42" CMP (N) 42" CMP (S)	7.20 7.45	C
N-13	57	60" CMP	5.19	C
N-13	58	42" CMP (N) 42" CMP (W)	7.75 7.75	C
N-13	59	42" CMP (E) 42" CMP (S)	8.08 8.20	C
N-13	61	60" CMP (E) 60" CMP (W)	6.39 6.29	C
N-13	62	60" CMP (E) 60" CMP (W)	5.47 5.85	C
N-13	63	21" CMP	-	C
N-13	64	48" RCP 48" RCP	3.99 4.08	HFS
N-13	66	48" RCP 48" RCP	4.21 3.83	C
N-13	68	36" RCP	9.09	C
N-13	69	36" RCP	8.45	C

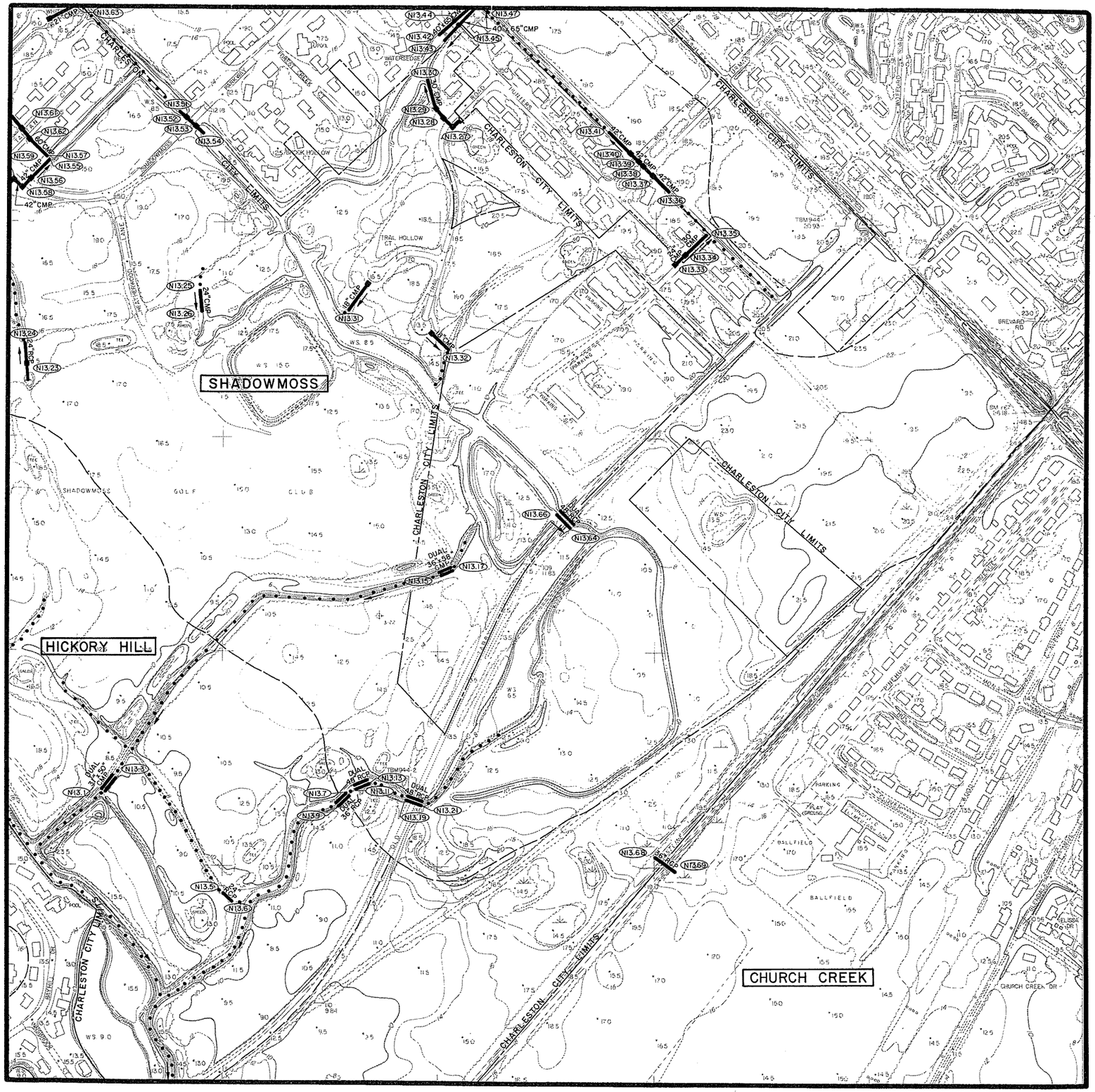
INVENTORY | MAP N13

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14	O13					
N15	N14		N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

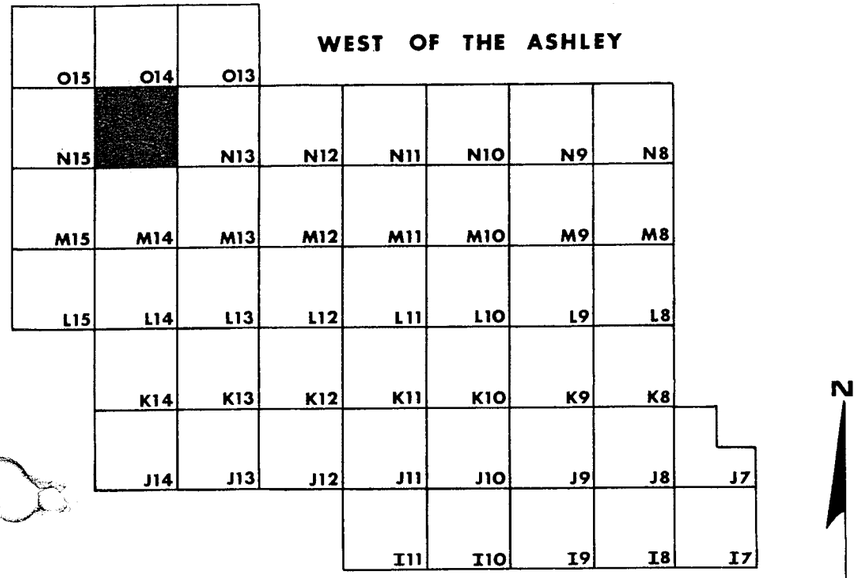
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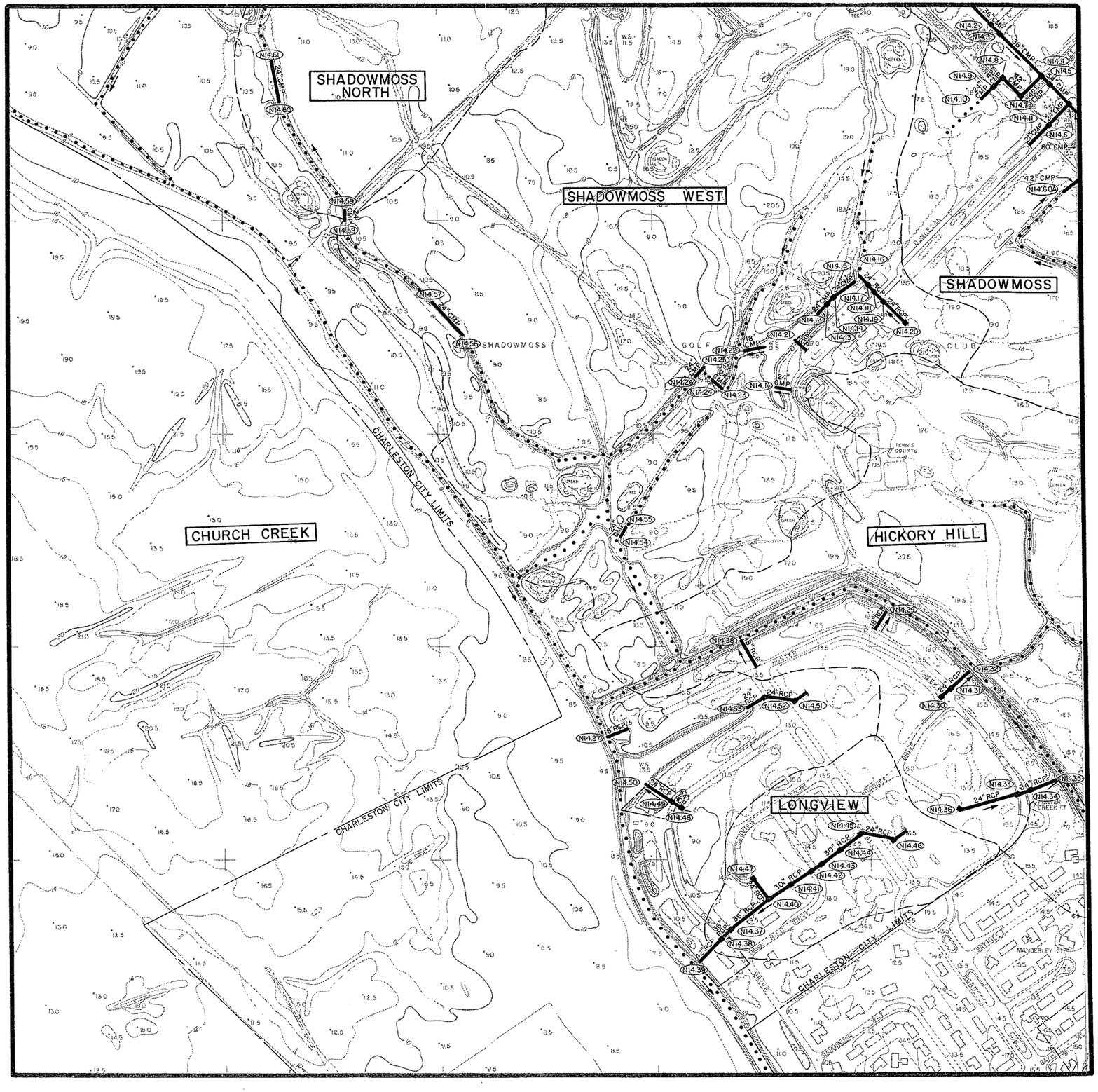
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
N-14	1	24" CMP	9.05	C
N-14	2	36" CMP (E) 36" CMP (W)	9.98 10.01	C
N-14	3	36" CMP (E) 36" CMP (W)	9.35 9.58	C
N-14	4	54" CMP (E) 36" CMP (W) 42" CMP (S)	7.57 8.31 7.81	C
N-14	5	54" CMP (E) 54" CMP (W)	7.05 7.12	C
N-14	6	60" CMP (E) 54" CMP (W) 24" CMP (S)	6.61 6.59 8.13	C
N-14	7	42" CMP (N) 42" CMP (W)	8.34 8.43	C
N-14	8	42" CMP (E) 42" CMP (S)	8.91 8.93	C
N-14	9	42" CMP (N) 24" CMP (S)	9.01 9.70	C
N-14	10	24" CMP	10.57	C
N-14	11	24" CMP (N) 21" CMP (S)	8.81 8.96	C
N-14	12	24" CMP	7.16	C
N-14	13	24" CMP (S) 24" CMP (N)	7.66 7.85	C
N-14	14	24" CMP (N) 24" CMP (S)	8.25 8.04	C
N-14	15	24" CMP	10.38	C
N-14	16	24" RCP	10.34	C
N-14	17	24" RCP (E) 24" RCP (W)	11.01 11.01	C
N-14	18	24" RCP (E) 24" RCP (W)	11.25 11.25	C
N-14	19	24" RCP (E) 24" RCP (W)	11.59 11.59	C
N-14	20	24" RCP (W)	12.16	C
N-14	21	18" RCP	9.48	C
N-14	22	18" CMP	6.28	C
N-14	23	24" CMP	5.38	C
N-14	24	24" CMP	5.25	C
N-14	25	24" CMP	5.20	C
N-14	26	24" CMP	5.00	C
N-14	27	18" RCP	-	C
N-14	28	15" RCP	-	C
N-14	29	18" RCP	-	FS
N-14	30	24" RCP (E)	7.23	C
N-14	31	24" RCP (E) 24" RCP (W)	6.64 6.75	C
N-14	32	24" RCP	7.07	C
N-14	33	24" RCP (E) 24" RCP (W)	7.38 7.42	C
N-14	34	24" RCP (E) 24" RCP (W)	7.10 7.10	C
N-14	35	24" RCP	7.03	C
N-14	36	24" RCP (E)	8.06	C
N-14	37	36" RCP (E) 36" RCP (W)	3.31 3.37	C
N-14	38	36" RCP (E) 42" RCP (W)	3.67 3.64	C
N-14	39	42" RCP	3.00	C
N-14	40	30" RCP (E) 36" RCP (W) 24" RCP (N)	4.64 4.39 4.76	C
N-14	41	30" RCP (E) 30" RCP (W)	4.96 4.96	C
N-14	42	30" RCP (E) 30" RCP (W)	5.31 5.16	C
N-14	43	30" RCP (E) 30" RCP (W)	5.35 5.14	C
N-14	44		-	CNO
N-14	45	24" RCP (E) 30" RCP (W)	6.58 6.57	C
N-14	46	24" RCP (W) 15" RCP (E)	6.55 7.99	C
N-14	47	24" RCP (S)	5.11	C
N-14	48	24" RCP (N)	4.59	C
N-14	49	24" RCP (N) 24" RCP (S)	4.42 4.42	C
N-14	50	24" RCP	4.07	C
N-14	51	18" RCP (E) 24" RCP (W)	7.27 7.27	C
N-14	52	24" RCP (E) 24" RCP (W)	7.22 6.76	C
N-14	53	24" RCP	5.12	C
N-14	54	24" CMP	4.71	C
N-14	55	24" CMP	4.93	C
N-14	56	24" CMP	4.84	C
N-14	57	24" CMP	5.44	C
N-14	58	24" CMP	4.86	C
N-14	59	24" CMP	5.17	C
N-14	60	24" CMP	4.59	C
N-14	60A	42" CMP	8.83	C
N-14	61	24" CMP	5.09	C

INVENTORY

MAP N14

existing drainage facilities
CITY OF CHARLESTON





N

LEGEND

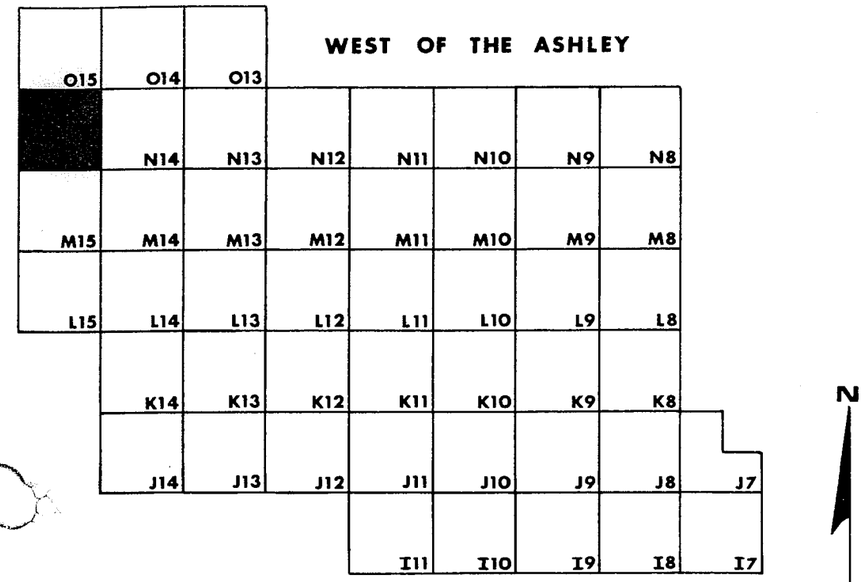
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

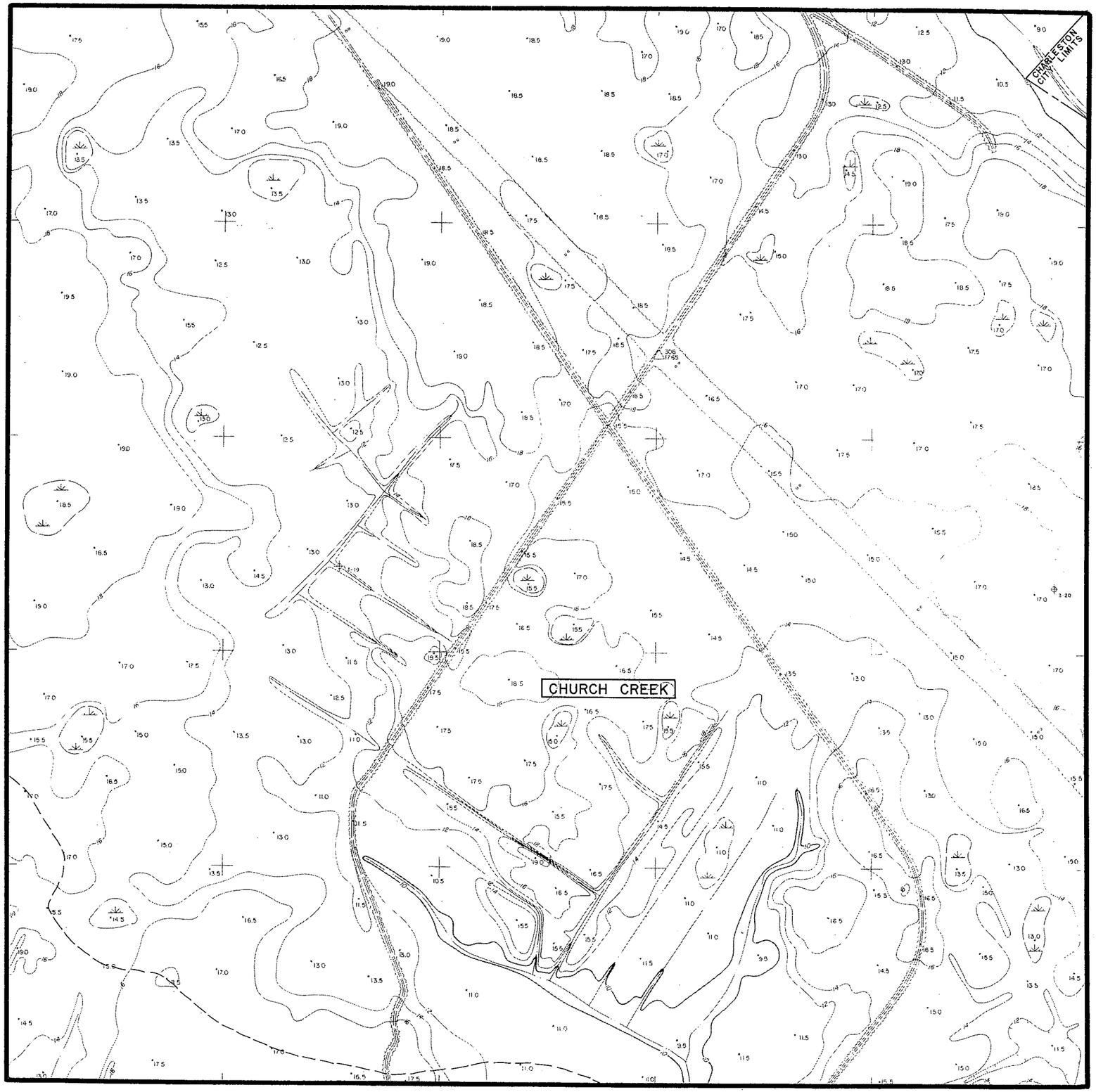
INVENTORY

MAP N15

existing drainage facilities
CITY OF CHARLESTON







LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500
FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
0-13	1	27" x 43" CMP (E) 27" x 43" CMP (W)	8.15 8.15	C
0-13	2	27" x 43" CMP (E) 24" CMP (W)	8.39 8.54	C
0-13	3	24" CMP	10.36	C
0-13	4	27" x 43" CMP	7.81	C
0-13	5	24" RCP	10.92	C
0-13	6	24" RCP	10.46	C
0-13	7	24" RCP	11.52	C
0-13	8	24" RCP	10.88	C
0-13	46	36" CMP (N) 40" x 65" CMP (S) 40" x 65" CMP (W #1) 40" x 65" CMP (W #2)	- 9.67 5.80 5.80	C
0-13	48	36" CMP (N) 36" CMP (S)	6.78 6.78	C
0-13	49	36" CMP (S) 36" CMP (E)	7.79 7.78	C
0-13	50	36" CMP	7.88	C

INVENTORY

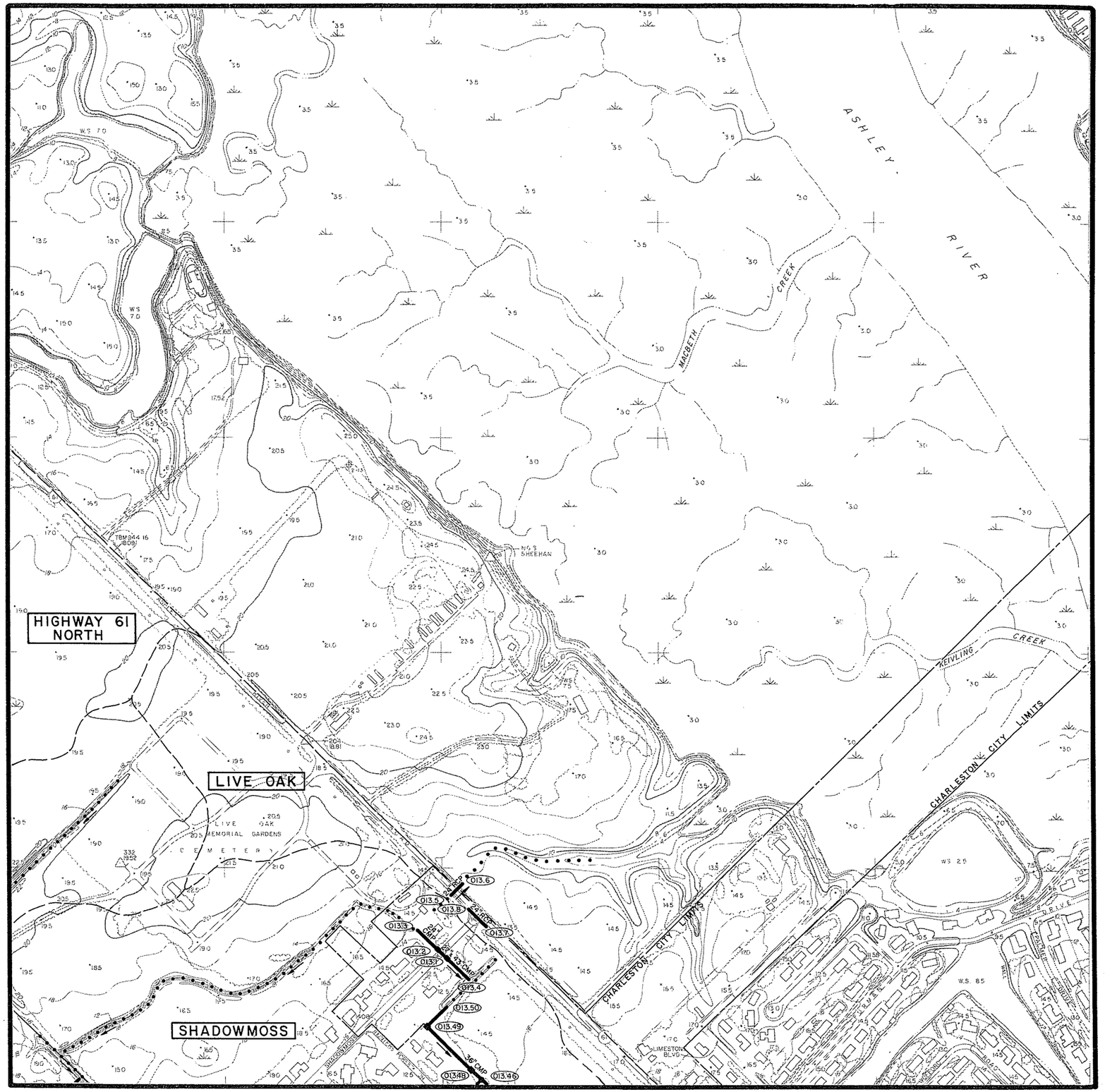
MAP 013

existing drainage facilities
CITY OF CHARLESTON

WEST OF THE ASHLEY

O15	O14						
N15	N14	N13	N12	N11	N10	N9	N8
M15	M14	M13	M12	M11	M10	M9	M8
L15	L14	L13	L12	L11	L10	L9	L8
	K14	K13	K12	K11	K10	K9	K8
	J14	J13	J12	J11	J10	J9	J8	J7
				I11	I10	I9	I8	I7

