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COVER SHEET

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DOCUMENT TITLE(S) PARK COTTAGES OPERATION AND MAINTENANCE MANUAL FOR THE STORMWATER COLLECTION SYSTEM, DETENTION SYSTEM, AND OIL / WATER SEPARATOR (PLAT OF PARK COTTAGES, RECORDED UNDER SKAGIT COUNTY AUDITOR'S FILE NO. 200404200129)

PARTIES (Owner):

1. PARK COTTAGES HOMEOWNERS ASSOCIATION

PARTIES (City):

1. City of Sedro-Woolley

Legal Description:

A portion of the Southeast ¼ of the Northeast ¼ of Section 13, T35N, R4E, W.M.

ASSESSOR'S PROPERTY TAX ACCOUNT NUMBER: 350413-0-005-0005
ASSESSOR'S PROPERTY TAX PARCEL NUMBER: P 36355

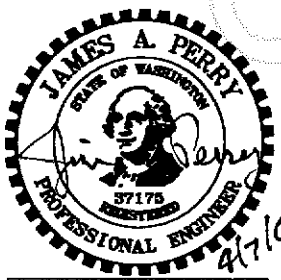
PARK COTTAGES

OPERATION
AND
MAINTENANCE MANUAL

FOR THE
STORMWATER COLLECTION SYSTEM,
DETENTION SYSTEM,
and OIL / WATER SEPARATOR

April 7, 2004

PREPARED BY



EXPIRES 7/18/05

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OPERATION AND MAINTENANCE MANUAL

for the

PARK COTTAGES

STORMWATER COLLECTION SYSTEM, DETENTION SYSTEM, and OIL / WATER SEPARATOR

TABLE OF CONTENTS

EXHIBITS:

The purpose of this manual is to outline the procedures for the proper operation and maintenance of the stormwater facilities for PARK COTTAGES as required to be maintained by the PARK COTTAGES Homeowners Association.

The PARK COTTAGES Homeowners Association has the responsibility for all reasonable and necessary maintenance and repairs of the stormwater facilities that are outside the public right-of-way of Park Cottages Drive. The City of Sedro-Woolley Public Works Department will maintain the street and catch basin within the public street right-of-way.

This manual is the mechanism for the maintenance, repair and replacement of stormwater, water detention and drainage facilities as required by and is a part of the Declaration of Covenants, Conditions and Restrictions for PARK COTTAGES.

For the benefit of the PARK COTTAGES Homeowners Association, conditions should not be allowed to deteriorate, nor maintenance not performed on-site, which would force the City of Sedro-Woolley Public Works Department to assume responsibility of the facility. The stormwater collection system and detention system should add to the beauty of living in PARK COTTAGES as much as possible.

II. PURPOSE OF FACILITY

In the development of the residential lots for PARK COTTAGES, the natural drainage of the area was changed by the construction of the road and houses. Instead of the rain falling on trees and grass and percolating into the soil, some of the rain will fall on pavement and roofs and quickly run off and collect at low points.

Now with more water reaching the low point faster, this stormwater facility provides control of the quality, amount and rate at which stormwater is discharged to the stream in the ravine.

Exhibit "A" is the plat layout of the street and lots for PARK COTTAGES. Also shown are the drainage easements of which the Association has legal right of access for maintenance purposes.

III. LAYOUT OF FACILITY

The stormwater system for PARK COTTAGES basically is comprised of two parts. First, the collection system and secondly, the detention system. Gutters on each side of the street collect and convey rain runoff from the street to a catch basin (C.B. #1) on the west end of the cul-de-sac. Two catch basins (C.B. #2 and C.B. #3) just north of the sidewalk on the north side of the street collect runoff from the two driveways to the north. A pipe conveys this runoff to the same catch basin manhole on the west end of

the cul-de-sac (C.B. #1). Exhibit "B" shows the layout of the stormwater collection system for Park Cottages.

From C.B. #1 the stormwater is piped to the oil / water separator. A 12" pipe connects the tank of the oil / water separator with the underground pipe detention system.

IV. FUNCTION OF UNITS

a.) OIL / WATER SEPARATOR

The oil / water separator (O/WS) serves to settle out sediment (sand and gravel) and collect floatables such as oil and grease. Exhibit "C" shows a cross section of the O/WS.

As stormwater enters the O/WS from the catch basin, the first chamber collects settled sand and gravel. The "sediment weir" provides for the water to slow down and gives time for suspended material to settle.