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- (P) — PUMPING STATION

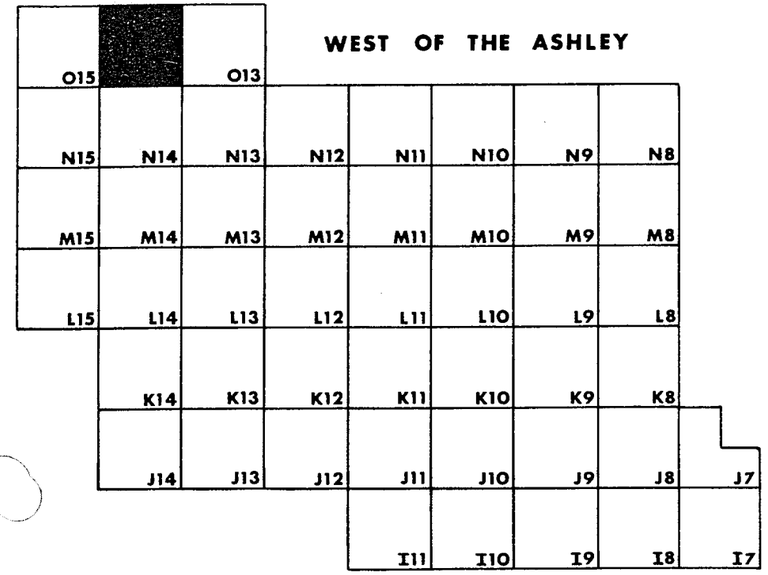
GRAPHIC SCALE 500 0 500 1000 1500 FEET

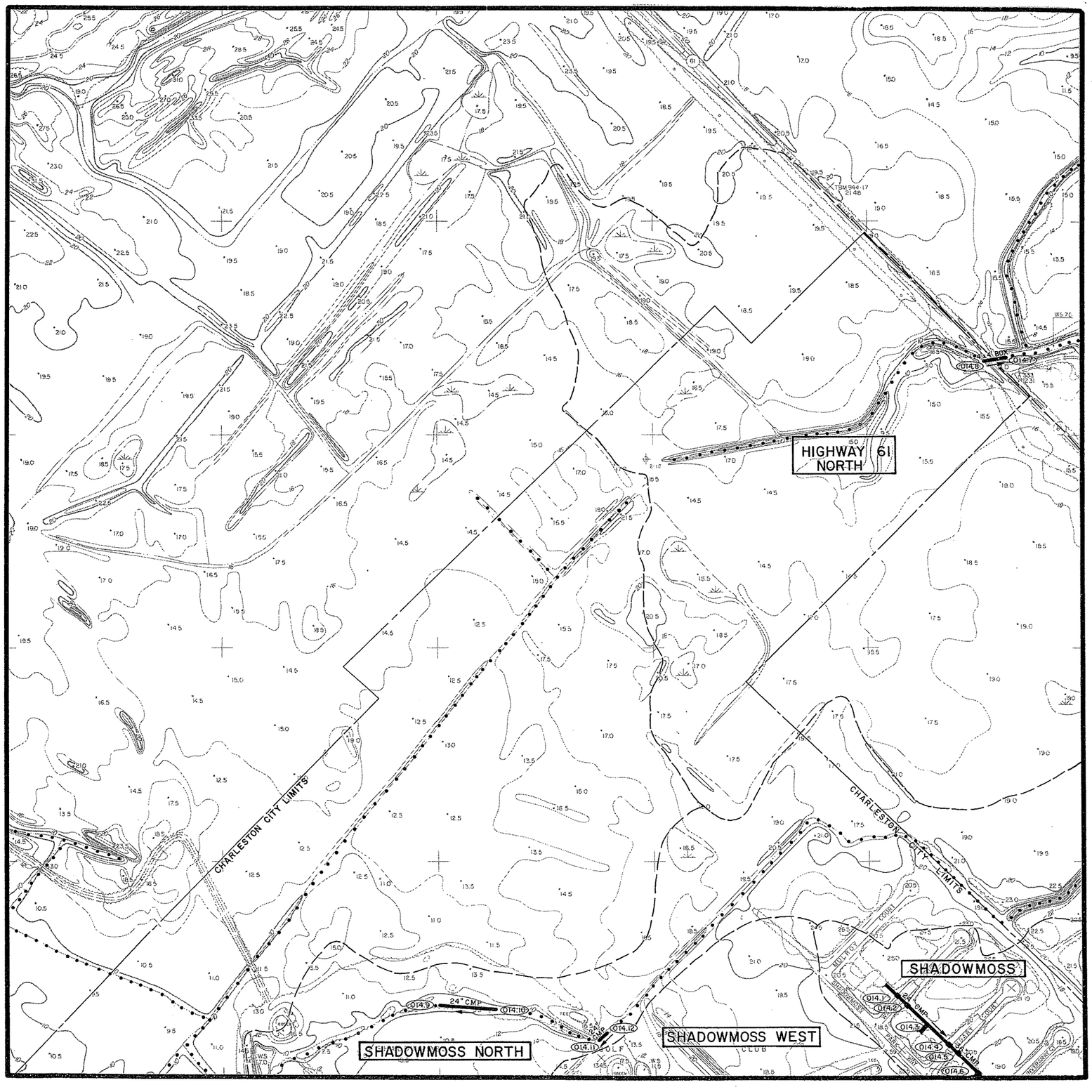
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
0-14	1	24" CMP (E) 18" CMP (W)	14.22 14.54	C
0-14	2	24" CMP (E) 24" CMP (W)	13.63 13.83	C
0-14	3	24" CMP (E) 24" CMP (W) 18" CMP (S)	12.87 12.87 13.19	C
0-14	4	36" CMP (E) 24" CMP (W)	11.57 11.93	C
0-14	5	36" CMP (E) 36" CMP (W)	11.95 11.84	C
0-14	6	36" CMP (E) 36" CMP (W) 18" (S)	10.50 10.84 11.89	C
0-14	7	4' x 4' BOX	5.26	C
0-14	8	4' x 4' BOX	5.21	C
0-14	9	24" CMP	7.16	C
0-14	10	24" CMP	7.78	C
0-14	11	24" CMP	8.79	C
0-14	12	24" CMP	9.04	C

INVENTORY

MAP 014

existing drainage facilities
CITY OF CHARLESTON





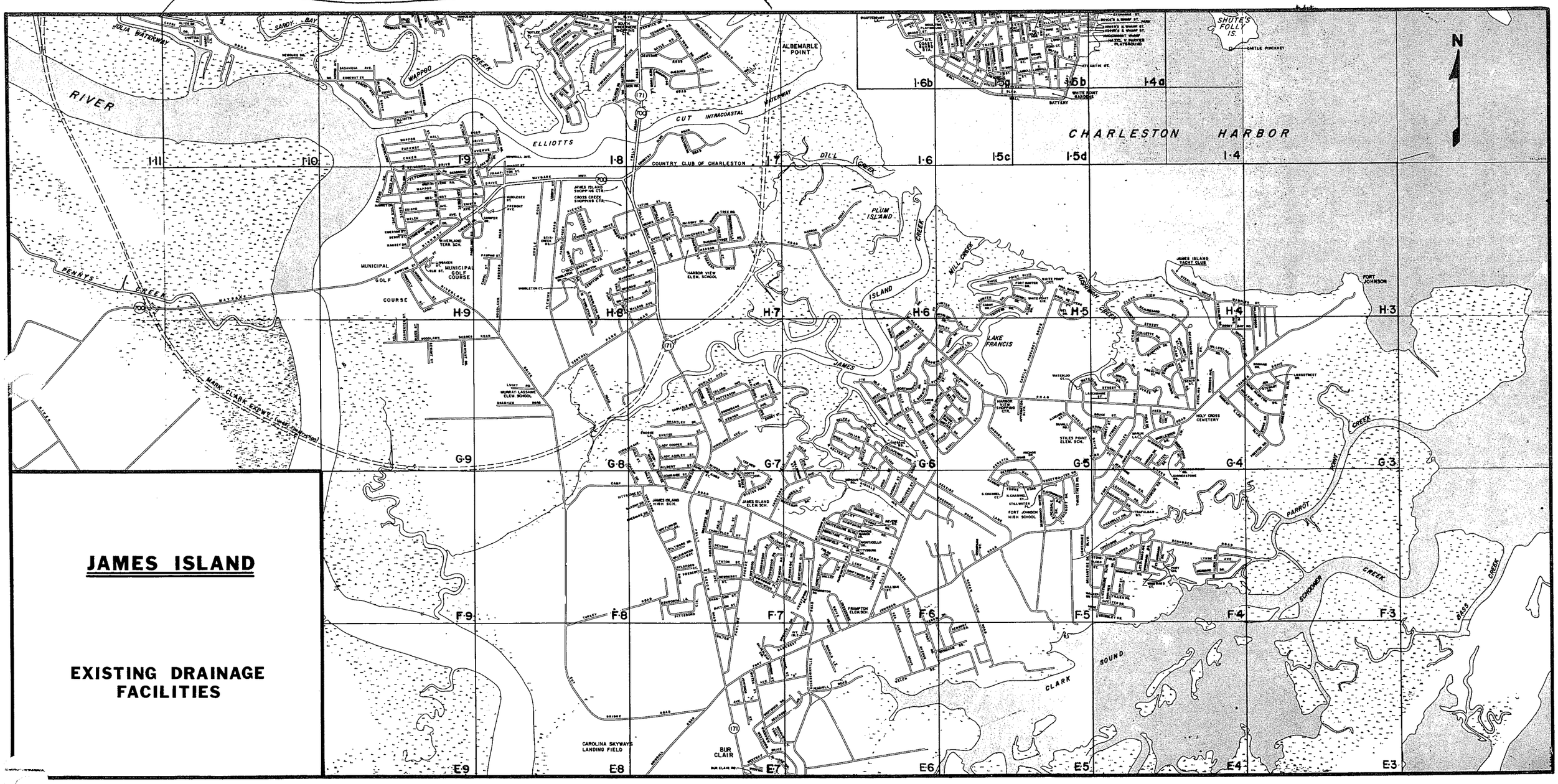
N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

West Ashley



JAMES ISLAND

EXISTING DRAINAGE FACILITIES

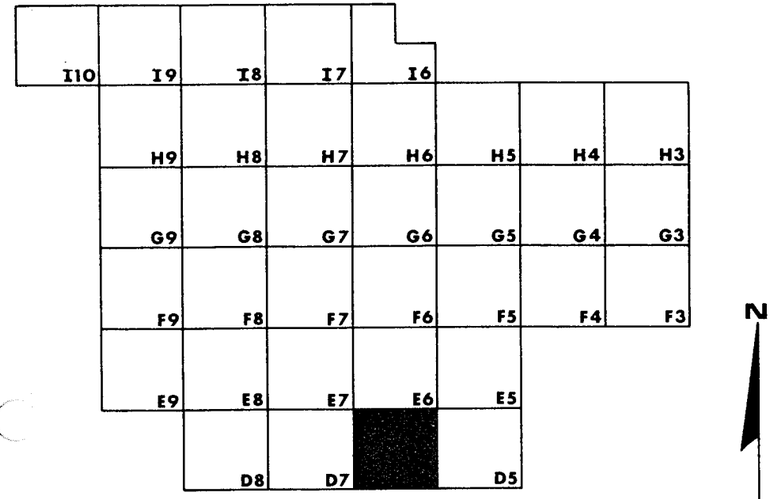
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
D-6	1	24" RCP	-1.75	HFS
D-6	2	24" RCP	-1.24	HFS

INVENTORY

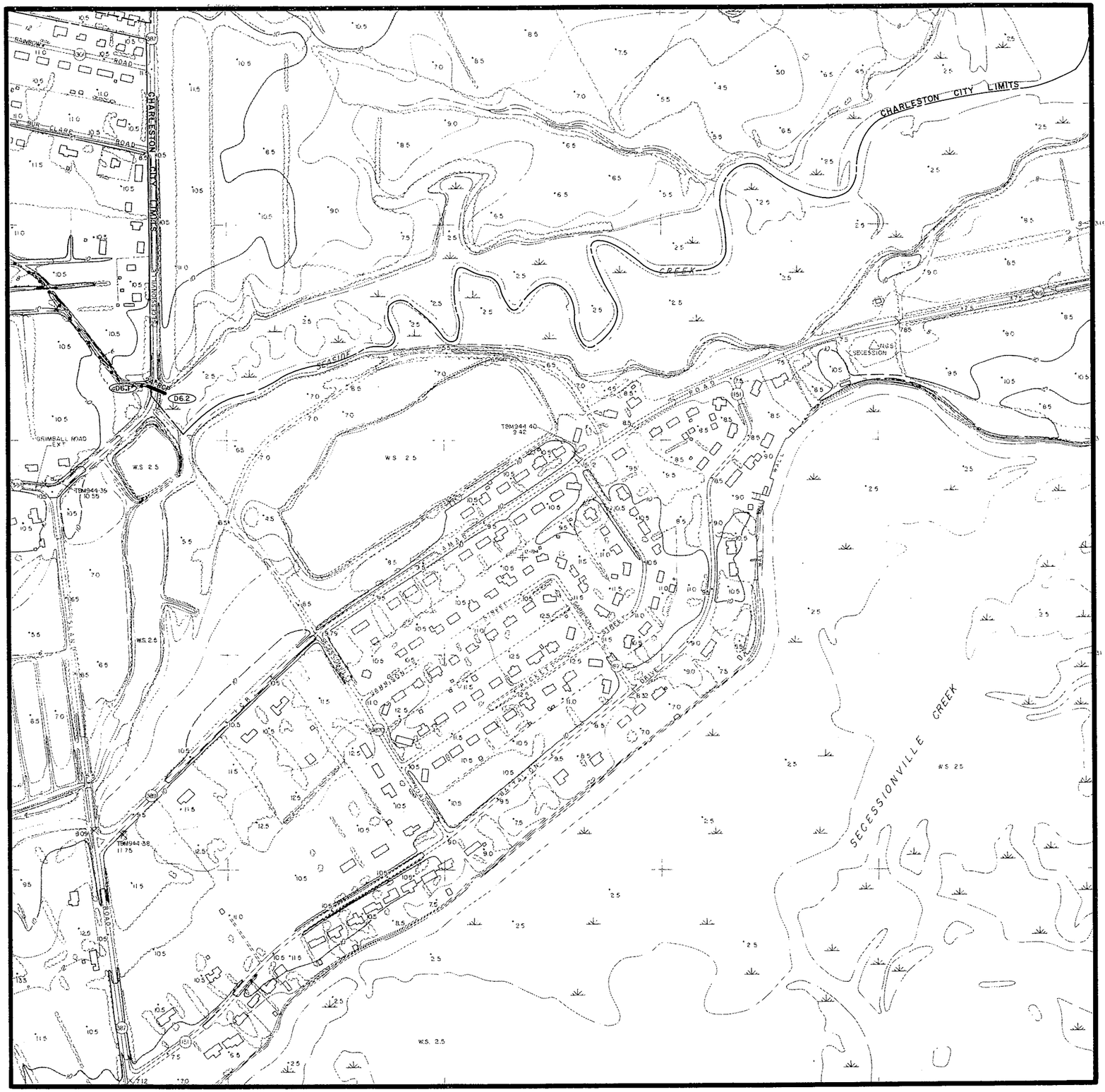
MAP D6

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

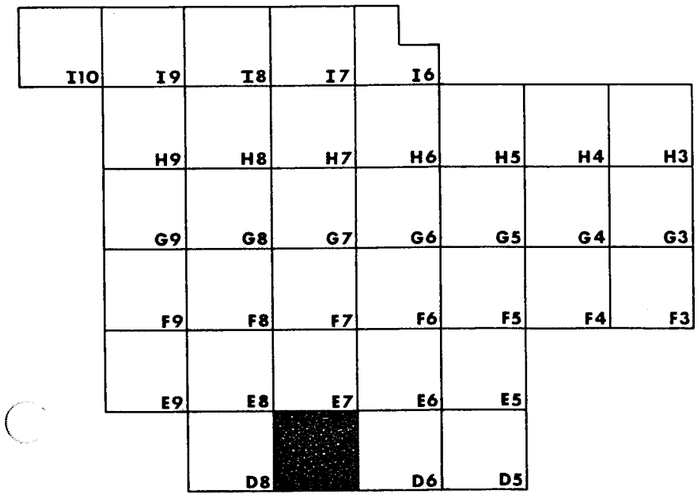
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
D-7	1	24" RCP	8.16	C
D-7	2	24" RCP	7.94	C
D-7	3	24" RCP	8.09	C
D-7	4	24" RCP	7.88	C
D-7	5	18" RCP	4.43	C

INVENTORY | MAP D7

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

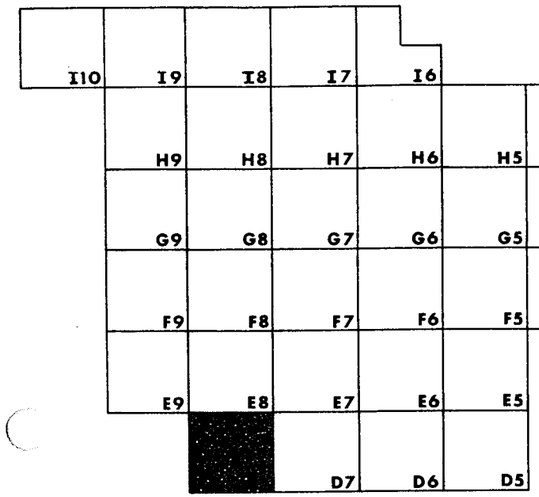
GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY

MAP D8

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND







LEGEND

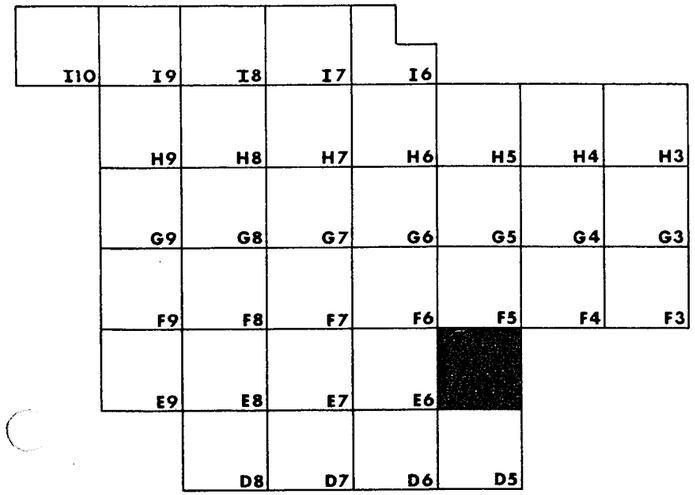
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY | MAP E5

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
E-6	1	24" RCP	4.38	HFS
E-6	2	24" RCP	4.68	HFS
E-6	3	42" RCP 42" RCP 27" x 43" CMP 27" x 43" CMP	1.95 1.64 3.57 3.88	C
E-6	7	42" RCP 42" RCP 27" x 43" CMP 27" x 43" CMP	1.61 1.47 3.52 3.76	C
E-6	11	36" RCP	2.56	C
E-6	12	36" RCP	2.96	C
E-6	6A	36" CMP	-	C
E-6	6B	36" CMP	-	C
E-6	13	27" x 43" CMP	4.42	C
E-6	14	27" x 43" CMP (S) 18" RCP (E) 12" RCP (W)	-	CNO
E-6	15	36" x 54" CMP	5.75	C
E-6	16	36" x 54" CMP	5.85	C
E-6	17	-	-	CNO
E-6	18	31" x 50" CMP (N) 31" x 50" CMP (S) 18" RCP (E)	5.45 5.45 5.45	C
E-6	19	31" x 50" CMP (S) 31" x 50" CMP (W)	5.46 5.46	C
E-6	20	31" x 50" CMP (E) 31" x 50" CMP (W)	5.74 5.74	C
E-6	21	22" x 36" CMP (N) 15" RCP (E) 15" RCP (W) 13" x 22" CMP (S)	8.27 8.57 8.57 8.65	C
E-6	22	22" x 36" CMP (N) 22" x 36" CMP (S)	8.07 8.07	C
E-6	23	22" x 36" CMP (N) 22" x 36" CMP (S)	8.12 8.12	C
E-6	24	22" x 36" CMP (N) 22" x 36" CMP (S)	7.95 7.95	C
E-6	25	22" x 36" CMP (N) 22" x 36" CMP (S)	7.97 7.97	C
E-6	26	22" x 36" CMP (N) 22" x 36" CMP (S)	7.70 7.70	C
E-6	27	22" x 36" CMP (S) 22" x 36" CMP (W)	7.48 7.48	C

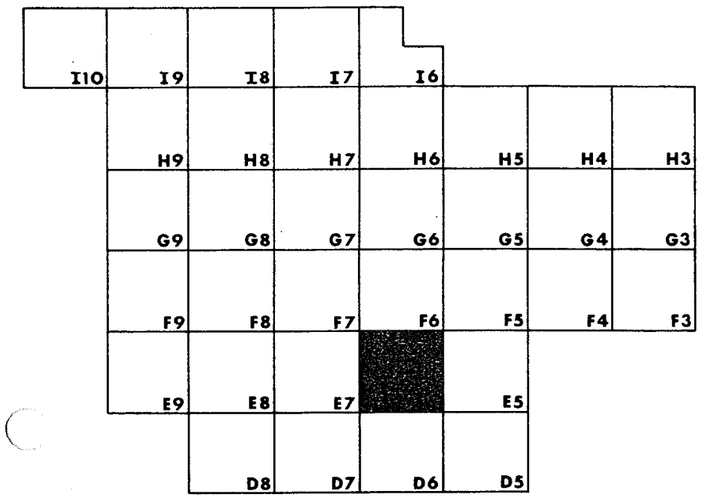
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
E-6	28	15" RCP	2.22	C
E-6	29	15" RCP	1.48	C
E-6	30	18" x 29" CMP (N) 18" CMP (S)	2.91 2.99	HFS
E-6	31	18" x 29" CMP	3.05	C
E-6	32	18" CMP (N) 18" x 29" CMP (S)	4.60 4.71	C
E-6	33	18" x 29" CMP (N)	4.95	C
E-6	34	18" x 29" CMP (E)	4.00	C
E-6	35	18" x 29" CMP (E) 18" x 29" CMP (W)	3.85 3.74	C
E-6	36	18" x 29" CMP	3.32	HFS
E-6	37	36" RCP	3.66	C
E-6	38	36" CMP (W) 36" RCP (S)	3.84 3.84	C
E-6	39	36" CMP (E) 24" CMP (N) 27" x 43" CMP (W)	4.25 4.29 4.36	C
E-6	40	27" x 43" CMP (E) 30" CMP (W)	4.32 4.32	C
E-6	41	30" CMP (E) 22" x 36" CMP (W)	5.36 5.63	C
E-6	42	22" x 36" CMP	5.99	C
E-6	43	24" RCP	3.45	C
E-6	44	24" RCP (N) 24" CMP (W)	3.90 3.80	C
E-6	45	24" CMP (E) 16" x 25" CMP (W)	4.58 4.65	C
E-6	46	22" x 36" CMP (W)	4.97	C
E-6	47	22" x 36" CMP (E) 30" RCP (W) 22" x 36" CMP (S)	4.90 4.73 4.75	C
E-6	48	22" x 36" CMP (N) 22" x 36" CMP (S)	5.19 5.20	C
E-6	49	22" x 36" CMP (N) 18" x 29" CMP (S)	5.78 5.78	C
E-6	50	18" x 29" CMP	5.87	C
E-6	51	30" RCP	4.23	C
E-6	52	42" RCP	-	C

INVENTORY

MAP E6

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

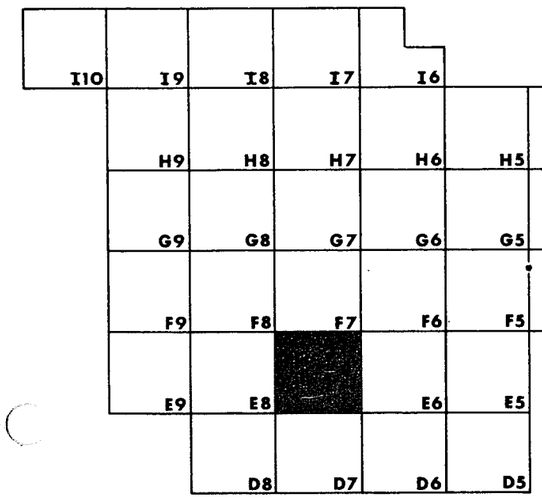
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
E-7	1	30" RCP 30" RCP	4.85 5.21	C
E-7	3	30" RCP 30" RCP	4.47 4.61	C
E-7	6	18" x 29" CMP (S) 18" RCP (E)	7.04 7.06	C
E-7	7			CNO
E-7	8			CNO
E-7	9	27" x 43" CMP	6.89	C
E-7	10	24" RCP	8.67	C
E-7	11	24" RCP	8.79	C
E-7	12	36" x 58" CMP	6.25	C
E-7	13	36" x 58" CMP	6.65	C
E-7	14	36" RCP	7.14	C
E-7	15	36" RCP	8.15	C
E-7	16	36" x 58" CMP	6.98	C
E-7	17	36" x 58" CMP	7.08	C
E-7	18	18" x 29" CMP 18" x 29" CMP	8.80 8.59	HFS
E-7	20	18" x 29" CMP 18" x 29" CMP	9.15 8.97	HFS
E-7	22	18" x 29" CMP 18" x 29" CMP	7.38 7.37	HFS
E-7	24	18" x 29" CMP (N) 18" x 29" CMP (N) 18" x 29" CMP (S) 18" x 29" CMP (S)	7.79 7.79 7.82 7.97	HFS
E-7	25	18" x 29" CMP 18" x 29" CMP	7.91 7.95	HFS
E-7	27	36" RCP	8.08	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
E-7	28	36" RCP (E) 36" RCP (W)	7.94 8.03	C
E-7	29	36" RCP	8.63	C
E-7	30	24" RCP	8.80	C
E-7	31	24" RCP	8.72	C
E-7	32	24" RCP	9.69	C
E-7	33	24" RCP	9.79	C
E-7	34	24" RCP	8.33	C
E-7	35	24" RCP	8.34	C
E-7	36	36" RCP	13.26	C
E-7	37	36" RCP	13.55	C
E-7	38	36" RCP	13.92	C
E-7	39	36" RCP	13.61	C
E-7	40	24" RCP	9.91	HFS
E-7	41	24" RCP (W) 30" RCP (E)	9.91 9.83	HFS
E-7	42	30" RCP	10.63	HFS
E-7	45	22" x 36" CMP (N) 22" x 36" CMP (E)	7.52 7.54	C
E-7	46	-	-	CNO
E-7	47	22" x 36" CMP (S) 30" RCP (W)	6.51 6.53	C
E-7	48	30" RCP	6.13	C
E-7	49	18" x 29" CMP (W) 27" x 43" CMP (N) 27" x 43" CMP (E)	5.91 5.87 5.29	C

INVENTORY | MAP E7

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N


DILLS BLUFF
RIVERLAND SOUTH
CHARLESTON CITY LIMITS
DUAL 30" RCP
BRADFORD AVE
MILTON
CHARLESTON CITY LIMITS
W5 105
STABILIZATION POND
JAMES ISLAND PRESBYTERIAN CHURCH
OXNER DR
WEST
OXFORD
OXFORD AVE
OXFORD
OXFORD
OXFORD

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
E-8	1	48" RCP	0.83	C
		48" RCP	0.64	
E-8	3	48" RCP	0.38	C
		48" RCP	0.45	

INVENTORY

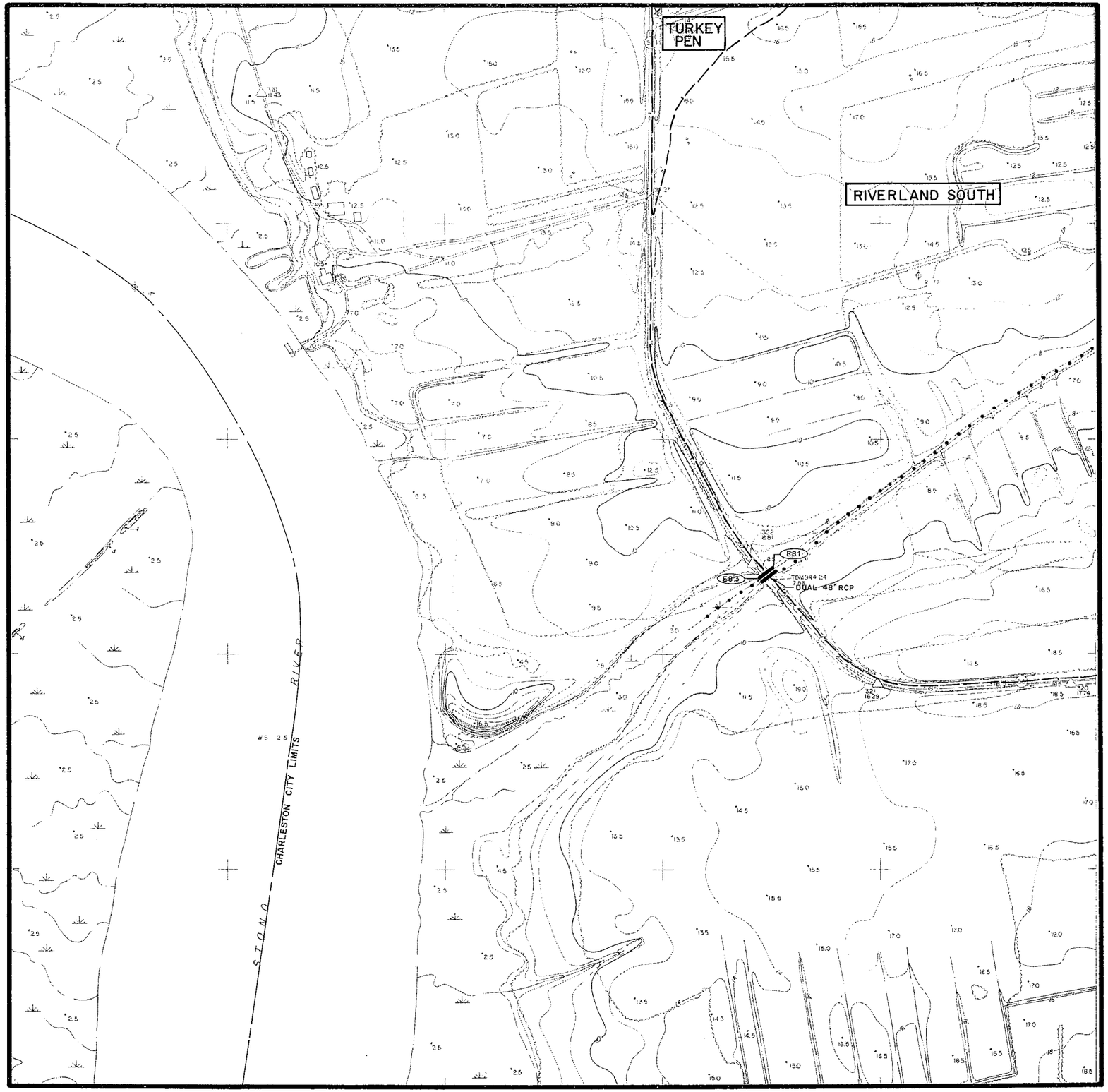
MAP E8

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND

I10	I9	I8	I7	I6			
	H9	H8	H7	H6	H5	H4	H3
	G9	G8	G7	G6	G5	G4	G3
	F9	F8	F7	F6	F5	F4	F3
	E9		E7	E6	E5		
		D8	D7	D6	D5		

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE

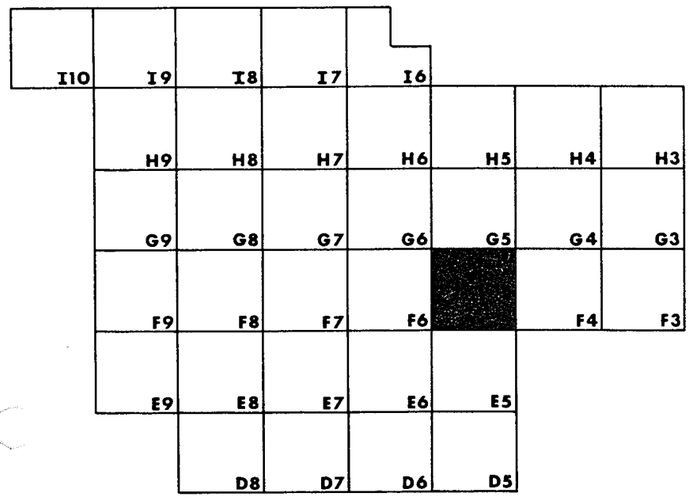
500 0 500 1000 1500
FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
F-5	1		-	CNO
F-5	2	24" RCP (E) 24" RCP (W)	11.46 11.29	C
F-5	3	24" RCP (N) 15" RCP (E) 24" RCP (W)	11.04 11.06 10.99	C
F-5	4	24" RCP (N) 24" RCP (S)	10.55 10.60	C
F-5	5	30" RCP (N) 24" RCP (S) 15" RCP (E)	9.77 10.31 10.88	C
F-5	6	30" RCP (N) 30" RCP (S) 15" RCP (E)	9.53 9.50 10.61	C
F-5	7	30" RCP (N) 30" RCP (S) 15" RCP (E)	8.92 9.01 9.94	C
F-5	8	30" RCP (W) 30" RCP (S) 15" RCP (E)	8.15 8.15 8.15	C
F-5	9	31" x 50" CMP (N) 30" RCP (E) 24" RCP (W)	7.03 7.13 7.48	C
F-5	10	31" x 50" CMP (N) 31" x 50" CMP (S)	5.93 5.93	C
F-5	11	31" x 50" CMP	5.23	C
F-5	12	24" RCP (E) 24" RCP (S/W)	8.62 8.85	C
F-5	13	24" RCP (N) 12" RCP (S)	9.87 9.92	C
F-5	14	40" x 65" CMP	3.06	HFS
F-5	15	40" x 65" CMP	3.05	HFS

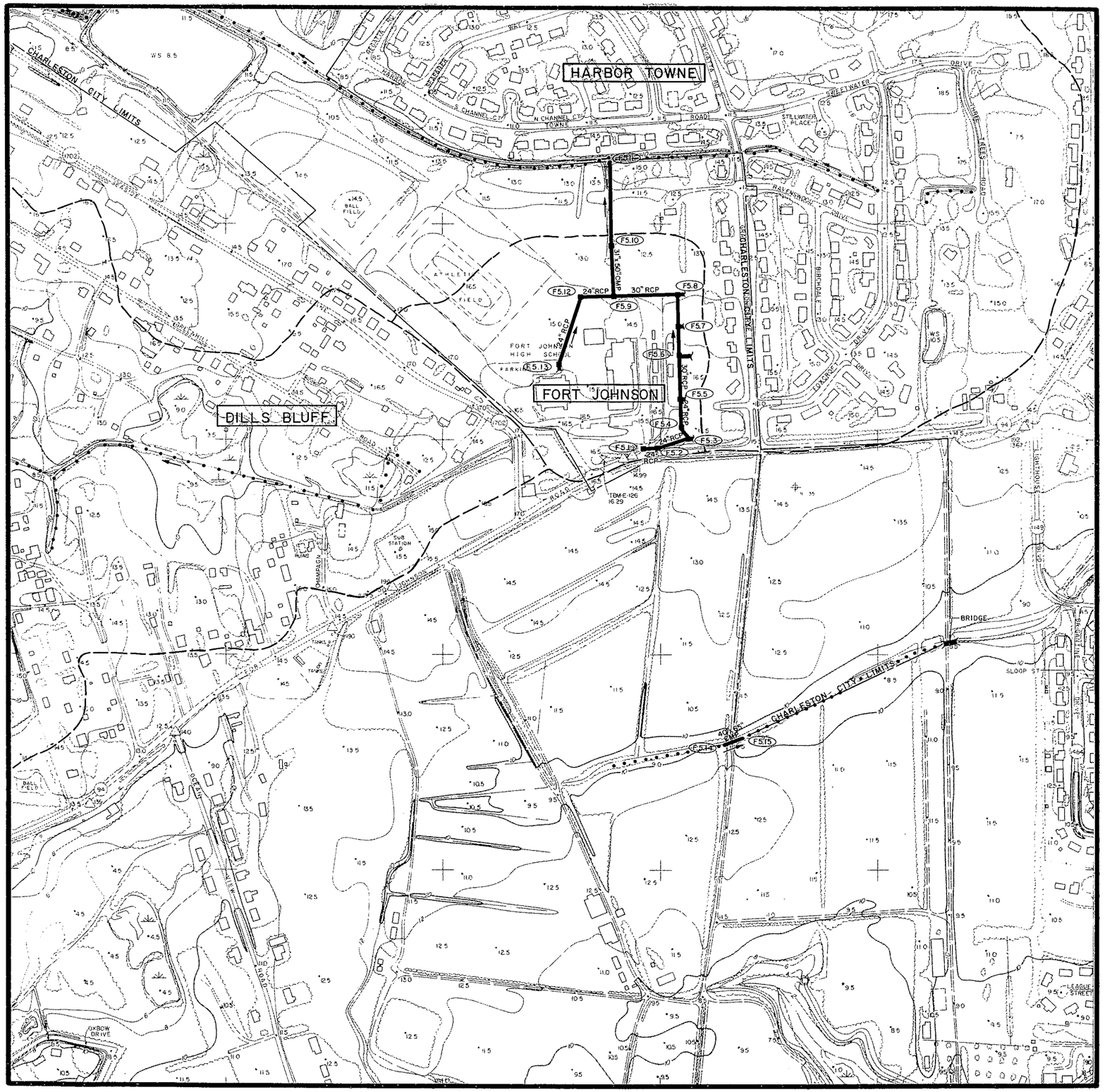
INVENTORY | MAP F5

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
F-6	1	42" RCP	4.17	C
F-6	2	30" CMP	5.10	C
F-6	3	15" RCP (N) 30" RCP (S) 24" RCP (E) 24" RCP (W)	6.95 4.67 4.63 4.62	C
F-6	4	15" RCP (N) 24" RCP (E) 24" RCP (W)	6.46 4.88 4.98	C
F-6	5	30" RCP (E) 30" RCP (W) 18" RCP (S)	- - -	CNO
F-6	6	30" RCP 24" RCP	5.53 5.43	C
F-6	8	24" RCP (N) 24" RCP (E) 24" RCP (W)	- - -	CNO
F-6	9	24" RCP	5.52	C
F-6	10	18" x 29" CMP	7.13	C
F-6	11	18" x 29" CMP (N) 18" x 29" CMP (S)	- -	CNO
F-6	12	18" x 29" CMP (N) 18" x 29" CMP (S)	- -	CNO
F-6	13	18" x 29" CMP	6.90	C
F-6	14	24" RCP	7.11	C
F-6	15	11" x 18" CMP (N) 18" x 29" CMP (E) 24" RCP (W)	7.98 7.83 7.57	C
F-6	16	18" x 29" CMP (W) 18" x 29" CMP (S)	7.77 7.81	C
F-6	17	30" CMP	-	CNO
F-6	18	13" x 22" CMP	-	C
F-6	19		-	CNO
F-6	20	18" CMP (N) 18" x 29" CMP (W) 30" CMP (S)	4.29 4.39 4.26	C
F-6	21	30" CMP (N)	3.69	C
F-6	22	18" x 29" CMP (N) 18" x 29" CMP (S) 18" x 29" CMP (W)	5.44 5.41 5.43	C
F-6	23	18" x 29" CMP (E)	5.60	C
F-6	24	18" x 29" CMP (N) 18" x 29" CMP (W) 18" RCP (E)	6.84 6.79 6.84	C
F-6	25	18" RCP (E) 18" x 29" CMP (W) 18" x 29" CMP (S)	7.24 6.99 7.06	C
F-6	26	18" x 29" CMP (E)	7.55	C
F-6	27	16" x 25" CMP	-	C
F-6	28	36" RCP	4.44	C
F-6	29	36" RCP	4.63	C
F-6	30	48" RCP	2.14	C
F-6	31	48" RCP	2.23	C
F-6	32	36" RCP 36" CMP	-0.44 -0.30	C
F-6	34	36" CMP 36" RCP	-0.74 -0.48	C

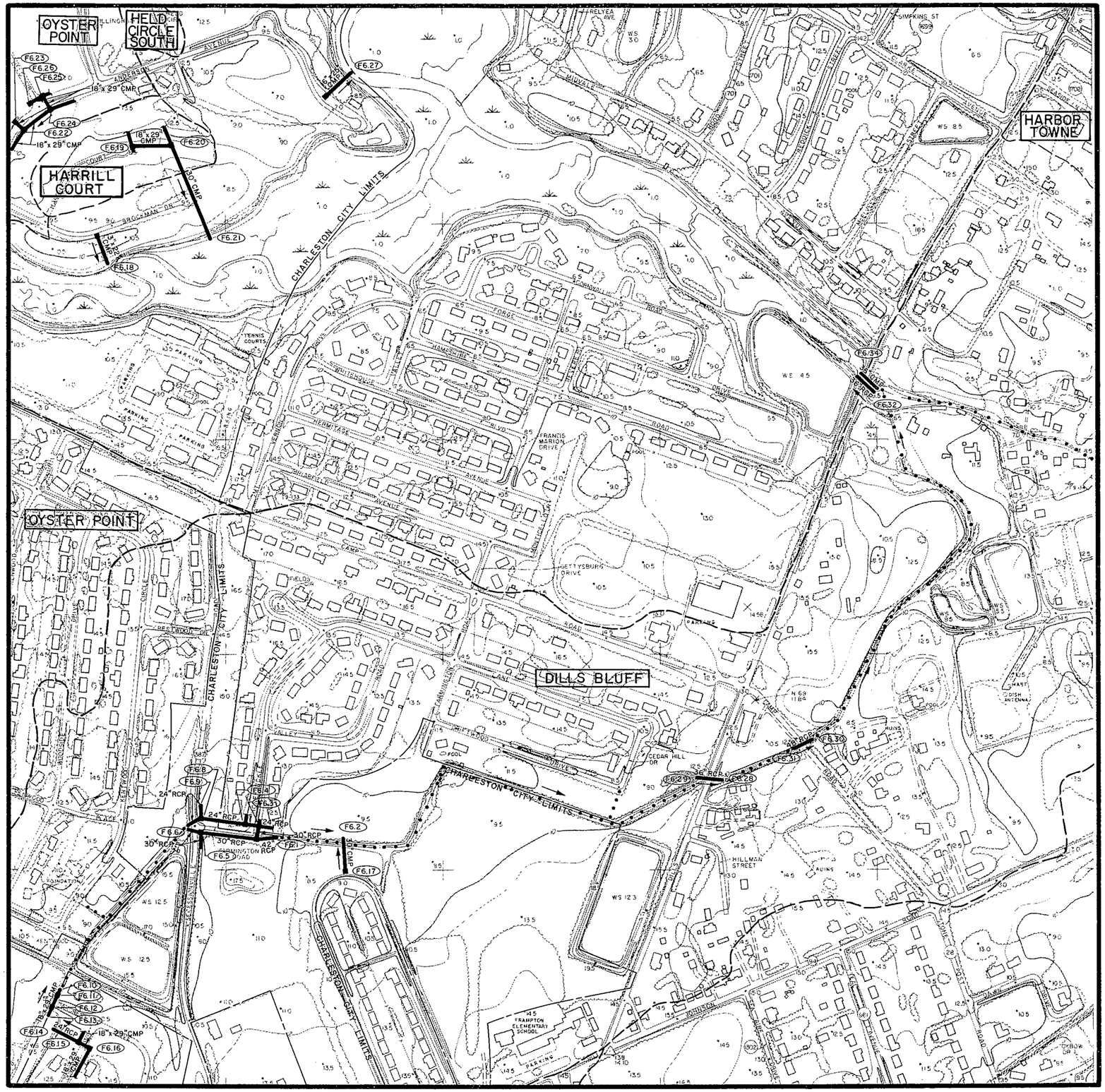
INVENTORY | MAP F6

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND

I10	I9	I8	I7	I6		
H9	H8	H7	H6	H5	H4	H3
G9	G8	G7	G6	G5	G4	G3
F9	F8	F7		F5	F4	F3
E9	E8	E7	E6	E5		
	D8	D7	D6	D5		

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
F-7	1	60" RCP 60" RCP	-0.35 -0.14	C
F-7	2	60" RCP (E) 60" RCP (W)	0.78 0.78	C
F-7	3	60" RCP (E) 60" RCP (W)	- -	CNO
F-7	4	60" RCP (E) 60" RCP (W)	- -	CNO
F-7	5	60" RCP (E) 60" RCP (W)	1.13 1.13	C
F-7	6	60" RCP 60" RCP	0.20 0.27	C
F-7	9	42" RCP	-	C
F-7	10	42" RCP (E) 42" RCP (S)	- -	C
F-7	11	42" RCP (N) 42" RCP (S)	- -	C
F-7	12	18" RCP	-	C
F-7	13	54" RCP	0.75	C
F-7	14	54" RCP (N) 54" RCP (S) 18" RCP (W)	0.66 0.66 6.39	C
F-7	15	54" RCP	-0.04	C
F-7	16	48" RCP	1.43	C
F-7	17	18" RCP (N) 48" RCP (S) 48" RCP (E) 18" RCP (W)	- - - -	CNO
F-7	18	48" RCP	1.61	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
F-7	19	24" RCP (E) 18" RCP (W)	2.96 2.77	C
F-7	20	24" RCP	2.47	C
F-7	21	36" RCP	2.71	C
F-7	22	36" RCP	2.47	C
F-7	23	15" RCP (W) 24" RCP (S)	- -	C
F-7	24	24" RCP	2.96	C
F-7	25	15" RCP (N) 24" RCP (S)	6.61 6.16	C
F-7	26	24" RCP (N) 24" RCP (S)	6.50 6.14	C
F-7	27	24" RCP (N) 24" RCP (S)	- -	C
F-7	28	24" RCP	5.53	C
F-7	29	24" RCP (N) 30" RCP (E) 24" RCP (W)	8.30 8.32 8.51	C
F-7	30	30" RCP (E) 30" RCP (W)	8.18 8.14	C
F-7	31	30" RCP	7.98	C
F-7	32	18" RCP	6.57	C
F-7	33	24" RCP	5.79	C
F-7	34	24" RCP	6.31	C
F-7	35	24" RCP	6.35	C
F-7	36	24" RCP	5.71	C

INVENTORY | MAP F7

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND

I10	I9	I8	I7	I6		
H9	H8	H7	H6	H5	H4	H3
G9	G8	G7	G6	G5	G4	G3
F9	F8		F6	F5	F4	F3
E9	E8	E7	E6	E5		
	D8	D7	D6	D5		

N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



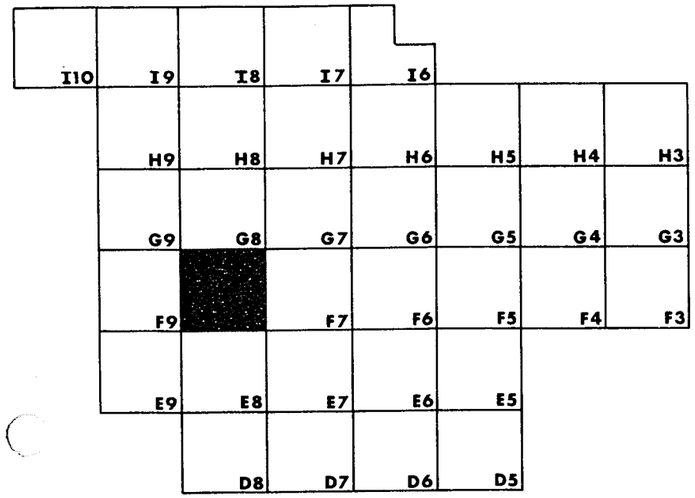
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
F-8	1	36" RCP	4.05	C
F-8	2	36" RCP	3.80	C
F-8	3	24" RCP	4.39	C
F-8	4	24" RCP	5.09	C
F-8	5	Bridge	-0.98	C
F-8	7	36" RCP	-0.66	C
F-8	8	36" RCP	-0.52	C
F-8	9	36" RCP	-0.66	C
F-8	10	36" RCP	-0.52	C

INVENTORY

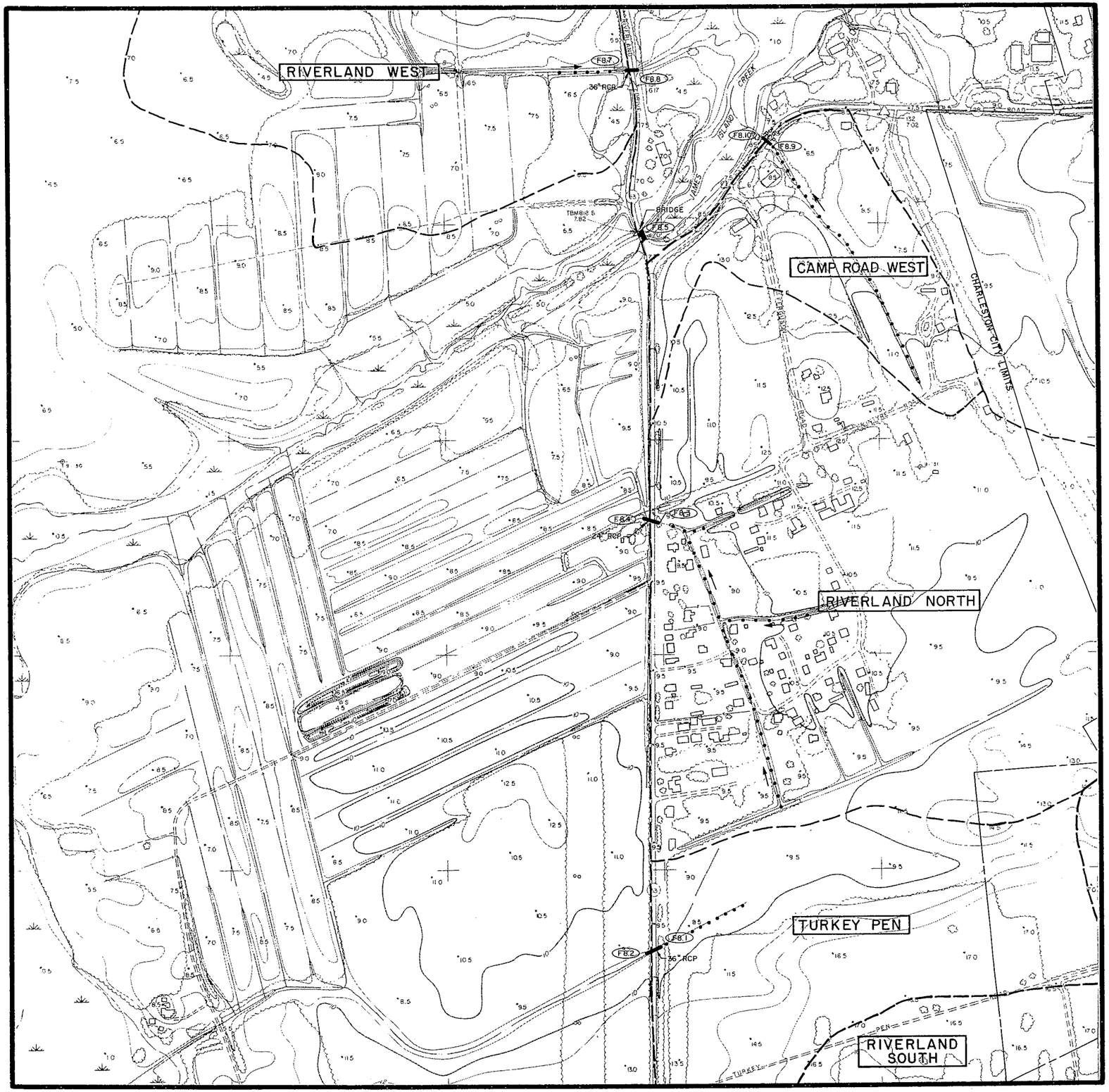
MAP F8

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

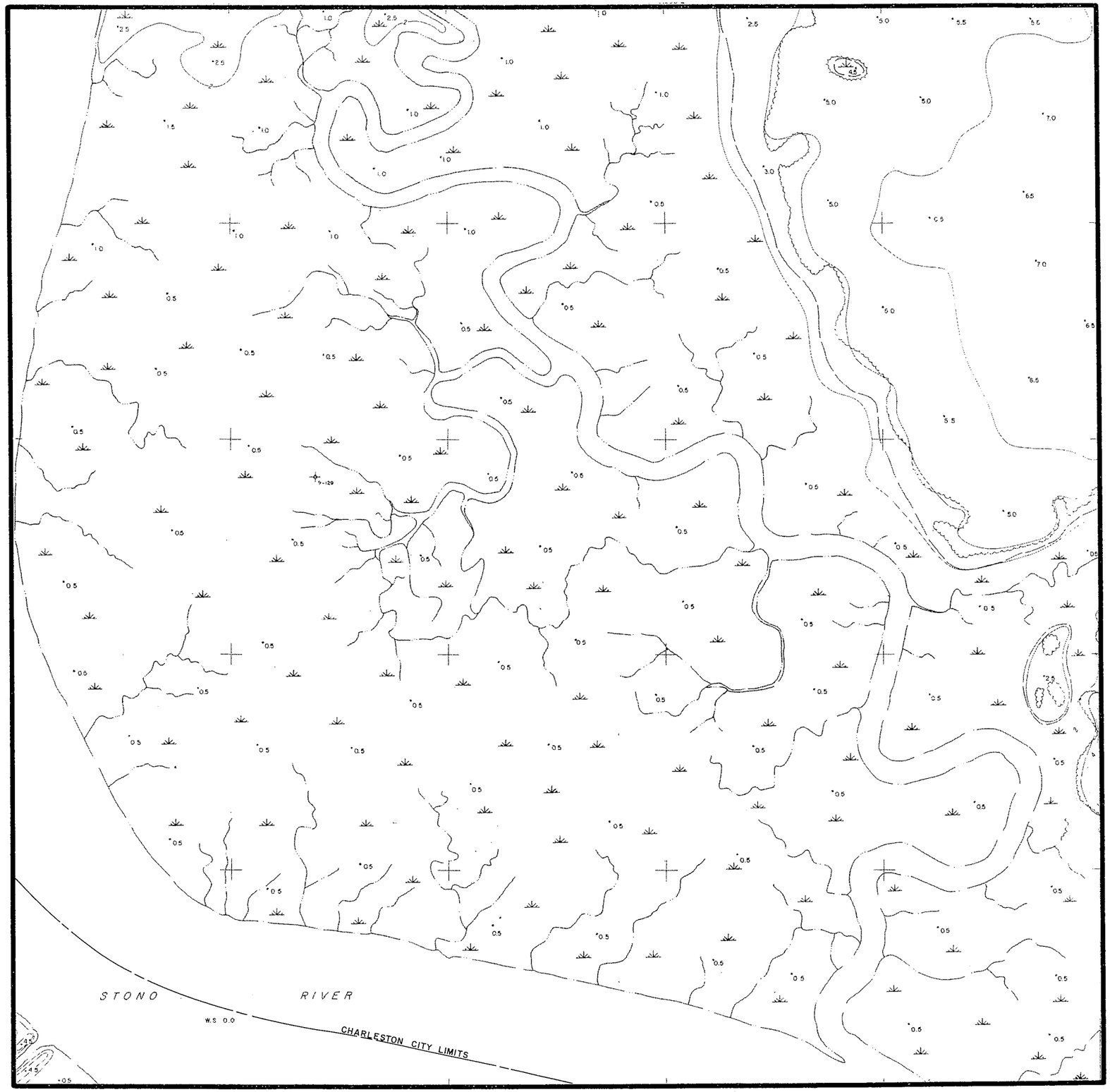
INVENTORY | MAP F9

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND

I10	I9	I8	I7	I6		
H9	H8	H7	H6	H5	H4	H3
G9	G8	G7	G6	G5	G4	G3
	F8	F7	F6	F5	F4	F3
E9	E8	E7	E6	E5		
	D8	D7	D6	D5		

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

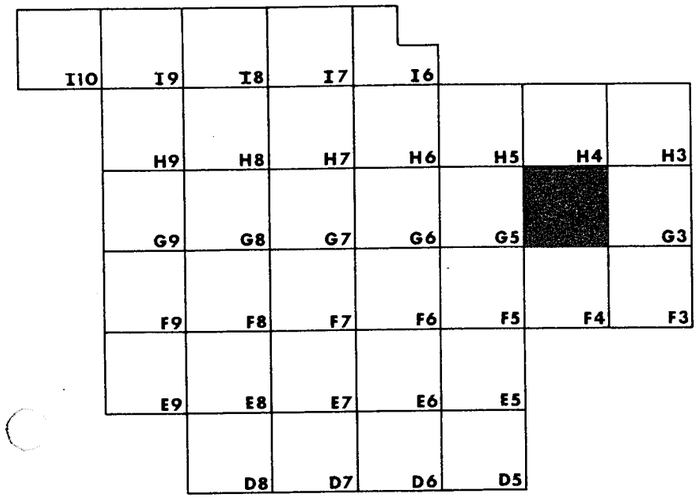
GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY

MAP G4

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE

500 0 500 1000 1500

FEET

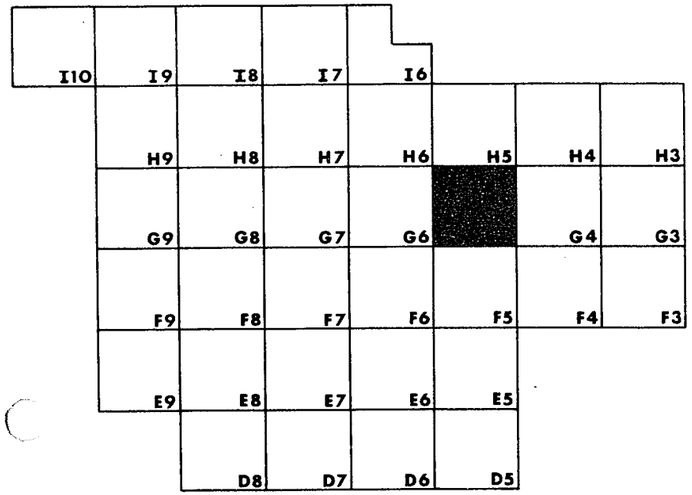
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
G-5	1	18" RCP 36" RCP	4.29 1.24	C
G-5	3	18" RCP 36" RCP	3.50 0.79	C
G-5	5	24" RCP 30" RCP	1.74 1.40	C
G-5	7	30" RCP 24" RCP	1.62 2.38	C
G-5	9	30" RCP 30" RCP	2.28 2.30	C
G-5	12	30" RCP 30" RCP	2.16 2.26	C
G-5	13	30" RCP	2.89	C
G-5	14	30" RCP	3.60	C
G-5	15	24" RCP	3.80	C
G-5	16	24" RCP (E) 18" RCP (S)	3.73 3.79	C
G-5	17	42" CMP 42" CMP	4.12 4.06	C
G-5	19	24" CMP (S)	5.02	C
G-5	20	18" RCP (N) 24" CMP (S)	5.39 5.39	C
G-5	21	42" CMP 42" CMP	4.78 4.81	C
G-5	23	36" RCP 36" RCP	4.36 4.27	C
G-5	25	36" RCP 36" RCP	3.71 3.75	C
G-5	27	24" RCP 24" RCP	4.24 4.26	C
G-5	29	24" RCP 24" RCP	3.95 3.93	C

INVENTORY

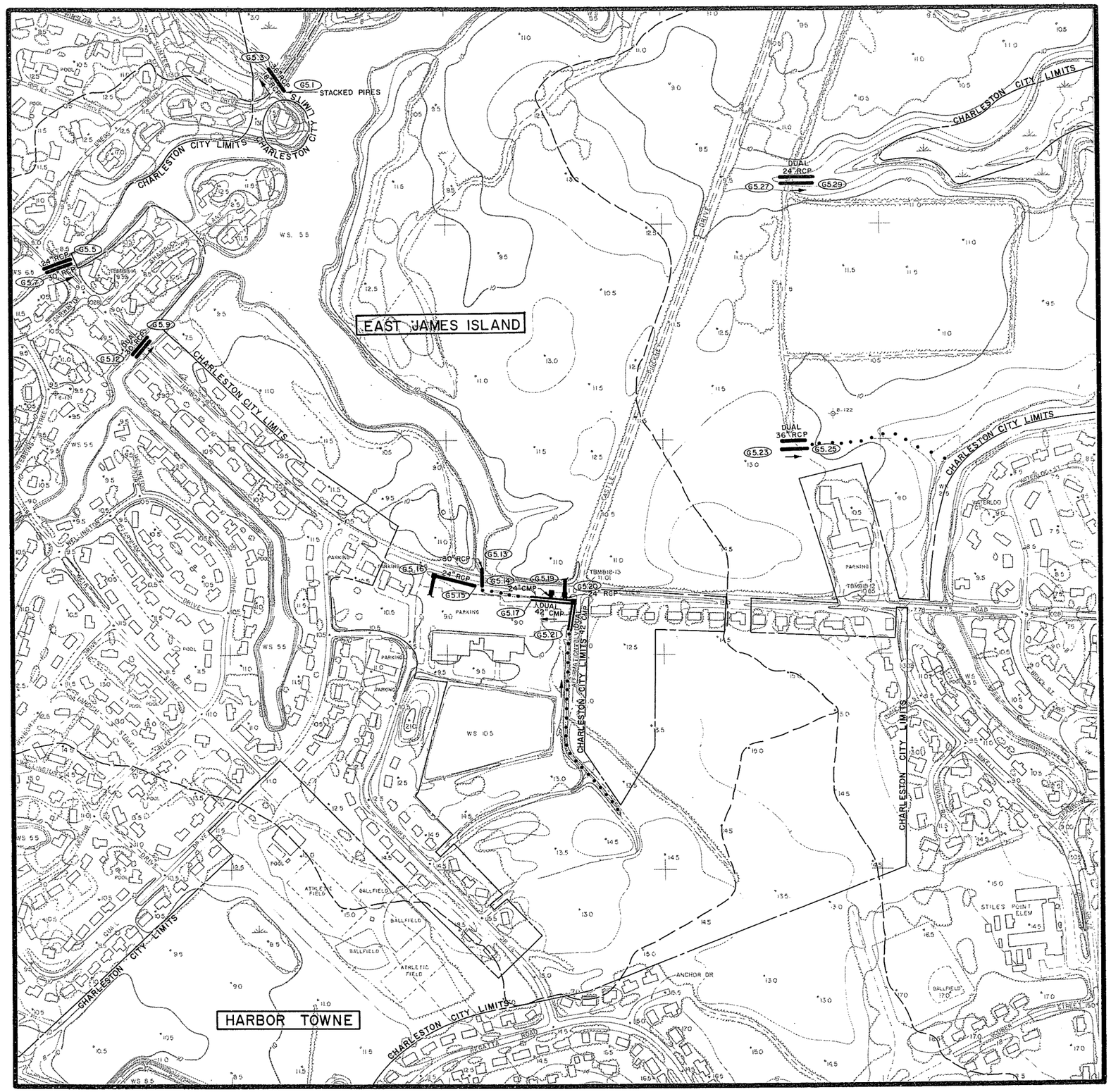
MAP G5

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

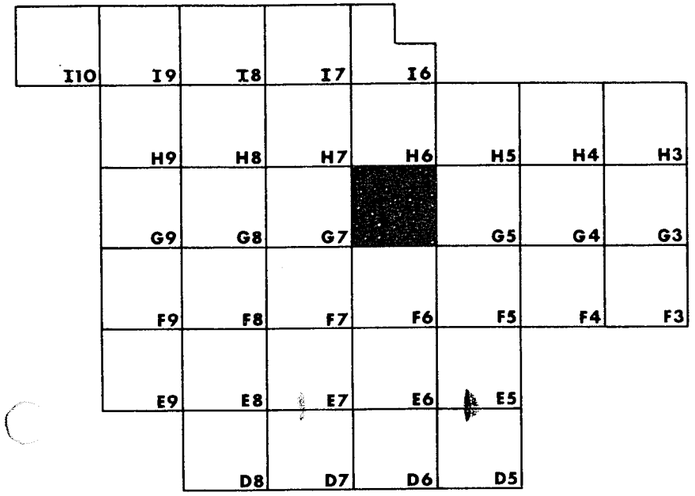
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
G-6	1	18" x 29" CMP	3.78	C
G-6	2	18" x 29" CMP (N)	4.86	C
		18" x 29" CMP (S)	4.97	
		18" RCP (E)	5.24	
		18" RCP (W)	5.34	
G-6	3	18" x 29" CMP (N)	5.64	C
		16" x 25" CMP (E)	5.64	
		18" RCP (S)	5.74	
G-6	4	18" x 29" CMP	3.91	C
G-6	5	18" x 29" CMP (N)	5.49	C
		18" x 29" CMP (S)	5.49	
		18" RCP (E)	5.83	
		18" RCP (W)	5.69	
G-6	6		-	CNO
G-6	7	18" x 29" (N)		CNO
		18" RCP (E)	-	
		18" RCP (W)	-	
G-6	8	13" x 22" CMP	-	C
G-6	9	18" RCP	-	C
G-6	10	18" RCP	-	C
G-6	11	36" RCP	-	C
G-6	12	36" RCP	-	C
G-6	13	18" RCP	-	C

INVENTORY | MAP G6

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



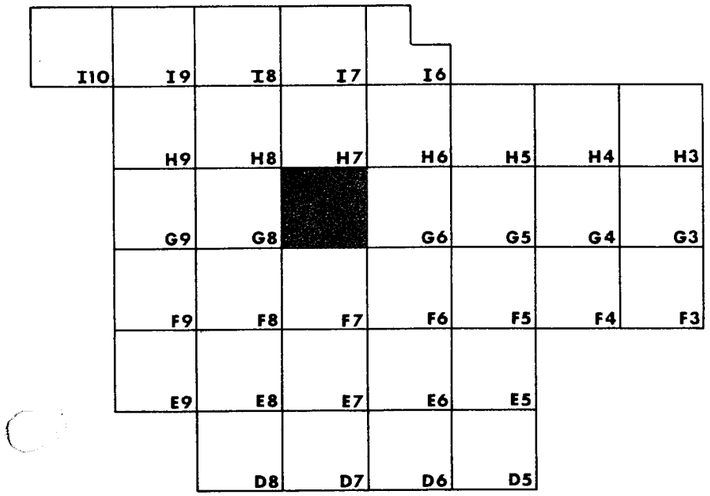
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
G-7	1	15" RCP	-	FS
G-7	2	24" RCP	-	C
G-7	3	24" RCP (N) 24" RCP (S)	- -	C
G-7	4	24" RCP (N) 24" RCP (S)	- -	C
G-7	5	24" RCP (N) 15" RCP (S) 15" RCP (E) 18" RCP (W)	- - - -	C
G-7	6	18" RCP	-	C
G-7	7	15" RCP	-	C
G-7	8	36" CMP	1.04	C W/TIDE GATE
G-7	9	36" CMP	1.31	C
G-7	10	15" RCP	-	C
G-7	11	15" RCP	-	C
G-7	12	15" RCP	-	C
G-7	13	15" RCP	-	C
G-7	14	15" RCP	-	C
G-7	15	30" RCP	7.83	C
G-7	16	30" RCP (E) 24" RCP (N/W)	7.59 7.24	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
G-7	17	24" RCP	7.82	C
G-7	18	24" RCP	8.31	C
G-7	19	24" RCP (E) 24" RCP (S)	8.95 8.95	C
G-7	20	24" RCP (N)	9.17	C
G-7	21	24" RCP (S)	8.68	C
G-7	22	24" RCP (N) 24" RCP (S/E)	8.48 8.67	C
G-7	23	18" RCP (N) 24" RCP (E)	9.07 9.06	C
G-7	24	36" RCP	-	C
G-7	25	18" RCP	-	C
G-7	26	30" RCP (N) 30" RCP (S) 18" RCP (E)	4.26 4.34 4.49	C
G-7	27	30" RCP (N) 24" RCP (E) 36" RCP (W)	3.11 3.11 3.11	C
G-7	28	36" RCP	3.00	HFS
G-7	29	24" RCP (E) 24" RCP (W)	3.58 3.52	C
G-7	30	24" RCP	3.94	C

INVENTORY | MAP G7

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
G-8	1	42" RCP	1.34	C
		36" RCP	1.32	
G-8	3	42" RCP (N)	1.19	C
		42" RCP (S)	1.07	
		18" RCP (E)	6.55	
G-8	4	42" RCP (N)	0.81	C
		42" RCP (S)	1.04	
		18" RCP (E)	6.68	
G-8	5	42" RCP	1.06	C
		36" RCP	0.99	
G-8	7	42" RCP	0.70	C
		42" RCP	0.85	
G-8	9	42" RCP	0.46	C
		42" RCP	0.32	
G-8	11	42" RCP	0.20	C
		42" RCP	0.13	
G-8	13	42" RCP (W)	-0.18	C
		48" RCP (W)	-0.18	
		42" RCP (N-1)	-0.18	
		42" RCP (N-2)	-0.18	
		36" RCP (E)	-0.18	
G-8	14	36" RCP	0.98	C
G-8	15	48" RCP	-0.10	C
		42" RCP	-0.36	
G-8	17	24" RCP	3.66	C
G-8	18	24" RCP (N)	3.88	C
		18" RCP (W)	4.03	C
G-8	19	30" RCP	1.57	HFS
		48" RCP	-0.13	
G-8	21	48" RCP	0.37	HFS
		30" RCP	1.08	
G-8	23	48" RCP	-1.31	C
		48" RCP	-1.37	
G-8	25	48" RCP	-1.48	C
		48" RCP	-1.67	
G-8	27	18" x 29" CMP	2.73	HFS
G-8	28	18" x 29" CMP	2.72	HFS
G-8	29	24" RCP	5.49	C
G-8	30	24" RCP	5.31	C

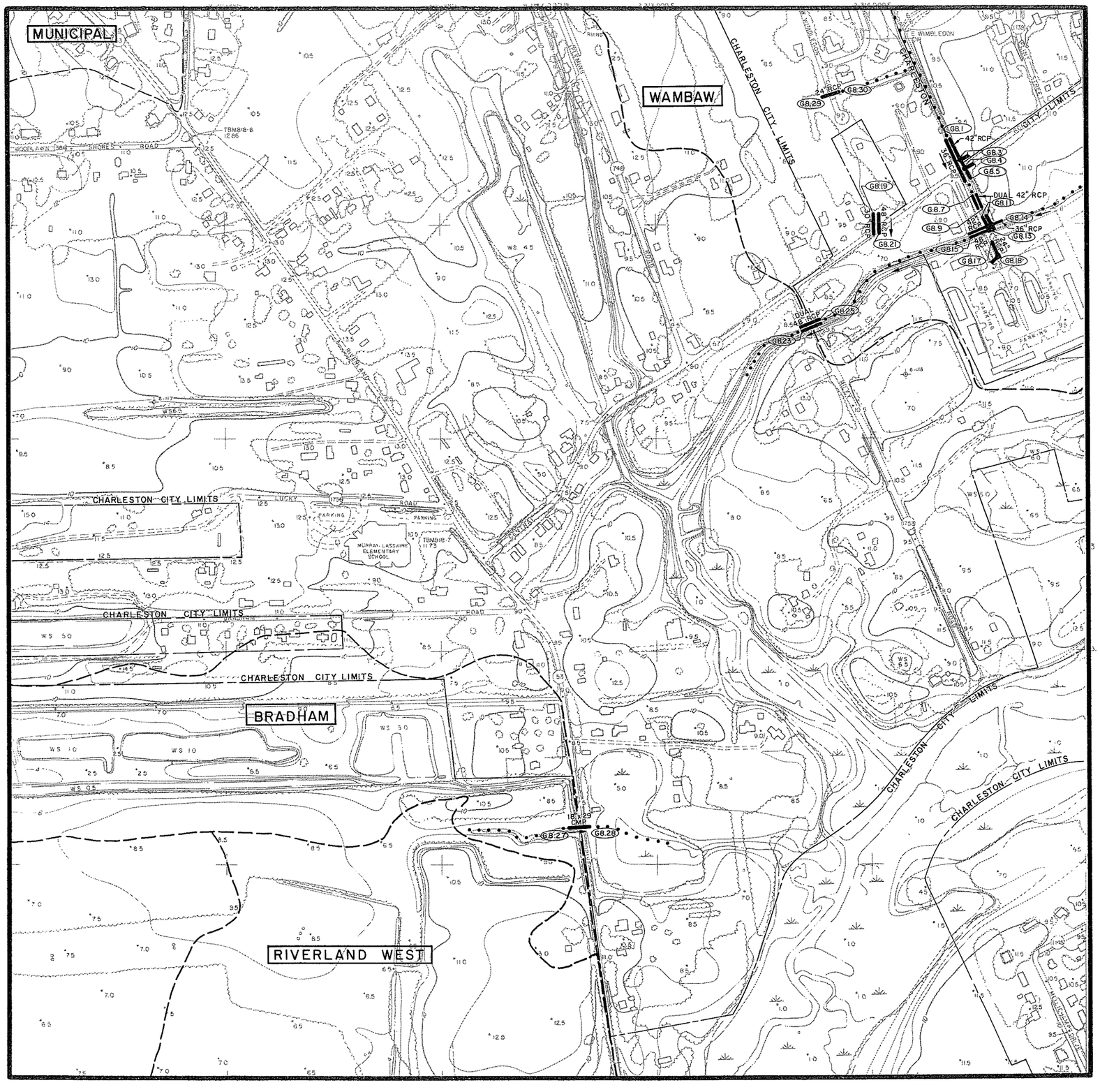
INVENTORY | MAP G8

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND

I10	I9	I8	I7	I6		
H9	H8	H7	H6	H5	H4	H3
G9		G7	G6	G5	G4	G3
F9	F8	F7	F6	F5	F4	F3
E9	E8	E7	E6	E5		
	D8	D7	D6	D5		

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

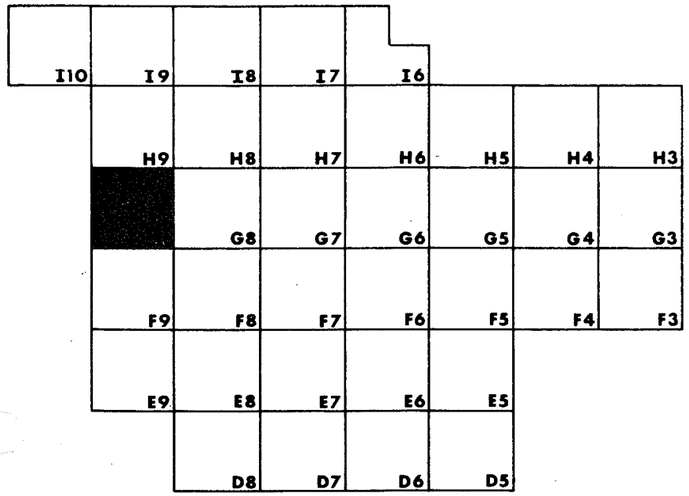
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
G-9	2	24" CMP	-1.95	C
G-9	3	24" CMP	-1.74	C

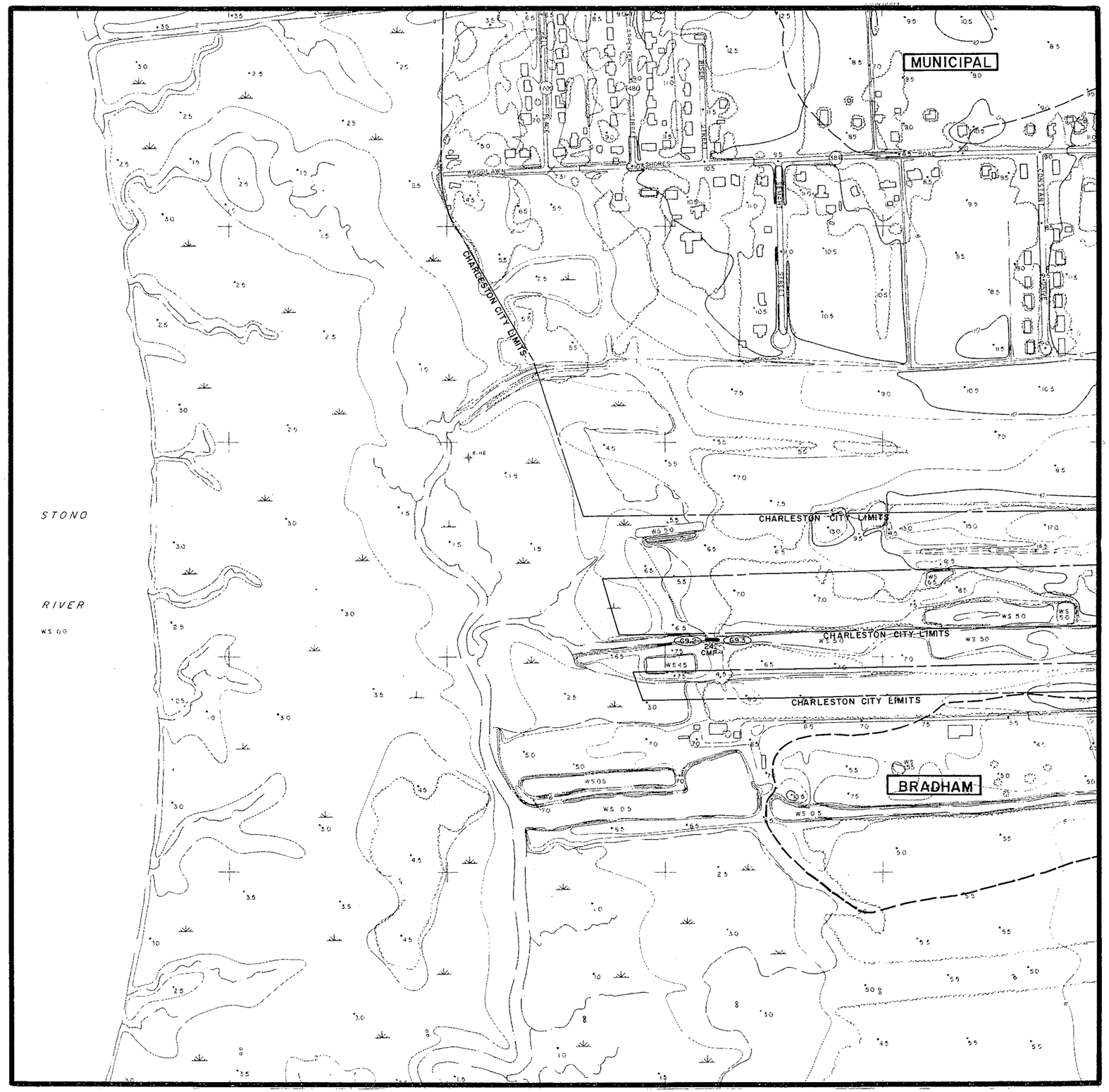
INVENTORY | MAP G9

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

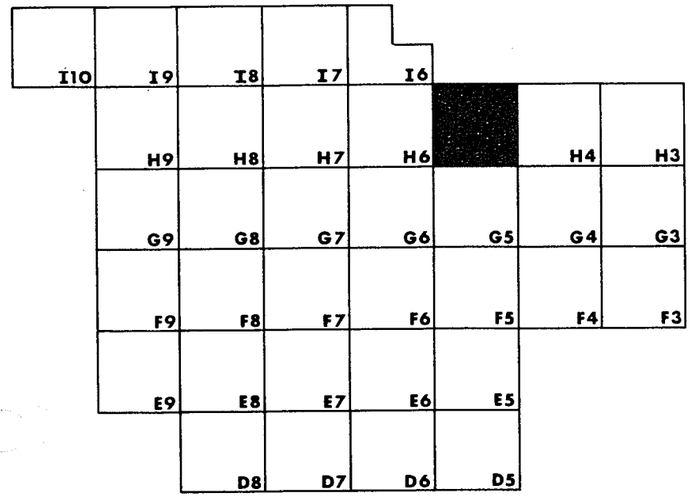
GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
H-5	1	15" RCP	-	C
H-5	2	18" RCP	-	C
H-5	3	24" RCP	2.48	C
H-5	4		-	CNO
H-5	5	24" RCP (W) 24" RCP (E)	3.83 3.83	C
H-5	6	18" RCP (E) 24" RCP (W)	4.20 4.18	C
H-5	7	30" RCP	1.21	C
H-5	8		-	CNO
H-5	9	30" RCP (E) 30" RCP (W) 15" RCP (N)	- - -	CNO
H-5	10	30" RCP	3.70	C
H-5	11	15" RCP	3.92	C
H-5	12	15" RCP	4.47	C
H-5	13	24" RCP	-	C
H-5	14	24" RCP	-	C

INVENTORY | MAP H5

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET



INVENTORY

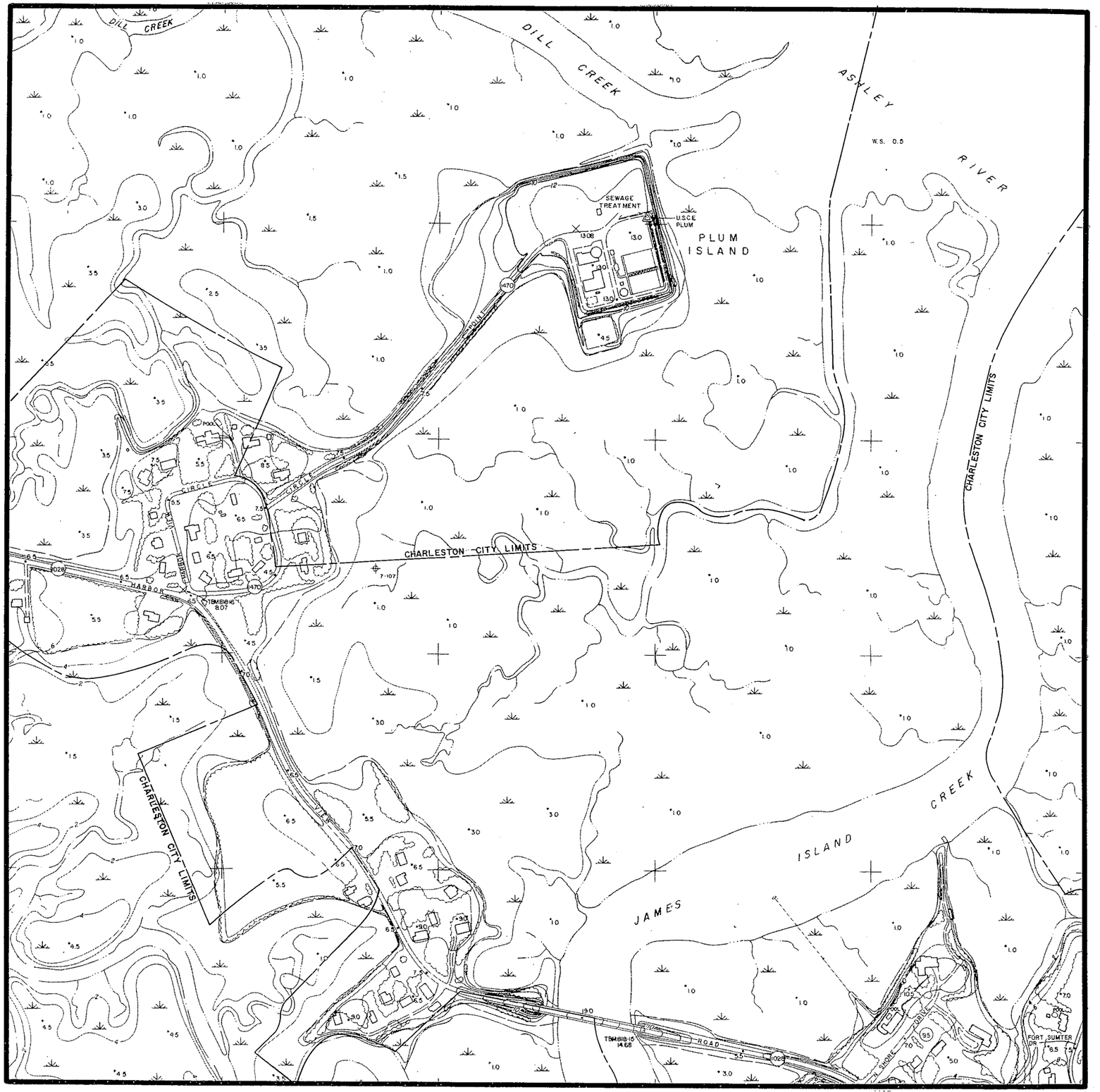
MAP H6

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND

I10	I9	I8	I7	I6		
	H9	H8	H7	H6	H5	H4	H3
	G9	G8	G7	G6	G5	G4	G3
	F9	F8	F7	F6	F5	F4	F3
	E9	E8	E7	E6	E5		
		D8	D7	D6	D5		

N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

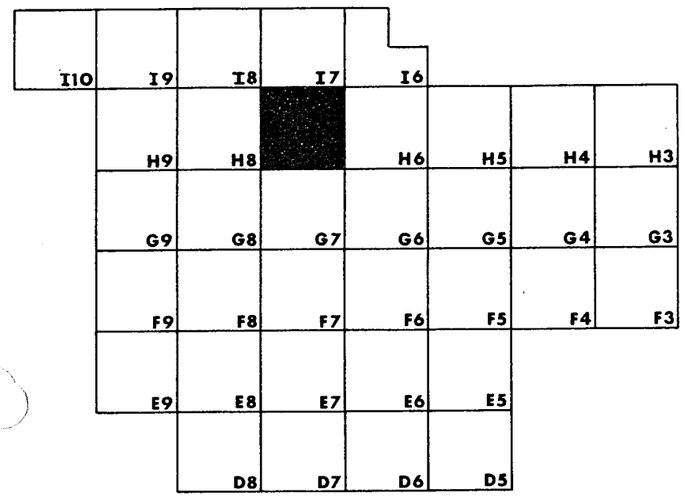
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
H-7	1	24" RCP (N)	6.73	C
		24" RCP (S)	6.84	
		18" RCP (E)	7.48	
		12" RCP (W)	7.36	
H-7	2	24" RCP (N)	7.88	C
		24" RCP (S)	7.91	
		15" RCP (W)	8.39	
H-7	3	24" RCP (N)	8.31	C
		18" RCP (E)	8.30	
		18" RCP (W)	8.30	
H-7	4	27" x 43" CMP	7.04	C
		27" x 43" CMP	6.97	
H-7	6	27" x 43" CMP (W#1)	6.98	C
		27" x 43" CMP (W#2)	6.98	
		27" x 43" CMP (S#1)	6.98	
		27" x 43" CMP (S#2)	6.98	
H-7	7	27" x 43" CMP	6.81	C
		27" x 43" CMP	6.73	
H-7	9	15" RCP	-	C
H-7	10	31" x 50" CMP	7.20	C
H-7	11	31" x 50" CMP (N)	7.27	C
		15" RCP (E)	10.69	
		15" RCP (W)	10.77	
		31" x 50" CMP (S)	7.35	
H-7	12	31" x 50" CMP (N)	6.18	C
		31" x 50" CMP (S)	6.18	
		18" RCP (E)	9.38	
		15" RCP (W)	10.66	
H-7	13	31" x 50" CMP	7.35	C
H-7	14		-	PO
H-7	15	24" RCP (N)	6.70	C
		24" RCP (S)	6.70	
H-7	16	24" RCP (N)	7.37	C
		24" RCP (S)	7.37	
H-7	17	24" RCP (N)	6.05	C
		24" RCP (S)	6.02	
		18" RCP (E)	6.12	
H-7	18	24" RCP (N)	5.41	C
		24" RCP (S)	5.51	
H-7	19	24" RCP (N)	5.34	C
		30" RCP (S)	5.32	
		18" RCP (E)	5.32	
H-7	20	30" RCP (N)	5.17	C
		30" RCP (S)	5.17	
H-7	21	30" RCP (N)	4.97	C
		30" RCP (S)	5.03	
H-7	22	30" RCP (N)	4.88	C
		30" RCP (S)	4.88	
H-7	23	30" RCP (N)	4.88	C
		30" RCP (S)	4.83	
		18" RCP (E)	5.31	
		24" RCP (W)	6.26	
H-7	24		-	PO
H-7	25	24" RCP (N)	6.96	C
		24" RCP (S)	6.86	
H-7	26	24" RCP	7.77	C
H-7	27	24" RCP (N)	6.75	HFS
		36" RCP (S)	6.83	
		24" RCP (E)	8.38	C

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
H-7	28	24" RCP	8.62	C
H-7	29	36" RCP	6.64	C
H-7	30	36" RCP	5.66	C
H-7	31	36" RCP	5.60	C
H-7	32	24" RCP	3.98	C
H-7	33	24" RCP (N)	3.72	C
		24" RCP (S)	3.93	
		18" RCP (W)	4.28	
H-7	34	18" RCP (N)	3.49	C
		24" RCP (S)	3.39	
		15" RCP (E)	4.07	
H-7	35	24" RCP (N)	3.62	C
		24" RCP (S)	3.57	
		18" RCP (E)	3.72	
H-7	36	24" RCP (N)	3.85	C
		24" RCP (S)	3.85	
H-7	37	24" RCP (N)	3.83	C
		24" RCP (W)	3.97	
		24" RCP (E#1)	3.81	
		18" RCP (E#2)	4.44	
		18" RCP (E#3)	4.44	
H-7	38	24" RCP	3.98	C
H-7	39	24" RCP (N)	3.53	C
		24" RCP (S)	3.71	
H-7	40	24" RCP (N)	3.61	C
		24" RCP (W#1)	3.61	
		18" RCP (W#2)	4.39	
		18" RCP (W#3)	4.21	
		24" RCP (E#1)	3.61	
		24" RCP (E#2)	3.71	
H-7	41	24" RCP	3.55	C
		24" RCP	3.49	
H-7	43	42" RCP	1.72	C
H-7	44	42" RCP	1.71	C
H-7	45	24" RCP	0.82	C
H-7	46	24" RCP	0.68	C
H-7	47	24" RCP	-1.06	C
H-7	48	24" RCP	-1.25	C
H-7	49	24" CMP	-1.43	C
H-7	50	24" CMP	-1.52	C
H-7	51	30" CMP	-0.95	C
H-7	52	30" CMP	1.86	C
H-7	53	30" CMP	-1.28	C
H-7	54	30" CMP	-0.73	C
H-7	55	30" VCP	-2.80	C
H-7	56	30" VCP	-2.66	C
H-7	57	30" CMP	-3.04	C
H-7	58	30" CMP	-2.20	C
H-7	59	24" VCP	-0.19	C

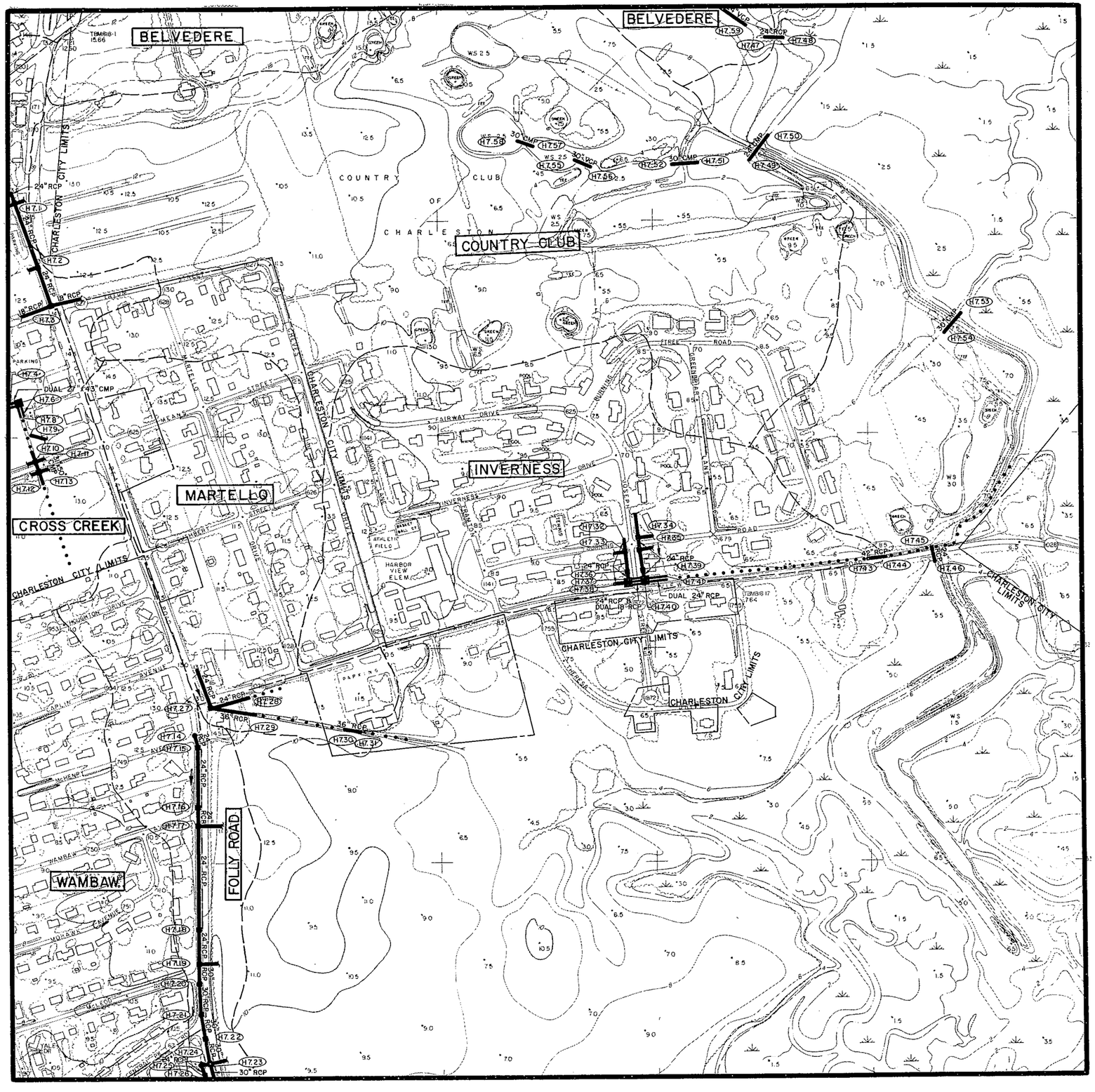
INVENTORY | MAP H7

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
H-8	1	30" RCP (E)	3.56	C
		18" RCP (W)	3.56	
H-8	2	30" RCP	2.92	C
H-8	3	36" RCP (E)	3.41	C
		30" RCP (W)	3.86	
		24" RCP (N)	3.86	
H-8	4	36" RCP	2.46	C
H-8	5	30" RCP (E)	3.66	C
		30" RCP (W)	3.81	
H-8	6	24" RCP (W)	4.88	C
		24" RCP (E)	4.77	
H-8	7	24" RCP (E)	-	C
		24" RCP (N)	-	
H-8	8	30" RCP (E)	5.02	C
		24" RCP (W)	4.72	
H-8	9	24" RCP (E)	4.79	C
		24" RCP (W)	4.79	
H-8	10	15" RCP (N)	6.91	C
		15" RCP (E)	6.89	
		24" RCP (S)	6.76	
H-8	11	24" RCP (E)	5.86	C
		18" RCP (W)	6.35	
H-8	12	24" RCP (N/W)	-	CNO
		24" RCP (E)	-	
H-8	13	18" RCP	-	C
H-8	13A	18" RCP	-	C
H-8	14	18" RCP (N)	8.17	HFS
		15" RCP (S)	9.37	C
		24" RCP (E)	8.06	C
		18" RCP (W)	8.00	HFS
H-8	15	24" RCP	8.13	C
H-8	16	16" x 25" CMP	6.57	C
H-8	17	16" x 25" CMP (N)	6.54	C
		16" x 25" CMP (S)	6.54	
		15" RCP (E)	6.62	
		18" RCP (W)	6.65	
H-8	18	16" x 25" CMP (N)	6.58	C
		16" x 25" CMP (S)	6.83	
		15" RCP (E)	6.68	
		18" RCP (W)	6.83	
H-8	19	16" x 25" CMP	6.72	C
H-8	20	18" x 29" CMP	5.40	C
H-8	21	18" x 29" CMP (N)	5.49	C
		18" x 29" CMP (S)	5.63	
		18" RCP (E)	7.87	
		18" RCP (W)	7.79	
H-8	22	18" x 29" CMP (N)	5.73	FWT
		18" x 29" CMP (S)	5.88	
		15" RCP (E)	7.33	
		15" RCP (W)	7.53	
H-8	23	18" x 29" CMP	5.84	C
H-8	24	36" RCP	6.38	C
H-8	25	15" RCP (N)	7.27	C
		15" RCP (S)	6.33	HFS
		27" x 43" CMP (E)	6.22	C
		22" x 36" CMP (W)	6.79	HFS

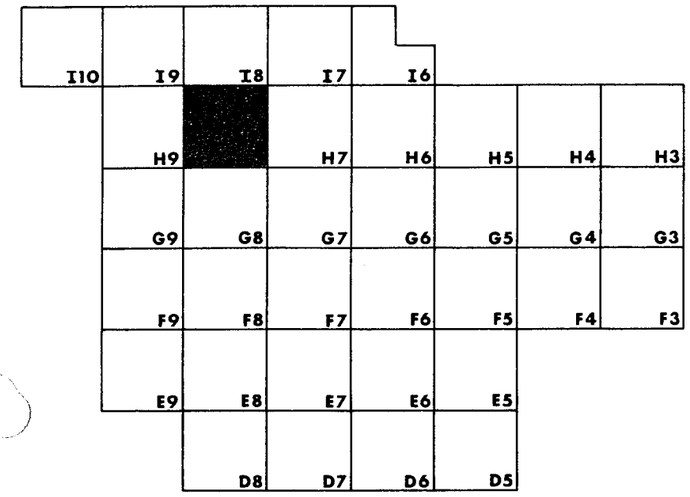
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
H-8	26	15" RCP (N)	7.38	C
		15" RCP (S)	7.38	
		22" x 36" CMP (E)	7.09	
		22" x 36" CMP (W)	7.04	
H-8	27	22" x 36" CMP (E)	7.32	C
		18" x 29" CMP (W)	7.14	
H-8	28	18" x 29" CMP (N)	7.56	C
		18" x 29" CMP (S)	7.58	
		15" RCP (E)	7.63	
		15" RCP (W)	7.63	
H-8	29	31" x 50" CMP	5.75	C
H-8	30	15" RCP (N)	5.97	C
		15" RCP (S)	5.90	
		31" x 50" CMP (E)	5.90	
		27" x 43" CMP (W)	5.95	
H-8	31	15" RCP (N)	6.70	C
		15" RCP (S)	6.34	
		27" x 43" CMP (E)	6.43	
		27" x 43" CMP (W)	6.38	
H-8	32	27" x 43" CMP (E)	6.40	C
		36" RCP (W)	6.40	
H-8	33	16" x 25" CMP (N)	6.71	C
		36" RCP (E)	6.68	
		22" x 36" CMP (W)	6.81	
H-8	34	22" x 36" CMP (E)	6.85	C
		22" x 36" CMP (W)	6.82	
		16" x 25" CMP (S)	6.82	
H-8	35	16" x 25" CMP (W)	7.50	C
		15" CMP (N)	7.50	
		15" CMP (S)	7.50	
		22" x 36" CMP (E)	7.50	
H-8	36	18" x 29" CMP	-	HFS
H-8	37	18" RCP	-	C
H-8	38	36" RCP	3.91	C
H-8	39	36" RCP (N)	5.97	C
		31" x 50" CMP (S)	5.47	
		18" RCP (E)	7.09	
		18" RCP (W)	7.27	
H-8	40	31" x 50" CMP (N)	5.87	C
		13" x 22" CMP (S)	6.11	
		36" RCP (E)	5.93	
		18" RCP (W)	6.85	
H-8	41	36" RCP	5.46	C
H-8	42	31" x 50" CMP	6.38	C
H-8	43	31" x 50" CMP (N)	6.37	C
		31" x 50" CMP (S)	6.24	
H-8	44	31" x 50" CMP (N)	6.66	C
		31" x 50" CMP (S)	6.63	
H-8	45	31" x 50" CMP (N)	7.31	C
		22" x 36" CMP (E)	7.32	
		13" x 22" CMP (S)	7.87	
H-8	46	22" x 36" CMP	7.76	C
H-8	47	24" CMP	7.38	C
H-8	48	18" x 29" CMP (N)	8.19	C
		24" CMP (S)	7.89	C
		18" x 29" CMP (E)	8.12	HFS
		18" x 29" CMP (W)	8.12	HFS

SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
H-8	49	18" x 29" CMP (S)	8.55	C
		18" x 29" CMP (E)	8.65	
		18" x 29" CMP (W)	8.65	
H-8	50	31" x 50" CMP	6.55	C
		31" x 50" CMP	6.55	
H-8	52	31" x 50" CMP (E#1)	6.55	C
		31" x 50" CMP (E#2)	6.73	
		31" x 50" CMP (W#1)	6.45	
		31" x 50" CMP (W#2)	6.63	
H-8	53	31" x 50" CMP (N#1)	6.55	C
		31" x 50" CMP (N#2)	6.55	
		31" x 50" CMP (E#1)	6.55	
		31" x 50" CMP (E#2)	6.55	
H-8	54	31" x 50" CMP (W#1)	5.88	C
		31" x 50" CMP (W#2)	5.88	
		31" x 50" CMP (S#1)	5.98	
		31" x 50" CMP (S#2)	5.98	
H-8	55	31" x 50" CMP	5.45	C
		31" x 50" CMP	5.51	
H-8	57	18" RCP	-	C
H-8	58	18" RCP	-	C
H-8	59	30" RCP	5.34	C
H-8	60	15" RCP	-	C
H-8	61	30" RCP (N)	6.68	C
		18" RCP (S)	6.91	
		18" RCP (S/E)	6.80	
H-8	62	48" RCP	3.97	C
H-8	63	48" RCP (E)	3.89	C
		48" RCP (W)	3.89	
		24" RCP (S)	6.45	
H-8	64	48" RCP (N)	3.76	C
		48" RCP (W)	3.76	
		18" RCP (E)	8.31	
H-8	65	24" RCP (N)	6.15	C
H-8	66	24" RCP (N)	5.87	C
		24" RCP (S)	5.12	
H-8	67	30" RCP (N)	4.95	C
		24" RCP (S)	-	CAVED IN
		18" RCP (W)	8.25	C
H-8	68	48" RCP (N)	3.53	C
		48" RCP (S)	3.60	
H-8	69	48" RCP (N)	-	C
		30" RCP (S#1)	-	
		48" RCP (S#2)	-	
		18" RCP (E)	-	
		18" RCP (W)	-	
H-8	70		-	FWT
H-8	71		-	FWT
H-8	72	54" RCP	0.64	C
H-8	73	18" RCP	-	C
H-8	74	18" RCP	-	C
H-8	75	15" RCP	-	C

INVENTORY | MAP H8

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND



N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

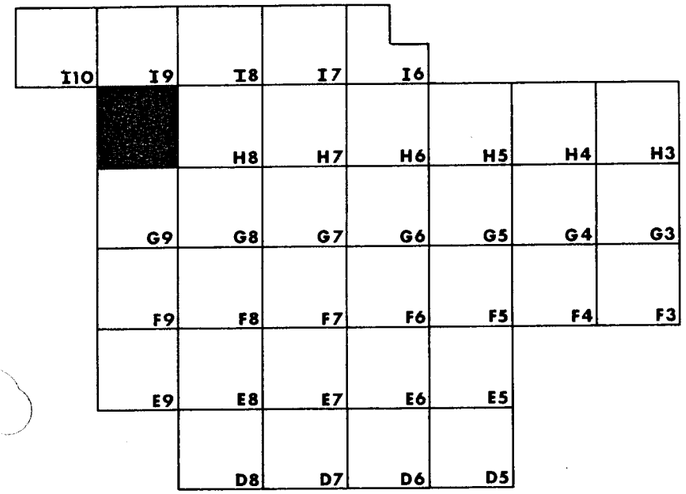

PAGELAND
MUNICIPAL
CROSS CREEK
WAMBAW
CHARLESTON CITY LIMITS
CHARLESTON CITY LIMITS
CHARLESTON CITY LIMITS
CHARLESTON CITY LIMITS
FRAMPTON STREET
WAPPOO DRIVE
FREMONT LANE
CONIFER DR
CAMPAW STREET
RIVERLAND DRIVE
TENNIS COURTS
TENNIS COURTS
BASKETBALL COURT
PARKING
TBMB#3 1976
H8.1
H8.2
H8.3
H8.4
H8.5
H8.6
H8.7
H8.8
H8.9
H8.10
H8.11
H8.12
H8.13
H8.13A
H8.14
H8.15
H8.16
H8.17
H8.18
H8.19
H8.20
H8.21
H8.22
H8.23
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H8.69
H8.70
H8.71
H8.72
H8.73
H8.74
H8.75
H8.76
H8.77
H8.78
H8.79
H8.80
36" RCP
30" RCP
24" RCP
18" RCP
15" RCP
54" RCP
48" RCP
42" RCP
DUAL 31"x50" CMP
31"x50" CMP
27"x43" CMP
22"x36" CMP
16"x25" CMP
18"x29" CMP
12"x43" CMP
WIMBLEDON DRIVE
WIMBLEDON CT
WESTRIDGE AVENUE
WESTRIDGE DRIVE
HILLCREST DRIVE
HILLCREST CIRCLE
HILLCREST DRIVE
HILLCREST CIRCLE
HILLCREST DRIVE
HILLCREST CIRCL

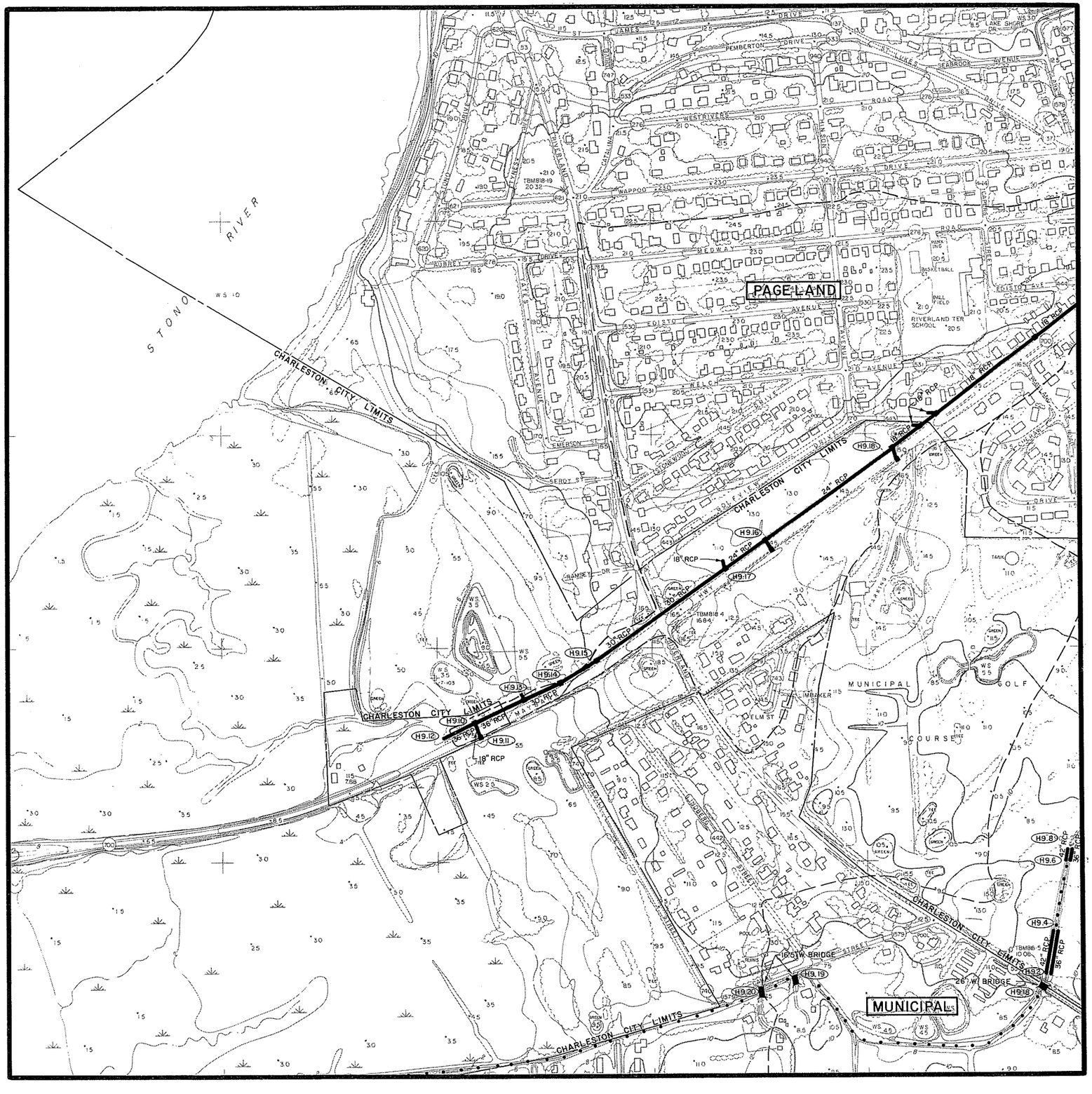
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
H-9	2	42" RCP 36" RCP	1.90 1.64	C
H-9	4	42" RCP 36" RCP	1.94 1.86	C
H-9	6	42" RCP 36" RCP	2.25 1.94	C
H-9	8	42" RCP 36" RCP	2.24 2.20	C
H-9	10	36" RCP (W) 36" RCP (E) 18" RCP (S)	2.18 1.50 2.59	C
H-9	11			CNO
H-9	12	36" RCP	5.78	HFS
H-9	13	42" RCP (W) 30" RCP (E) 18" RCP (N)	1.17 1.39 2.19	C
H-9	14	30" RCP (W) 30" RCP (E)	2.07 3.10	C
H-9	15	30" RCP (E) 30" RCP (W)	4.59 3.78	C
H-9	16	24" RCP (E) 24" RCP (W)	6.34 6.28	C
H-9	17			CNO
H-9	18	26' W. Bridge		
H-9	19	17' W. Bridge		
H-9	20	17' W. Bridge		

INVENTORY | MAP H9

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND





N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500 FEET

INVENTORY | MAP I6

existing drainage facilities
CITY OF CHARLESTON

JAMES ISLAND

	I10	I9	I8	I7			
		H9	H8	H7	H6	H5	H4	H3
		G9	G8	G7	G6	G5	G4	G3
		F9	F8	F7	F6	F5	F4	F3
	E9	E8	E7	E6	E5		
		D8	D7	D6	D5		

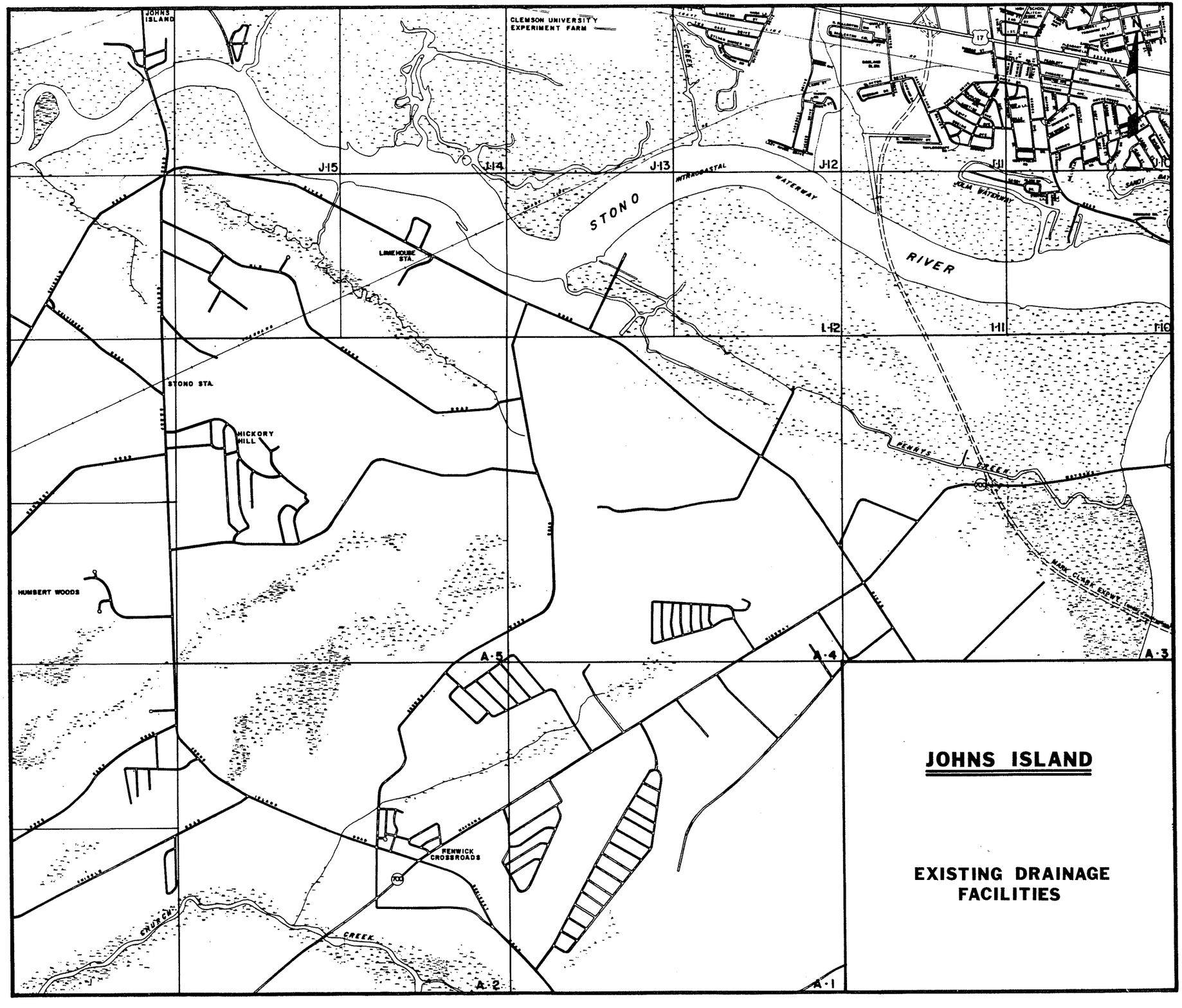
N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 500 0 500 1000 1500
FEET



JOHNS ISLAND

EXISTING DRAINAGE FACILITIES

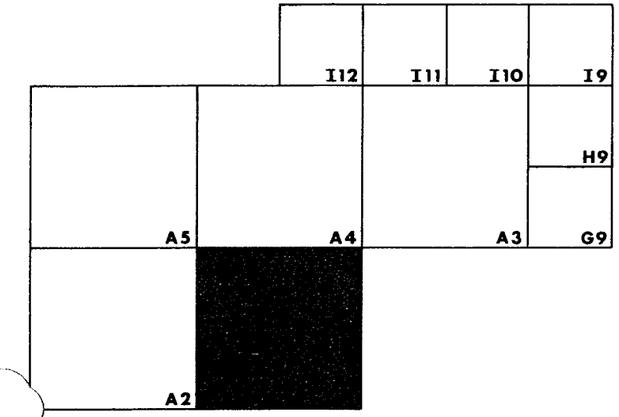
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
A-1	1	36" RCP	14.93	C
A-1	2	36" RCP	15.30	C
A-1	3	18" CMP	17.25	C
A-1	4	18" CMP	17.51	C

INVENTORY

MAP A1

existing drainage facilities
CITY OF CHARLESTON

JOHNS ISLAND

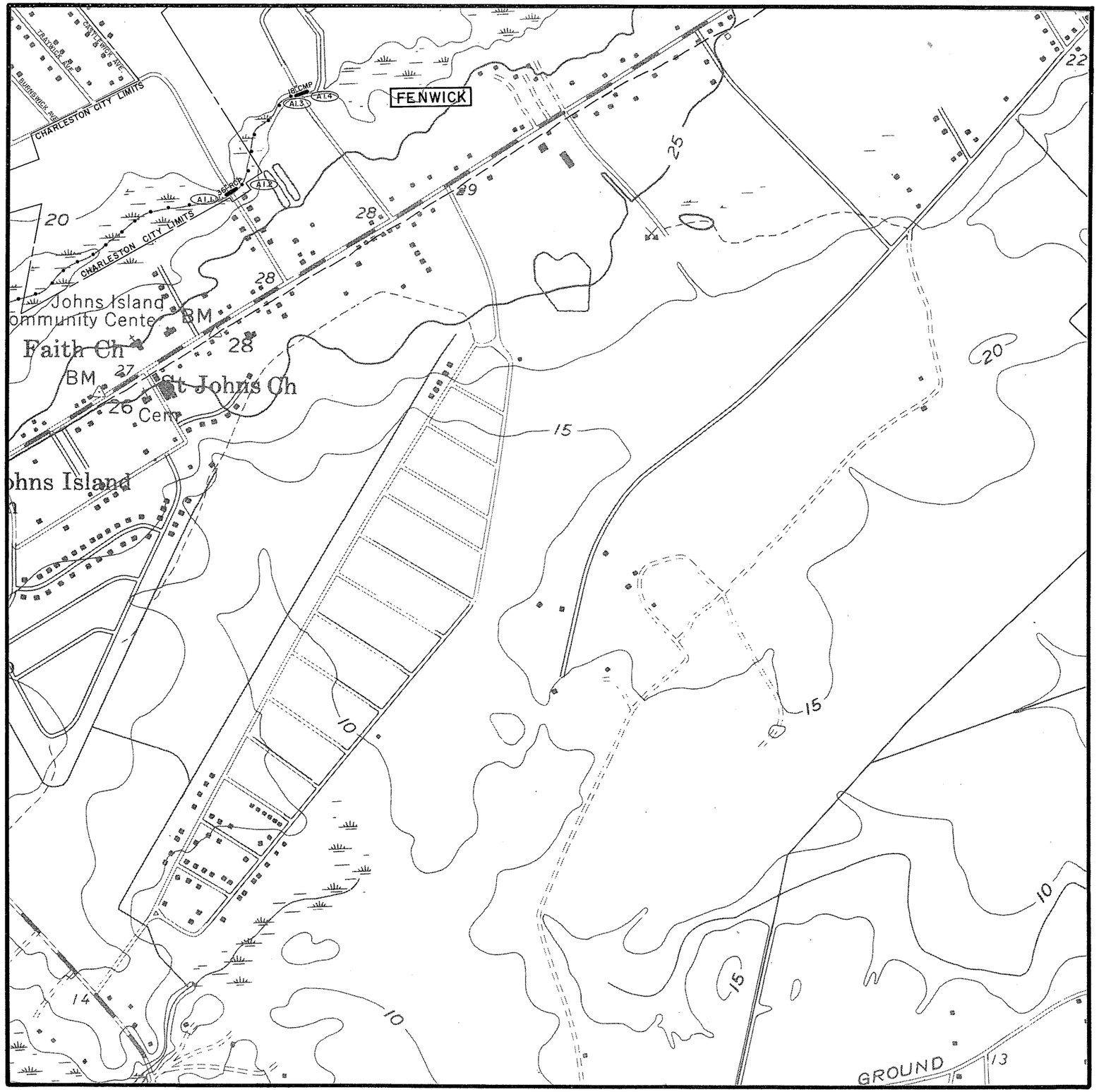


N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 300 0 300 600 900 FEET



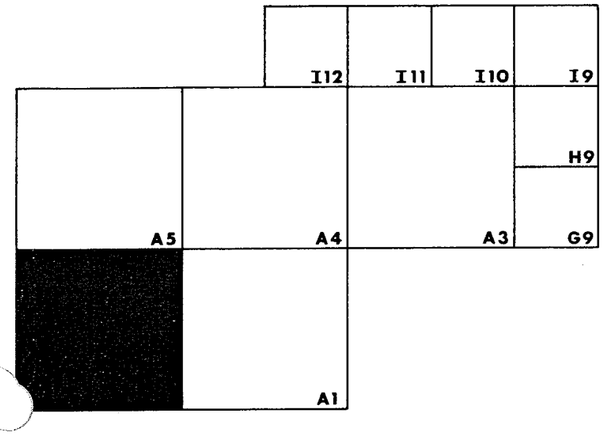
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
A-2	1	45' W. Bridge		
A-2	2	45' W. Bridge		

INVENTORY

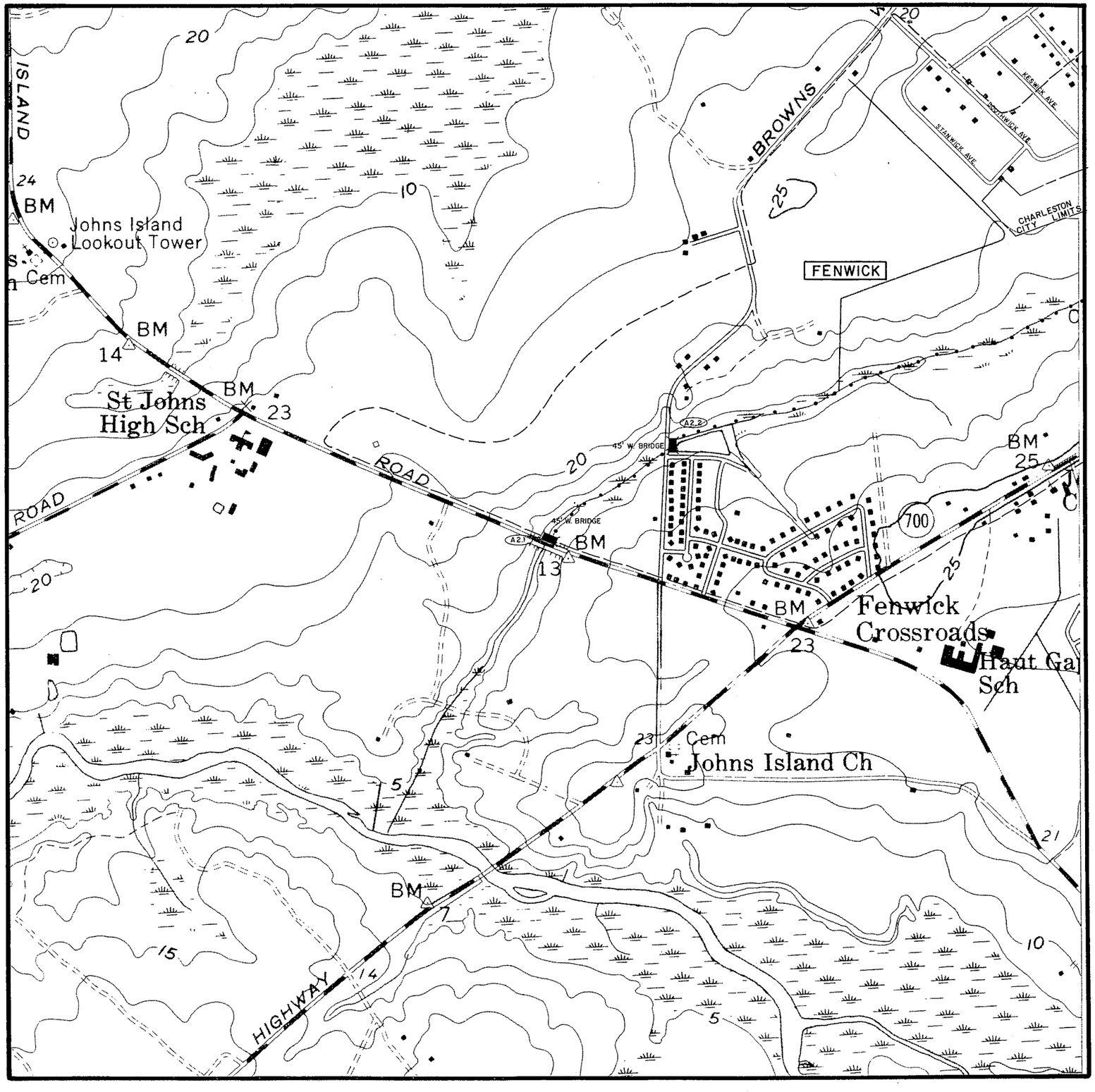
MAP A2

existing drainage facilities
CITY OF CHARLESTON

JOHNS ISLAND



N



LEGEND

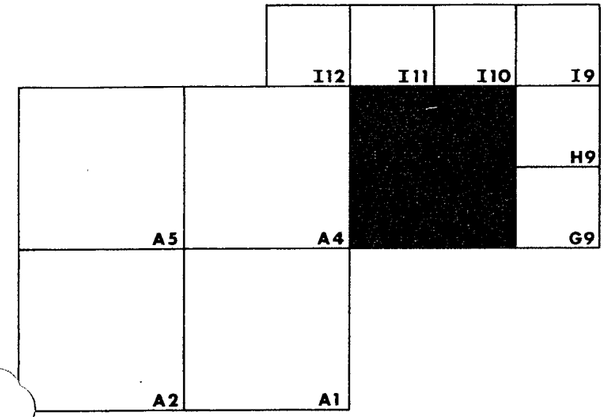
- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 300 0 300 600 900 FEET

INVENTORY | MAP A3

existing drainage facilities
CITY OF CHARLESTON

JOHNS ISLAND



N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 300 0 300 600 900 FEET



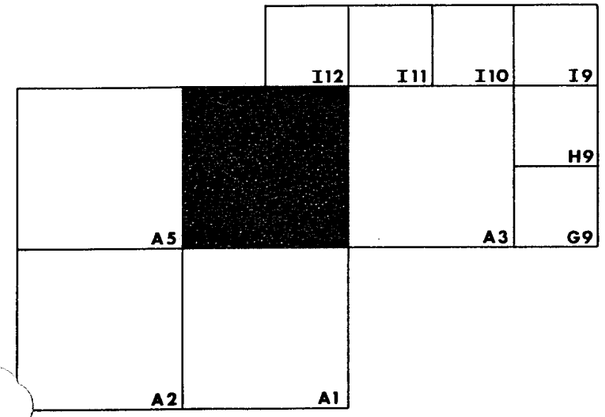
SHEET NO.	MANHOLE NO.	PIPE SIZE	INVERT ELEV.	CONDITION
A-4	1	14' W. Bridge		
A-4	2	36" RCP	0.263	C
A-4	3	36" RCP	-.707	C
A-4	4	Bridge		
A-4	5	24" RCP	1.673	C
A-4	6	24" RCP	1.543	C
A-4	7	30" RCP	5.63	C
A-4	8	30" RCP	6.04	C

INVENTORY

MAP A4

existing drainage facilities
CITY OF CHARLESTON

JOHNS ISLAND

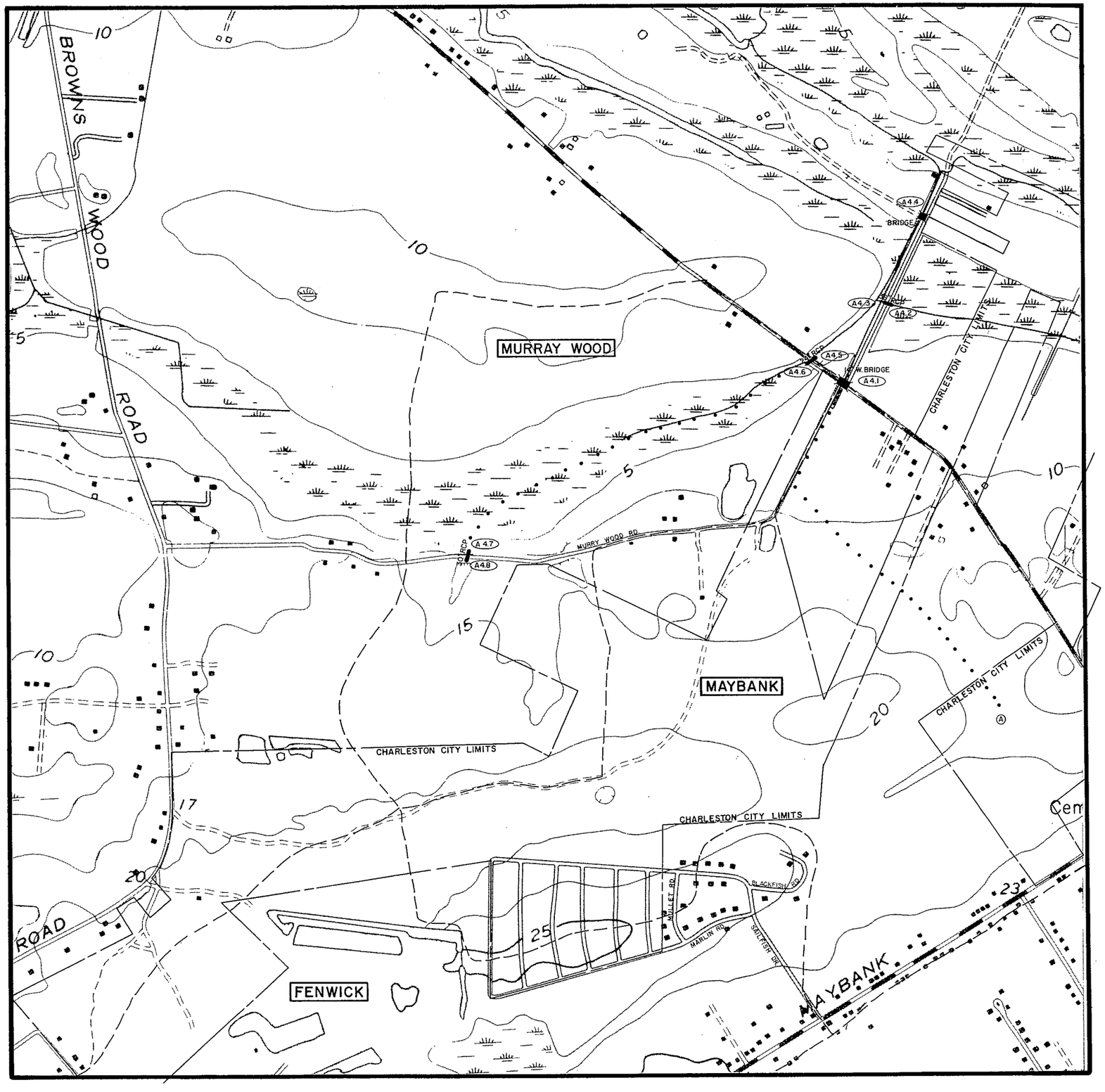


N

LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 300 0 300 600 900 FEET

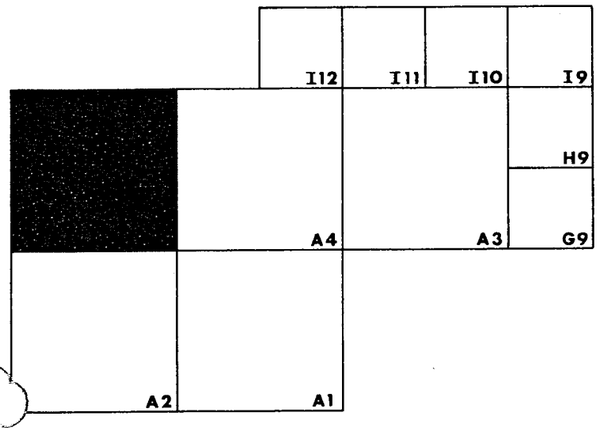


INVENTORY

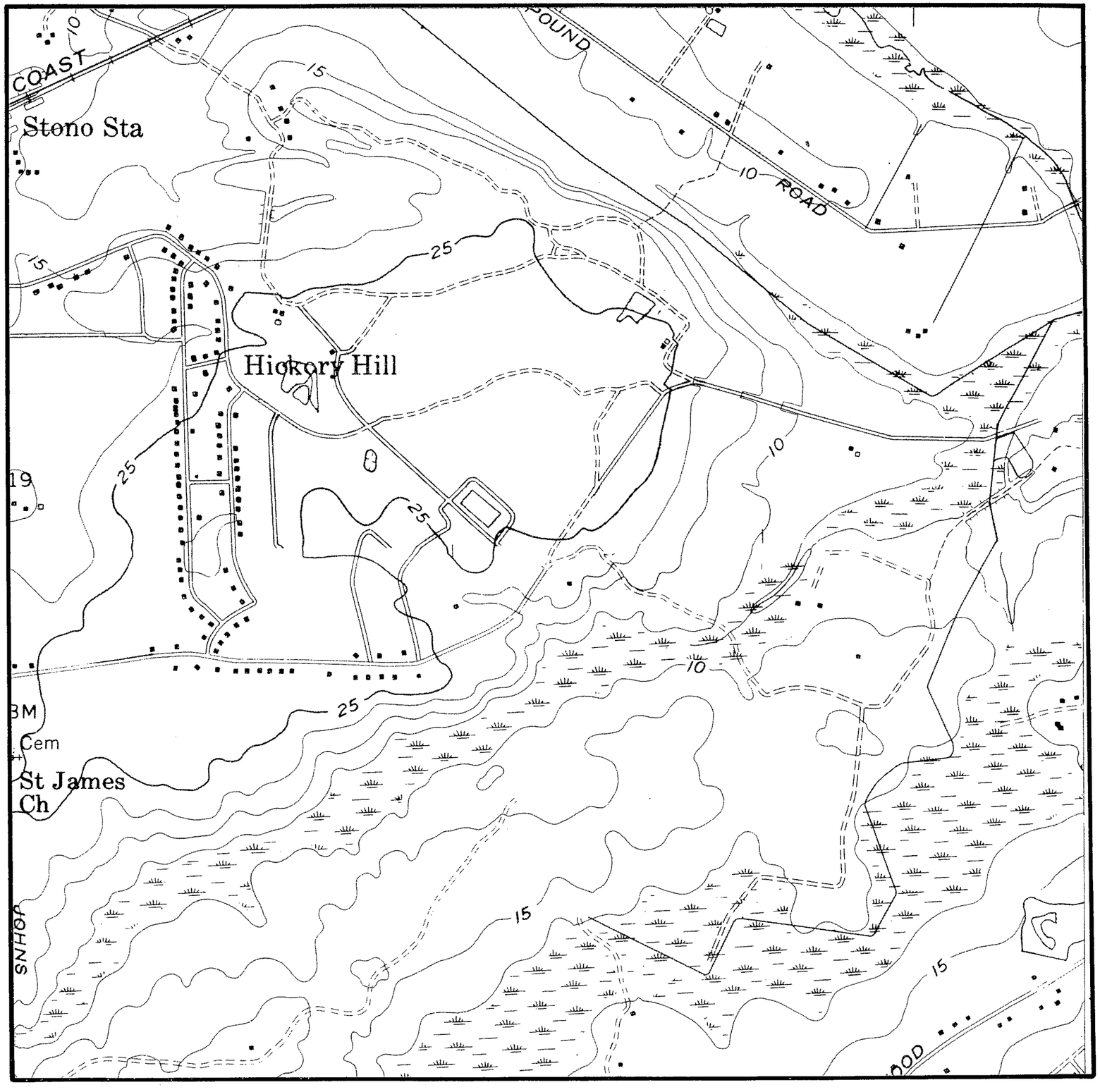
MAP A5

existing drainage facilities
CITY OF CHARLESTON

JOHNS ISLAND



N



LEGEND

- DRAINAGE PIPE
- DRAINAGE CHANNEL
- CHARLESTON CITY LIMITS
- WATERSHED BOUNDARY
- CROSSCREEK — WATERSHED NAME
- DETENTION BASIN
- BRIDGE
- J5.13 — MANHOLE IDENTIFICATION NO.
- P — PUMPING STATION

GRAPHIC SCALE 300 0 300 600 900 FEET

APPENDIX B

ALTERNATIVE MATERIALS FOR STORM SEWERS

CITY OF CHARLESTON

MASTER DRAINAGE AND FLOODPLAIN MANAGEMENT PLAN

APPENDIX B

ALTERNATIVE MATERIALS FOR STORM SEWERS

I. INTRODUCTION

Davis & Floyd, Inc. was requested by the City of Charleston to investigate available pipe materials for utilization in the construction of storm sewers and culverts and to make recommendations concerning their use as a part of the City of Charleston Master Drainage and Flood Plain Management Plan. The purpose of this investigation is to identify "equals" for pipe materials to be utilized in the construction of storm sewers and culverts which are effectively resistant to the corrosive soil and effluent characteristics of the area, are readily available and are suitable for installation by City employees and private contractors. A variety of pipe materials were studied to ascertain their record of durability in local installations and in existing drainage systems comparable to the City of Charleston environment and to establish how each type compares on an "or equal" basis.

This study included an analysis of available information on the soil characteristics, topography and weather records of the area to establish bases for comparative analysis of each material.

Appendix C lists the soils existing in the study area and summaries the extent of incidence of each soils series and its characteristics, including hydrological group, reaction (pH value) and resistivity.

II. GENERAL

The types of pipe material studied are:

A. Reinforced concrete pipe.

B. Corrugated metal pipe as follows:

1. galvanized steel
2. galvanized steel with full asphalt coating
3. galvanized steel with full asphalt coating and paved invert
4. galvanized steel with full asphalt coating and fully paved
5. asbestos bonded steel
6 asbestos bonded steel with asphalt coating
7. aluminized steel
8. plastic coated steel
9. aluminum

C. Polyvinyl chloride (PVC) pipe.

Reports of independent studies conducted by several other states' agencies concerning the suitability of the different type materials currently used for the construction of culverts and storm sewers were utilized in this study. Other resource data included information provided by pipe manufacturers, interviews with Federal Highway Administration, State Highway department and local public works personnel, field investigations, and past experience of Davis & Floyd engineers.

Selection of a specific pipe material to be used for an installation requires determination that the pipe characteristics fall within the bounds of several parameters, each of which may play a greater or less significant role in each given circumstance.

Durability of the pipe material, i.e., its resistance to failure from the exterior, caused by corrosive effects of the surrounding soil, or, failure from the interior, caused by the effects of the effluent carried by the pipe, ultimately plays the most significant role in the majority of situations. Cost effectiveness is directly influenced by the expected useful life of a pipe installation.

The data in Appendix C, Soil Characteristics, shows that the soil in the area is basically acidic and the soil resistivity is low, a combination which creates a corrosive environment for the culvert and storm sewer systems. The relatively flat topography of the study area leads to occurrences of tidal salt and brackish waters entering and standing in storm sewers and culverts in the area. The presence of salt water establishes a highly corrosive environment in the areas in which this occurs. These two factors, moderate soil acidity and low resistivity, combine to create a relatively highly corrosive environment into which the culvert and storm sewer systems must be placed and maintained.

III. PIPE MATERIALS

Generally, in the Charleston area, storm sewers and culverts are constructed of corrugated metal or reinforced concrete pipe with each having relative advantages and disadvantages, including the following:

REINFORCED CONCRETE PIPE (RCP)

Advantages

1. Proven reliability.
2. Life expectancy of 100 years or more.
3. Good hydraulic characteristics.
4. Local availability.
5. High external load resistance.

Disadvantages

1. Heavy weight, especially significant in larger diameters.
2. Separation of joints likely to occur where installed in soils subject to subsistence or consolidation.

CORRUGATED METAL PIPE (CMP)

Advantages

1. Can be installed using longer section lengths.
2. Relatively light weight.
3. Positive jointing system.

Disadvantages

1. Poor hydraulic characteristics which necessitate use of larger diameters or providing internal paving for equivalent flow capacity.
2. Twelve inch minimum cover required to provide impact load protection.
3. Documented life expectancy of 50 years or less without protective coatings.

POLYVINYL CHLORIDE PIPE (PVC)

Polyvinyl chloride pipe is used extensively in the area for sanitary sewerage systems. However, since the largest size PVC pipe produced is 24 inch diameter, it has not been used for storm sewer construction, and has not been evaluated in this study.

IV. PIPE MATERIAL ANALYSES AND COMPARISONS

A. Reinforced Concrete Pipe

An indication of the durability of reinforced concrete pipe in the Charleston area is its almost exclusive use by local highway and public works departments over a long period of years. Information from local users and data compiled from the experience of Davis & Floyd engineers indicate the following listed advantages of using RCP in the Charleston area:

1. Reinforced concrete pipe has better hydraulic characteristics than corrugated metal pipe (without invert pavement). Therefore, either a larger diameter corrugated metal pipe or the provision of a paved invert or full pavement in corrugated metal pipe is necessary to obtain flow results equivalent to reinforced concrete pipe.

2. Local experience has shown that reinforced concrete pipe has a long useful life even in the aggressive corrosion environment of many existing Charleston area storm drainage installations. A life expectancy of 100 years for RCP is considered an acceptable norm in the criteria on which to base selection of storm sewer and culvert pipe material.

3. Local maintenance personnel are generally experienced with the installation of reinforced concrete pipe.

Although RCP weighs considerably more than CMP per lineal foot, this factor was not considered significant by those interviewed due to the handling ability of the excavation equipment normally at the job site. The standard relatively short pipe lengths, 4' and 8', are considered an advantage in pipe placement in problem areas.

The major problem with RCP experienced in this area as well as others, has been joint separation at installations where the trench foundation is subject to subsidence or consolidation. The problem is addressed in Culvert Material Performance Evaluation [1], which documents an extensive study by the Washington State Highway Commission and the U.S. Bureau of Public Roads of performance of numerous culvert installations in soil and effluent environments analogous to the Charleston area. The report states: "Mortared joints, which are commonly used, are essentially rigid; and movement sufficient to open them will lead to infiltration or exfiltration." This is especially detrimental in silty or sandy soil areas where the water table is high, a condition common to the Charleston area. The wet soil will infiltrate storm sewers and culverts, clogging the drainage pipe and creating voids in the soil surrounding the joint.

The problem can be alleviated, however, by placing the RCP on a gravel bedding and providing rubber O-ring compression gasket joints, complying with the requirements of ASTM C443, where foundation conditions are susceptible to movement, and when concrete pipe is placed:

a. as a culvert under embankments of more than ten feet.

b. as a culvert or storm sewer constructed on an embankment;

c. in any type closed drainage system or in any other type installation where joint failure would be difficult or expensive to correct.

The American Society for Testing and Materials (ASTM) Specification C-76 divides RCP into five major classes with each having three distinct wall types. The first two classes, I & II are not recommended for this area and will not be considered for use in the Charleston area. Class III, IV & V are used in the area with the class determination based on height and weight of cover and highway loading. Typically, Class III satisfies the requirements for use in this area. Table P-1, "Reinforced Concrete Pipe Classifications", of this report, shows the maximum allowable depths of cover for Class III, IV & V pipe.

Type "B" wall, which provides a good balance between strength, resistance to deterioration and cost, is recommended for use in this area in either pipe class specified.

B. Corrugated Metal Pipe

As listed earlier in this report, corrugated metal pipe is produced in several different materials and combinations of materials with both interior and exterior coatings. Standard section lengths of corrugated metal pipe are longer than concrete pipe (18' - 20'). In general, the advantages gained by use of corrugated metal pipe are as discussed in the following paragraphs.

The longer laying lengths and relative light weight can be advantageous when installed in stable soil conditions because the installation time and therefore, the cost of installation, will probably be lower. This advantage in installation cost is especially evident in the larger diameter pipes (30 inches and larger). Another advantage of corrugated metal pipe is the positive jointing system which resists "pull-apart" and offers excellent beam strength in unstable bedding and backfill areas. In addition, the positive jointing system resists soil infiltration thereby reducing the incidence of cave-ins and functional failure of the drainage system.

There are significant inherent disadvantages in the use of corrugated metal pipe. One principal disadvantage is the relative short useful service life expectancy as compared to concrete pipe. In general, a useful life period of no more than 50 years can be assumed in the consideration of corrugated metal pipe even with protective coating when designing a drainage system. This is substantiated in the Washington State study, Culvert Performance Evaluation [1], which determined that uncoated CMP failed within a relative few years and that, even with protective coatings, failure occurred significantly within a fifty year period in areas experiencing large amounts of annual precipitation. Evaluation of Drainage Pipe by Field Experimentation and Supplemental Laboratory Evaluation, Interim Report No. 3 [2], dated November 1981, by the Louisiana Department of Transportation and Development provides significant information in this respect. The interim report "at the end of six years of in-service exposure" states that: "All of the coating on various test culverts are showing signs of distress at the highly corrosive test sites" (site environments similar to the Charleston area).

The corrugations in CMP create a turbulent flow situation resulting in a greater friction loss which limits the quantity of flow or discharge through a given size pipe. One method used, to alleviate this condition, is to use CMP larger in diameter than a hydraulically equivalent RCP when used as an

alternate. Table P-2, "Equivalent Pipe Diameters for Reinforced Concrete and Corrugated Metal Pipe" lists the diameter of helical or annular corrugated metal pipe that must be used to provide flow equivalent to RCP. These pipe sizes are based on a Manning's Formula roughness coefficient of pipe interior surface, "n", value of .015 for RCP and .021 and .024 for helical and annular CMP respectively. These are standard "n" values recommended for use in culvert and storm sewer design manuals such as SCHD Roadway Design Manual [5], Concrete Pipe Handbook [6], and Handbook of Steel Drainage and Highway Construction Products [3].

In lieu of using a larger diameter pipe, smooth flow pipe (galvanized steel or aluminum with full asphalt coating and fully paved) can be used as an alternate to reinforced concrete pipe. The smooth flow pipe is often more expensive than the larger diameter corrugated pipe which can be utilized to handle the flow.

The larger diameter equivalent influences the limited cover requirement and interference with existing utilities. This problem is especially noticeable in the smaller diameter pipes.

The structural design of corrugated metal pipes was based on information provided in the ASTM Specifications for Aluminum and Steel corrugated metal pipes along with information provided in the Handbook of Steel Drainage and Highway Construction Products. The design dealt with structural requirements as found in the ASTM Specifications for aluminum and steel corrugated metal pipe, considered the additional thickness required with aluminum pipe to help prevent damage during installation and anticipated the rate of metal loss for steel pipes caused by corrosion as outlined in the Handbook of Steel Drainage and Highway Construction Products. According to this reference and as verified in a study conducted by the Georgia Department of Transportation, a rate of metal loss of 0.0013 inches per year is anticipated for ordinary installations and 0.0030 inches per year for unusually soft water installations. As a result of this anticipated rate of metal loss after the outside protective coatings have worn off, all corrugated steel pipes, which had a structural thickness of less than 0.138 inches (10 gage), were designed based on the next larger gage thickness available above the minimum required. A thickness of 0.138 inches was chosen as the break point, since it will take 106 years to perforate the invert of a corrugated steel pipe with an anticipated metal 0.0013 inches per year. This yields a life expectancy of coated corrugated steel pipe equal to or greater than that of reinforced concrete pipe. Table P-3 "Minimum Gage Thickness for Corrugated Steel Pipe," and Table P-4 "Minimum Gage Thickness for Corrugated Aluminum Pipe," show the recommended gage thickness for steel and aluminum corrugated metal pipes

respectively, which will provide a product equal to reinforced concrete pipe.

As stated previously, a discussion of each type of corrugated metal pipe follows:

a. Galvanized Steel. Plain galvanized steel is unacceptable for use in this area. This is justified on the basis of:

1. past experience in this area;

2. the Washington State Study which found the plain galvanized steel pipe to be unacceptable in areas which have a large amount of precipitation;

3. the Colorado Study rated it as the type pipe most susceptible to corrosion;

4. the Georgia Department of Transportation requires coating and paving of all storm drains based on their "Performance Evaluation of Corrugated Metal Culverts in Georgia;" and

5. the New York Study which recommended that galvanized steel be coated in order to have a reasonable life expectancy.

b. Galvanized Steel with Full Asphaltic Coating. Galvanized steel with full asphalt coating is satisfactory in this area under certain circumstances. The asphalt coating gives corrugated steel pipe a life expectancy of ten plus years over plain galvanized steel pipe according to the results of the tests conducted by the American Iron and Steel Institute and as substantiated by most independent reports on the subject. However, the life expectancy of asphalt coated pipe is limited and therefore should not be used under certain circumstances, such as:

1. culverts under embankments of more than ten feet where replacement would be difficult; and

2. pipe in any type of closed drainage system, or in any other type of installation where failure would be difficult or expensive to correct such as culverts under major streets or highways.

Conditions where plain asphalt coated pipe would be acceptable due to its ease of installation, resistance to breakage, light weight, and its ability to be removed without damage would be:

1. culverts under minor streets and secondary roads where it will not be expensive or difficult to correct failures; and

2. temporary culverts utilized during construction activities.

Based on the above, it is recommended that asphalt coated pipe be utilized as an alternate to reinforced concrete pipe using the minimum gages shown in Table P-3, "Minimum Gage Sizes for Corrugated Steel Pipe," under the above acceptable conditions, provided the pipe has sufficient cover as shown in Table P-3, and provided the corrugated metal pipe is furnished in the equivalent reinforced concrete pipe diameters as shown on Table P-2 "Equivalent Pipe Diameters for Reinforced Concrete and Corrugated Metal Pipes." It is not recommended that this type pipe be utilized in tidally affected areas based on past experience and the corrugated pipe manufacturers' recommendations.

c. Galvanized Steel with Full Asphalt Coating and Paved Invert was found to be superior to plain asphalt coated pipe according to tests conducted by the Washington State Highway Department and the Georgia Department of Transportation. According to their findings, the majority of the failures using plain asphalt coated pipe occurred in the invert of the pipe. "Invert paving would clearly add at least 30 years of service and make the use of metal culverts feasible in a corrosive environment," according to these reports. Based on these findings and backed by other similar reports, it is recommended that galvanized steel with full asphalt coating and paved inverts be used as an alternate to reinforced concrete pipe provided the equivalent reinforced concrete pipe diameters found in Table P-2 are used, and the pipe has the minimum gage thickness and sufficient cover as provided for in Table P-3. It is not recommended that this type pipe be used in tidally affected environments, however, based on past experience and the corrugated pipe manufacturers' recommendations.

d. Galvanized Steel with Full Asphalt Coating and Fully Paved has the advantage aforementioned for paved invert pipe, with the additional advantage of good hydraulic characteristics which reduce the friction factor and thereby increase the quantity of flow through a given size pipe. The flow through a given diameter fully paved corrugated steel pipe is as great as the same diameter reinforced concrete pipe. Therefore, it is recommended that galvanized steel with full asphalt coating and fully paved corrugated metal pipe be utilized as an alternate to reinforced concrete pipe, provided the pipe has the minimum gage thickness and sufficient cover as provided for in Table P-3. It is not recommended that this type pipe be used in tidally affected environments, however, based on past experience and the corrugated pipe manufacturers' recommendations.

e. Asbestos Bonded Steel Pipe is recommended by many sources for use in salt water environments. However, it was determined by tests conducted by the Colorado Highway Department that without additional coating the asbestos had a tendency to wear off rapidly. Therefore, due to the high cost of asbestos bonded pipe and its tendency to wear off rapidly, it is recommended that uncoated asbestos bonded steel pipe not be utilized.

f. Asbestos Bonded with Asphalt Coating Corrugated Steel Pipe is recommended by many sources for use in salt water environments and has a good record of performance. This type could be utilized in tidal outfalls, provided the pipe has the minimum gage thickness and sufficient cover as provided for on Table P-3 and is provided in the equivalent reinforced concrete pipe diameters found in Table P-2, when used as an alternate to reinforced concrete pipe.

g. Aluminized Corrugated Steel Pipe is a relative new product, which has been on the market for approximately twenty years. During the past several years, the use of aluminized corrugated steel pipe has increased in Charleston County, and its' use has been approved by the Charleston County Public Works Department. Based upon studies by Armco.Steel with asphalt coating, it is as good as paved invert galvanized steel pipe. Aluminized corrugated steel pipe with asphalt coating is an acceptable alternative to RCP, provided the pipe has the minimum gage thickness and sufficient cover as provided for in Table P-3.

h. Plastic Coated Steel Pipe is manufactured by several different companies with each product being slightly different. Plastic coated steel pipe is fairly new on the market; however, the Colorado Highway Department has studied the pipe and reports the following:

Nexon Coated Metal manufactured by U.S. Steel. After three years of installation in a corrosive environment the coatings were beginning to come off, and in the areas where the coatings were detached, the pipes were rusting. In a separate study conducted by the Colorado Highway Department, the report stated: "Coupons prepared using this material performed quite well except for those exposed to combinations of salts in water. Some loss of adhesion and blistering was evident, however." Based on the above and due to the lack of experience with this material, it is recommended that this type of pipe be utilized only on an experimental basis in areas where replacement is inexpensive.

Plasticote manufactured by Wheeling Steel. After a year's time in Colorado the pipe was in good condition;

however, this was not sufficient time to evaluate its performance. The plasticote utilized in Colorado was ten mils thick on the outside and 3 mils thick on the inside. Approximately seven years ago, the Charleston County Public Works Department allowed some plasticote pipe to be installed on an experimental basis at Quail Run Subdivision, on James Island where it empties directly into a tidal marsh and is subjected to tidal influences. At this installation the plasticote pipe is three mils thick on the outside and ten mils thick on the inside. An on-site examination of the pipe revealed the following:

1. The pipe appeared to be in better condition than plain asphalt coated corrugated metal pipe as evidenced by field observation of both types. The pipes were installed simultaneously within 150 feet of each other with both encountering approximately the same type conditions.

2. The outside coating of the pipe needs to be thicker than the three mils utilized for this pipe to help prevent damage during installation and blistering from the sunlight.

3. The plasticote pipe has a better appearance in areas where it is exposed than the asphalt coated pipe.

Based on the above, it is recommended that this type of pipe be utilized as an alternate to plain asphalt coated pipe with the same minimum gage and cover requirements, provided it is coated with a 12 mil thickness of plasticote on the inside and 10 mil thickness of plasticote on the outside. In addition, plasticote pipe can be used as an alternate to asphalt coated asbestos bonded steel in areas where replacement is inexpensive.

Blac-Clad manufactured by Inland Steel. The only independent testing that could be found on this type of pipe was with the Colorado Highway Department. After four years in Colorado there were no visible signs of corrosive attack on this pipe. Due to the lack of experience in this area, it is recommended that it be used only on an experimental basis in areas where replacement will be very inexpensive until further information is made available concerning this type pipe.

Kinkote Plastic Coating manufactured by Kenitex Corporation. This type plastic coating can be utilized on both steel and aluminum pipe. According to the results of testing conducted by the Colorado Highway Department, it performed better than any of the other plastic coatings on both the steel and aluminum pipes.

Based on the Colorado Highway Department's findings, it is recommended that Kinkote Plastic Coating be utilized as an alternate to fully asphalt coated steel and be utilized on aluminum pipe in areas which are very corrosive, such as tidal storm drains. It is not recommended that this type pipe be utilized as culverts or storm sewers on major streets and highways until further information is made available concerning its life expectancy.

i. Aluminum Corrugated Metal Pipe was introduced in the late 1950's and information concerning its ability to hold up through the years is just becoming available. Reports from the 1960's (Washington State and New York State) found aluminum pipe to be satisfactory; however, these conclusions were based on only three or four years experience with the material. Both of these reports suggested that bituminous coatings were unnecessary except in unsually harsh conditions, since "the outside cladding material is provided as a scarificial protection similar to galvanizing on steel." Later reports (Colorado Report, 1977) as well as the manufacturers' representatives, say the asphalt coating is unnecessary; and according to the manufacturers, the asphalt coating will not adhere to the aluminum. There are some reports of aluminum pipe suffering from severe corrosion due to tidal action, and this was also a problem which was noted in the Washington State Study. For this reason it is recommended that aluminum pipes which are subjected to tidal influences and which are used as culverts under major streets or highways, or otherwise expensive to replace, be coated with a material such as Kinkote manufactured by the Kenitex Corporation which will adhere to aluminum. (See Plastic Coated Pipe.)

Aluminum's lightweight and long laying lengths give it an advantage over reinforced concrete pipe and the equivalent, fully asphalt coated paved invert corrugated steel pipe. Due to its lighter weight, the pipe gives up much of its structural strength in the smaller gages and has a tendency to be crushed during installation as evidenced by the Colorado State report which found "contractors to be hesitant to use aluminum for fear of damage in transit or installation."

They suggested that aluminum culverts could be used where light equipment is required, such as rest areas and bike paths."

Based on the above, it is recommended that aluminum pipe be used with the gages shown in Table P-4, "Minimum Gage Sizes for Corrugated Aluminum Pipe," with the minimum cover requirements noted for secondary streets and highways or with the minimum cover requirements as noted

for primary streets and highways and closed systems as applicable and provided the equivalent reinforced concrete pipe diameters found in Table P-2 are used. It should be noted that aluminum pipe is not acceptable for use by the American Railway Engineering Association, and therefore, cannot be used under railroads except on an experimental basis.

V. RECOMMENDATION

It is recommended that the City of Charleston specify reinforced concrete pipe with O-ring gaskets and accept corrugated metal pipe equivalents as shown in this report as being acceptable alternates.

VI. TABLES

The following Tables should be used for design calculations of storm sewers and culverts.

TABLE P-1

REINFORCED CONCRETE PIPE CLASSIFICATIONS(1)

Pipe Diameter	Maximum Depth of Cover Top of Pipe to Top of Ground in Feet(3) Class III	Class IV	Class V(4)(5)
12"	9.5	13.5	19.0
15"	9.5	13.5	20.0
18"	9.5	13.5	20.0
21"	10.0	14.0	21.0
24"	10.0	14.0	21.0
27"	10.5	14.5	22.0
30"	10.5	15.0	22.0
36"	10.5	15.0	23.0
42"	11.0	16.0	23.0
48"	11.5	16.0	23.0
54"	11.5	16.5	23.5
60"	12.0	17.0	23.5
66"	12.0	17.0	23.5
72"	12.5	17.0	23.5
78"(2)	12.5	17.0	24.0

NOTES:

1. Classifications based on ASTM Specification C76, Latest Revision.
2. Larger diameter pipes shall be considered on an individual basis.
3. Depth of cover based on Wall Thickness B.
4. Pipes which require greater cover shall be considered on an individual basis.

TABLE P-2

Equivalent Pipe Diameters
for
Reinforced Concrete and Corrugated Metal Pipe

Pipe Diameter	Equivalent Pipe Diameter Corrugated Metal	
Reinforced Concrete[1]	Helical[2]	Annular[3]
12"	15"	15"
15"	18"	18"
18"	21"	24"
21"	24"	27"
24"	30"	30"
30"	36"	36"
36"	42"	48"
42"	48"	54"
48"	54"	60"
54"	60"	66"
60"	72"	72"
66"	78"	78"
72"[4]	84"	90"

NOTES:

1. A Mannings n of 0.015 was used for reinforced concrete pipe.
2. A Mannings n of 0.021 was used for helical corrugated metal pipe.
3. A Mannings n of 0.024 was used for annular corrugated metal pipe.
4. Larger diameter pipes shall be considered on an individual basis.

TABLE P-3

MINIMUM WALL GAGE THICKNESS
FOR
CORRUGATED STEEL PIPE[1]

Pipe Size	Minimum Cover		2-2/3"x1/2" Corrugations	3"x1" Corrugations
	12"[2]	12"[3]		
12"	12"	12"	16 ga.	-
15"	12"	12"	16 ga.	-
18"	12"	12"	16 ga.	-
21"	12"	12"	14 ga.	-
24"	12"	12"	14 ga.	-
27"	12"	12"	14 ga.	-
30"	12"	12"	14 ga.	-
36"	12"	12"	14 ga.	16 ga.
42"	12"	12"	12 ga.	14 ga.
48"	12"	12"	12 ga.	14 ga.
54"	12"	18"	10 ga.	12 ga.
60"	12"	18"	10 ga.	12 ga.
66"	12"	18"	12 ga.	12 ga.
72"	12"	18"	8 ga.	10 ga.
78"	12"	24"	8 ga.	10 ga.
84"	12"	24"	8 ga.	10 ga.
90"	12"	24"	8 ga.	10 ga.
96[4]	12"	24"	8 ga.	10 ga.

NOTES:

1. Pipe gage thickness recommendation is based on the Handbook of Steel Drainage and Highway Construction Products concerning structural design together with information on the effects of deterioration on the thickness design of corrugated metal pipe.
2. Minimum cover of corrugated steel pipe based on H-20 highway loading.
3. Minimum cover of corrugated steel pipe based on E-80 railroad loading.
4. Larger diameter pipes shall be considered on an individual basis.

TABLE P-4

MINIMUM WALL GAGE THICKNESS
FOR
CORRUGATED ALUMINUM PIPE[1]

Pipe Size	Minimum Cover Type "A"	Minimum Cover Type "B"[3]	2-2/3"x1/2" Corrugations	3"x1" Corrugations
12"	2'-0"	1'-0"	14 ga.	-
15"	2'-0"	1'-0"	14 ga.	-
18"	2'-0"	1'-0"	12 ga.	-
21"	2'-0"	1'-0"	12 ga.	-
24"	2'-0"	1'-0"	12 ga.	-
27"	2'-0"	1'-0"	10 ga.	-
30"	2'-0"	1'-0"	10 ga.	10 ga.
36"	2'-0" or 3'-0"[4]	1'-0"	10 ga.	10 ga.
42"	3'-0"	1'-0"	10 ga.	10 ga.
48"	3'-0"	1'-0"	8 ga.	10 ga.
54"	3'-0"	1'-3" or 1'-6"[5]	8 ga.	8 ga.
60"	3'-0"	1'-3"	-	8 ga.
66"	3'-0"	1'-6"	-	8 ga.
72"	3'-0" or 4'-0"[6]	1'-6"	-	8 ga.
78"	4'-0"	1'-6" or 1'-9"[7]	-	8 ga.
84"	4'-0"	1'-6" or 1'-9"[7]	-	8 ga.
90"	4'-0"	1'-9"	-	8 ga.
96"[9]	4'-0"	1'-9" or 2'-0"[8]	-	8 ga.
17"x13"	2'-0"	1'-0"	14 ga.	-
21"x15"	2'-0"	1'-0"	14 ga.	-
24"x18"	2'-0"	1'-0"	14 ga.	-
28"x20"	2'-0"	1'-0"	12 ga.	-
35"x24"	2'-0"	1'-0"	12 ga.	-
42"x29"	2'-6"	1'-3"	10 ga.	-
49"x33"	2'-6"	1'-3"	10 ga.	-
57"x38"	2'-6"	1'-3"	8 ga.	-
64"x43"	3'-0"	1'-6"	8 ga.	-
71"x47"[9]	3'-0"	1'-6"	8 ga.	-

NOTES:

1. Pipe wall gage thicknesses recommended based on past experience and recommendations of the manufacturers' brochures.

2. Type "A" minimum cover based on H-20 loading plus installation loading for primary streets and roads as well as closed drainage systems.

3. Type "B" minimum cover based on H-20 loading only for secondary streets and highways.

4. 3'-0" of cover required for 2-2/3"x1/2" corrugation and 2'-0" of cover required for 3"x1" corrugations.

5. 1'-6" of cover required for 2-2/3"x1/2" corrugations and 1'-3" of cover required for 3"x1" or 6"x1" corrugations.

6. 3'-0" of cover required for 3"x1" corrugations and 4'-0" of cover required for 6"x1" corrugations.

7. 1'-6" of cover required for 3"x1" corrugations and 1'-9" of cover required for 6"x1" corrugations.

8. 1'-9" of cover required for 3"x1" corrugations and 2'-0" of cover required for 6"x1" corrugations.

9. Larger diameter pipes shall be considered on an individual basis.

APPENDIX C

SOIL CHARACTERISTICS

CITY OF CHARLESTON

MASTER DRAINAGE AND FLOODPLAIN MANAGEMENT PLAN

APPENDIX C

SOIL CHARACTERISTICS

I. GENERAL

The soil associations within the present City of Charleston area as delineated by Soil Survey of Charleston County, South Carolina, USDA, Soil Conservation Service and Forest Service, in cooperation with the South Carolina Agricultural Experiment Station, dated March 1971, are shown in Figures 17 thru 20. The numbers on this map represent the various soil associations which were used on the General Soil map which is part of the above referenced Soil Survey.

There are six established soil association areas within the Charleston city limits in addition to the peninsular area. Table 1 lists these six areas, the percentage of the total city land area which each comprises, and other data which are pertinent to this study. The general characteristics of each soil association pertinent to this report are summarized below:

3. Chipley-Lakeland Association

This association occurs in the northern part of the peninsular area and accounts for approximately 5 percent of the study area. The soils of this association are moderately to well drained fine sands, which become coarser as the depth below the surface layer increases. Runoff generated from this association is low.

5. Wando-Seabrook Association

This association occurs within the James Island portion of the study area and accounts for approximately 10 percent of the soils within the study area. The soil is a fine loamy sand which is typically well to excessively drained. Amounts of runoff generated from this association tends to be low.

6. Kiawah-Seabrook-Dawhoo Association

This association occurs within the Johns Island portion of the study area. The soils are typically sandy and are generally well drained, dependent upon the existing water table height. Runoff generated from this association tends to be low.

7. Yonges-Hockley-Edisto Association

This association occurs in the West of the Ashley area and is the largest soil association within the study area, accounting for approximately 30 percent of the total area. The association is a moderately well drained to poorly drained soil that has a sandy surface layer and a predominately loamy subsoil. The water table is typically 24 to 36 inches below the surface area. Rate of runoff generated from this association tends to be high.

10. Tidal Marsh Association

This association occurs within all portions of the study area and comprises approximately 20 percent of the total area. The soil is a soft loam, clay, muck, or peat which is covered by 6 to 24 inches of water at high tide and is constantly wet. Construction within this area

is regulated by the South Carolina Coastal Council and the U.S. Army Corps of Engineers. Due to the absence of building in this soil association, the amount of runoff generated is not significant.

11. Mine, Pits, Dumps, Made Land

This association makes up 10 percent of the study area, and consist mainly of old phosphate mining areas. The land is characterized by high, narrow ridges, with water-filled troughs between the ridges. The majority of this area is wooded and the amount of runoff generated is very low.

The area which comprises the peninsular area of the City of Charleston was not included in the survey. As far as can be determined, there is no existing formal documentation of the soil characteristics of the peninsular area. However, from a basis of general knowledge of the historical development of the tidal marsh and other soil areas in this location, it is logical to assume that the general characteristics of these soils are comparable to those in the contiguous areas within the city limits.

Soil characteristics of primary significance in Table 1 are the Reaction (pH value) and the Composite Hydrological Group Association. The Reaction is an indication of the degree of acidity or alkalinity of each soil series, and is expressed in numerical form in Table 1. A soil having a pH of less than 7 is classified as acidic and those having a pH greater than 7 are alkaline.

The Composite Hydrological Group Association classifies the soil groups according to their infiltration and water transmission rates. This association is utilized in Technical Release No. 55, "Urban Hydrology for Small Watersheds" by USDA, Soil Conservation Service to estimate the amount of runoff from a given watershed. The Hydrologic Soil Groups are listed in Table 2.

The climate for the area is temperate with heavy, well distributed rainfall. A large portion of the study area is also effected by tidal action. Table 1 shows a high incidence of soils with hydrological characteristics which primarily tend to hold moisture. Due to these influences, the area soils remain predominately moist throughout most of the year.

II. CONCLUSIONS

From the data given in Table 1 it is evident that a predominate characteristic of the soil in the City of Charleston area is its moderately acidic nature. The acidic condition combined with the presence of moisture results in soils which have a low resistivity value. The resistivity of a soil is a measure of the soils ability to resist the process of electrolysis. The presence of soils with low resistivity, combined with the acidic nature of the soil lead conclusively to the fact that the soil environment of the study area is predominately aggressively corrosive.

The corrosive environment is even greater for those areas which are subject to tidal action due to the cylical presence of the salt water and the residual salinity of the soil in these areas.

TABLE 1

CHARLESTON AREA SOIL CHARACTERISTICS

SOIL ASSOCIATION	% LAND AREA	SOIL SERIES	% EXTENT (WITHIN ASSOCIATION)	REACTION (pH)	HYDROLOGICAL GROUP (EACH SERIES)	COMPOSITE HYDROLOGICAL GROUP ASSOCIATION	
						GROUP	% EXTENT
3- Chipley-Lakeland	5	Chipley	66	5.1/5.5	A	A	88%
		Lakeland	23	4.5/5.5	A		
		Rutledge		5.1/5.5	B	B	12%
		Osier	11	4.5/5.0	A		
		Wagram		5.1/5.5	A		
5- Wando-Seabrook	10	Wando	51	6.1/6.5	A	A	55%
		Seabrook	31	5.1/6.0	C	B	30%
		Kiawah		5.1/6.0	B	C	15%
		Rutledge		5.1/5.5	B		
		Dawhoo	18	6.1/6.5	B		
		Charleston		4.5/5.5	D		
		Wagram		5.1/5.5	A		
		Edisto		4.5/5.5	C		
6- Kiawah-Seabrook-Dawhoo	10	Kiawah	48	5.1/6.0	B	B	70%
		Seabrook	19	5.1/6.0	C	C	30%
		Dawhoo	17	6.1/6.5	B		
		Rutledge		4.5/5.0	B		
		Wando	16	6.1/6.5	A		
		Edisto		4.5/5.1	C		
		Yonges		4.5/8.4	D		
7- Yonges-Hockley-Edisto	30	Yonges	31	5.6/8.4	D		
		Hockley	21	4.5/5.5	B	B	28%
		Edisto	14	4.5/5.5	C	C	14%
		Charleston		4.5/5.5	D	D	58%
		Meggett		4.5/7.3	D		
		Santee	34	5.1/6.5	D		
		Wadmalaw		4.5/8.4	D		
		Wicksburg		4.5/6.5	B		
10- Tidal Marsh	20	Tidal Marsh	70	4.5/7.0	D	A	18%
		Capers	18	5.6/6.5	D		
		Coastal Beaches		5.6/6.0	A		
		Dune Land		5.6/6.0	A	D	82%
		Crevasse	12	5.1/5.5	A		
		Dawhoo		6.5/6.5	B		
		Pamlico		4.5/6.0	D		
		Rutledge		5.1/5.5	B		
11- Mine Pits, Dumps, Made Land	10	Pits & Dumps (Old Phosphate Mines)	70		D	D	100%
		Made Land	30				
Peninsula	15	(See Text)				A	70%
						C	30%

TABLE 2

HYDROLOGIC SOIL GROUPS

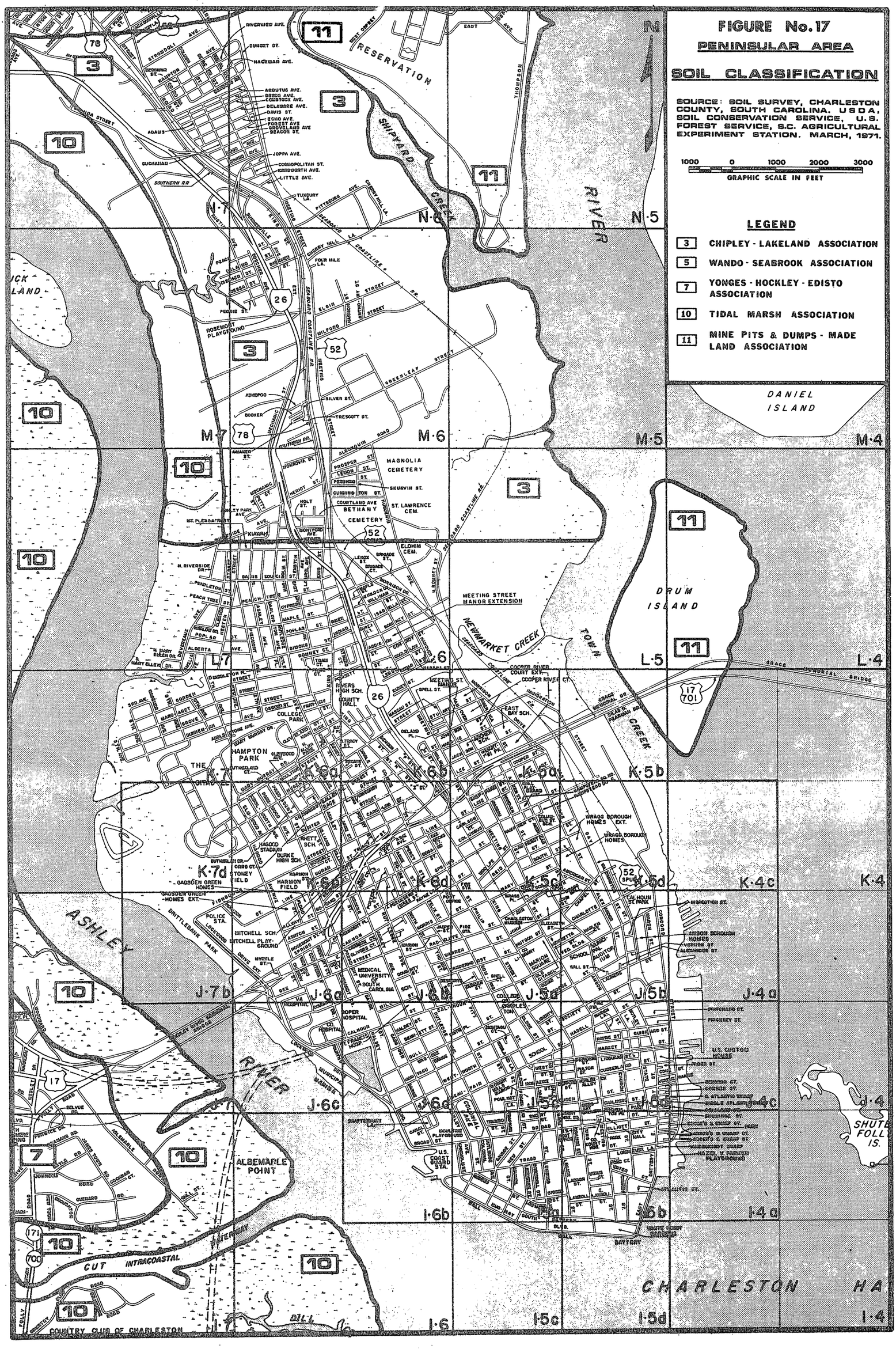
The soils of the study area have been classified into four hydrologic soil groups. The hydrologic soil groups, according to their infiltration and transmission rates, are:

A. (Low runoff potential). Soils having high infiltration rates even when thoroughly wetted. These consist chiefly of deep, well to excessively drained sands or gravels. These soils have a high rate of water transmission in that water readily passes through them.

B. Soils having moderate infiltration rates when thoroughly wetted. These consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

C. Soils having slow infiltration rates when thoroughly wetted. These consist chiefly of soils with a layer that impedes downward movement of water or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.

D. (High runoff potential). Soils having very slow infiltration rates when thoroughly wetted. These consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.


FIGURE No.17
PENINSULAR AREA
SOIL CLASSIFICATION
SOURCE: SOIL SURVEY, CHARLESTON COUNTY, SOUTH CAROLINA. U S D A, SOIL CONSERVATION SERVICE, U.S. FOREST SERVICE, S.C. AGRICULTURAL EXPERIMENT STATION. MARCH, 1971.
1000 0 1000 2000 3000
GRAPHIC SCALE IN FEET
LEGEND
3 CHIPLEY - LAKELAND ASSOCIATION
5 WANDO - SEABROOK ASSOCIATION
7 YONGES - HOCKLEY - EDISTO ASSOCIATION
10 TIDAL MARSH ASSOCIATION
11 MINE PITS & DUMPS - MADE LAND ASSOCIATION
N
DANIEL ISLAND
SHIPYARD CREEK
RIVER
RESERVATION
MAGNOLIA CEMETERY
BETHANY CEMETERY
ST. LAWRENCE CEM.
ELOHIM CEM.
MEETING STREET MANOR EXTENSION
NEWMARKET CREEK
DRUM ISLAND
TOWN
COOPER RIVER
GRACE MEMORIAL BRIDGE
HAMPTON PARK
THE CITADEL
COLLEGE PARK
RIVERS HIGH SCH.
COUNTY HALL
EAST BAY SCH.
WRAGG BOROUGH HOMES
WRAGG BOROUGH HOMES EXT.
GADSDEN GREEN HOMES
GADSDEN GREEN HOMES EXT.
HARMON FIELD
HAGOOD STADIUM
DUKE HIGH SCH.
MITCHELL SCH.
MITCHELL PLAY-GROUND
ASHLEY
ASHLEY RIVER
MEDICAL UNIVERSITY OF SOUTH CAROLINA
VA HOSPITAL
ROPER HOSPITAL
CO. HOSPITAL
ST. FRANCIS HOME
U.S. CUSTOM HOUSE
U.S. COAST GUARD STA.
ALBEMARLE POINT
SHUTE FOLL IS.
INTRACOASTAL WATERWAY
CUT
CHARLESTON HA
COUNTRY CLUB OF CHARLESTON
ROSEMONT PLAYGROUND
HAZEL V. PARKER PLAYGROUND
K-7a
K-6a
K-5a
K-5b
K-7d
K-6d
K-5d
K-4c
K-4
J-7b
J-6c
J-5c
J-4c
J-4
I-6b
I-5b
I-4a
I-6
I-5c
I-5d
I-4

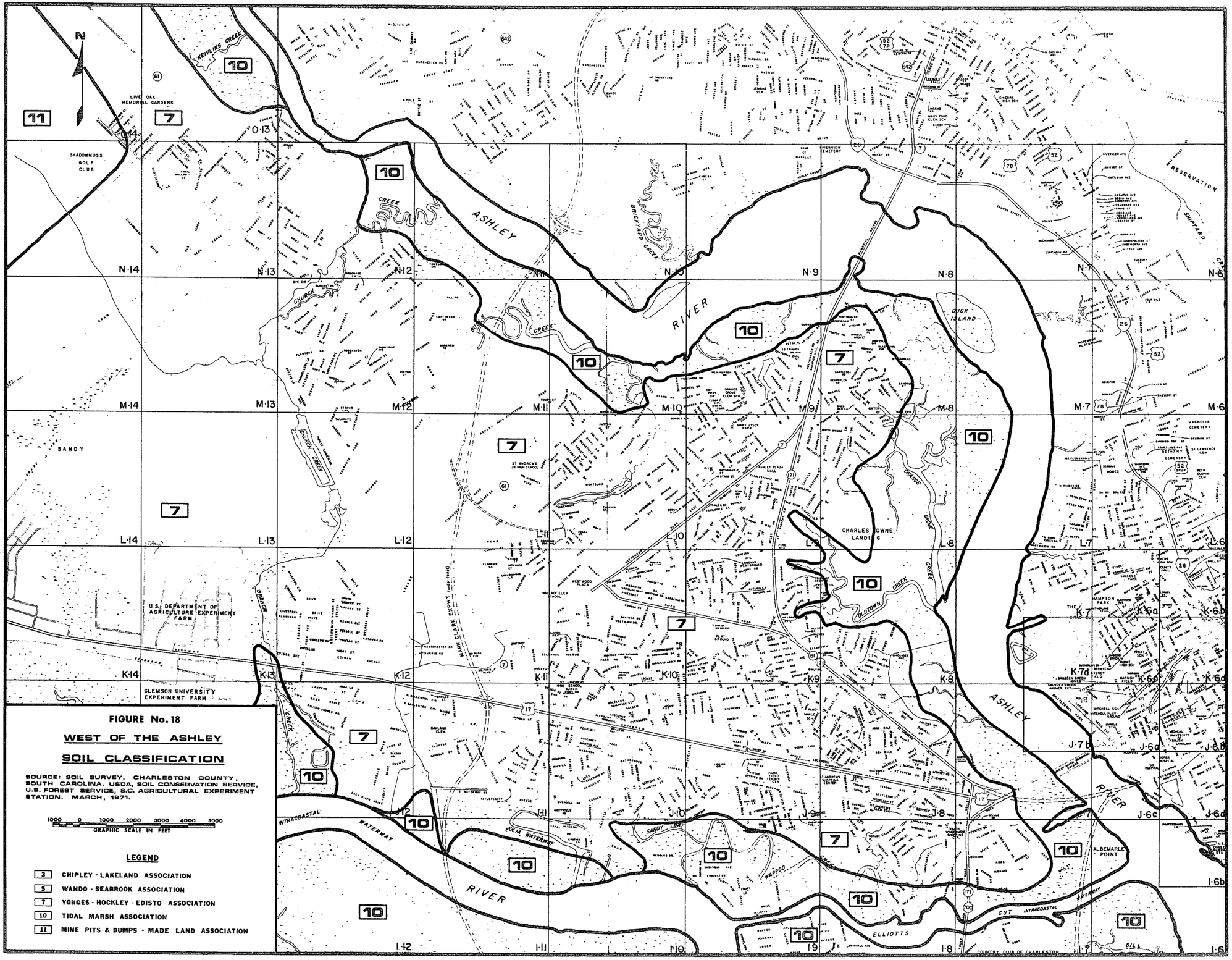


FIGURE No. 18

WEST OF THE ASHLEY

SOIL CLASSIFICATION

SOURCE: SOIL SURVEY, CHARLESTON COUNTY, SOUTH CAROLINA. USDA, SOIL CONSERVATION SERVICE, U.S. FOREST SERVICE, S.C. AGRICULTURAL EXPERIMENT STATION. MARCH, 1971.

1000 0 1000 2000 3000 4000 5000
GRAPHIC SCALE IN FEET

LEGEND

- 3 CHIPLEY - LAKELAND ASSOCIATION
- 5 WANDO - SEABROOK ASSOCIATION
- 7 YONGES - HOCKLEY - EDISTO ASSOCIATION
- 10 TIDAL MARSH ASSOCIATION
- 11 MINE PITS & DUMPS - MADE LAND ASSOCIATION

FIGURE No.19

JAMES ISLAND

SOIL CLASSIFICATION

SOURCE: SOIL SURVEY, CHARLESTON COUNTY, SOUTH CAROLINA. USDA, SOIL CONSERVATION SERVICE, U.S. FOREST SERVICE, S.C. AGRICULTURAL EXPERIMENT STATION. MARCH, 1971.

1000 0 1000 2000 3000 4000 5000
GRAPHIC SCALE IN FEET

LEGEND

- 3 CHIPLEY - LAKELAND ASSOCIATION
- 5 WANDO - SEABROOK ASSOCIATION
- 7 YONGES - HOCKLEY - EDISTO ASSOCIATION
- 10 TIDAL MARSH ASSOCIATION
- 11 MINE PITS & DUMPS - MADE LAND ASSOCIATION

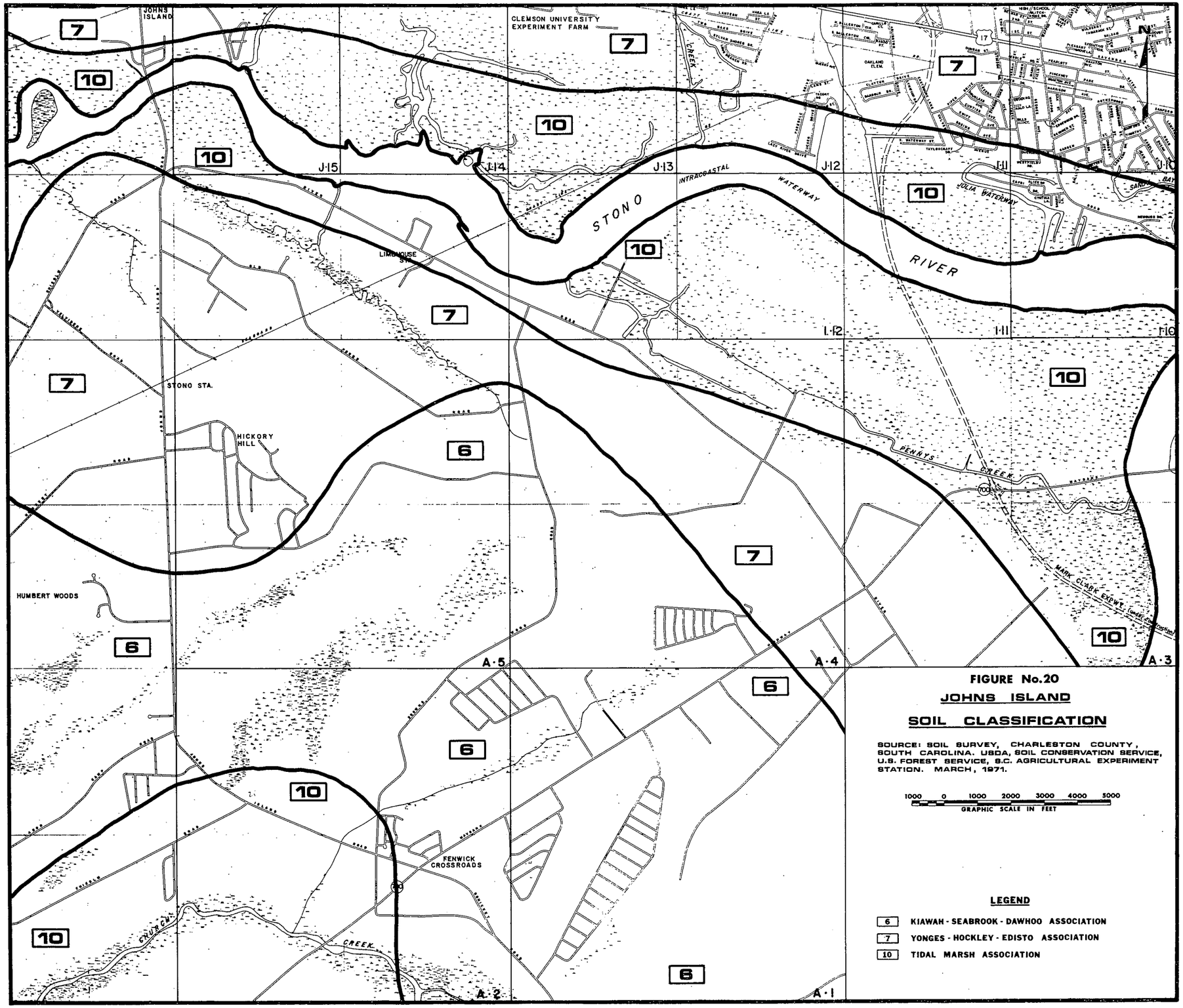


FIGURE No.20

JOHNS ISLAND

SOIL CLASSIFICATION

SOURCE: SOIL SURVEY, CHARLESTON COUNTY, SOUTH CAROLINA. USDA, SOIL CONSERVATION SERVICE, U.S. FOREST SERVICE, S.C. AGRICULTURAL EXPERIMENT STATION. MARCH, 1971.

1000 0 1000 2000 3000 4000 5000
GRAPHIC SCALE IN FEET

LEGEND

- 6 KIAWAH - SEABROOK - DAWHOO ASSOCIATION
- 7 YONGES - HOCKLEY - EDISTO ASSOCIATION
- 10 TIDAL MARSH ASSOCIATION