The water then flows over the sediment weir into the next chamber where the "oil retaining baffle" keeps floating material form being discharged. This first part of the O/WS is where oil and grease collect and stay – the water level never drops below the bottom of the baffle thus keeping the floating oil from being discharged.

The O/WS also includes the discharge tee in which are two orifices and the overflow pipe. These orifices control the discharge rate to the stream. There is one 2¼" orifice in the bottom plate of the tee. This orifice regulates the flow so that the 2-year "developed" rainstorm is 50% of the discharge as before the land was developed.

The second orifice on the side of the discharge tee is 3-7/8" in diameter and allows only the same flow as the pre-developed rate for a 10-year storm. Storms greater than a 10-year occurrence flow over the top of the pipe.

The O/WS also serves as a chamber for collecting the stormwater as it builds up head for the water to be discharged through the orifices. The orifices need head for water to flow through them. As the water level increases in the tank of the O/WS, a 12-inch pipe conveys water to the detention pipes.

The level would build up slow enough in the O/WS that this connecting 12-inch pipe will keep the water level in the detention pipes the same level as in the O/WS.

b.) DETENTION PIPES

The function of the detention pipes is to store the water while the discharge orifices in the O/WS discharge the flow. The detention pipes are six feet in diameter and are long enough to have the volume of the required 7,656 cubic feet. This volume equals 57,300 gallons. The detention pipes consist of three runs of 70-foot long pipes joined by a header at each end. There are access manholes at each end of the layout

c.) DISCHARGE PIPE TO STREAM

As can be seen in Exhibit "B", the 8-inch discharge pipe out of the O/WS is underground until it exits the bank of the ravine. Down the bank of the ravine, the pipe is anchored to keep it in place. Exhibit "D" shows how the plans for this project detailed this anchor. The intent of this anchor method was to not disturb the bank of the ravine by digging a trench.

At the bottom of the ravine, the end of the pipe has a device to dissipate the energy of the flowing water so that the streambed does not get eroded. The detail from the plans of this energy dissipator is shown in Exhibit "E".

V. NORMAL OPERATING PROCEDURES

The stormwater collection and detention system is designed to function on its own. A rainstorm comes, the water is collected and flows through the system and down to the creek. The only and main operating procedure is to once a month make sure nothing has plugged the catch basins and the orifices in the O/WS. It is important that this operating procedure be recorded.

Inspect the orifices by removing the west manhole lid on the O/WS. You will need a ½ - allen wrench to remove the bolt-down lid. Visually inspect the orifices to make sure they are not clogged. By looking down the inside of the riser pipe you should be able to see the bottom orifice.

The City may wish to see a record of operating and maintenance procedures actually performed. Keep a log of the date and what was observed and/or done. A copy of a master form for keeping this log is included as Exhibit "F". The person responsible for operating and maintaining the stormwater system for Park Cottages is to keep a copy of this manual in a ring binder with extra copies of the maintenance log form. This way the manual and the log will keep everything recorded and organized.

Twice a year the energy dissipator down at the stream is to be inspected to make sure it is in place and not clogged. It is recommended that this be done before the rainy season (suggest November) and then after the rainy season (suggest April). These inspections are to be recorded on the maintenance log form.

VI. MAINTENANCE OF FACILITY

The main maintenance procedure is to remove any accumulated debris, sand and gravel from catch basin number 1 (at the end of the cul-de-sac) and from the first chamber of the O/WS.

C.B. #1 is deep and is going to be hard to remove accumulated debris from it. The catch basin is 8'10" deep. The connecting pipe to the O/WS is ten inches above the bottom. The catch basin needs to be cleaned out when there is about eight inches of sand and gravel in the bottom. You can tell how much gravel is in the bottom by measuring down from the grate on the catch basin. When this measurement is less than 8'2", it is time to clean out the gravel. It is best not to let this build up to the point where the debris is washed into the O/WS. Mainly heavier sand and gravel will settle out in this catch basin. Finer and lighter material will settle out in the O/WS.

The depth to the bottom of the O/WS is 12'3". When there is two feet of debris settled in this first chamber it needs to be cleaned out. When you measure down 10'3" to the level of debris, it is time to clean it out.

Because of the deep depth of the catch basin and O/WS, a vacuum pump truck will be needed. This will be a necessary and mainly the only expense in the operation and maintenance of your stormwater collection system. However, it needs to be done.

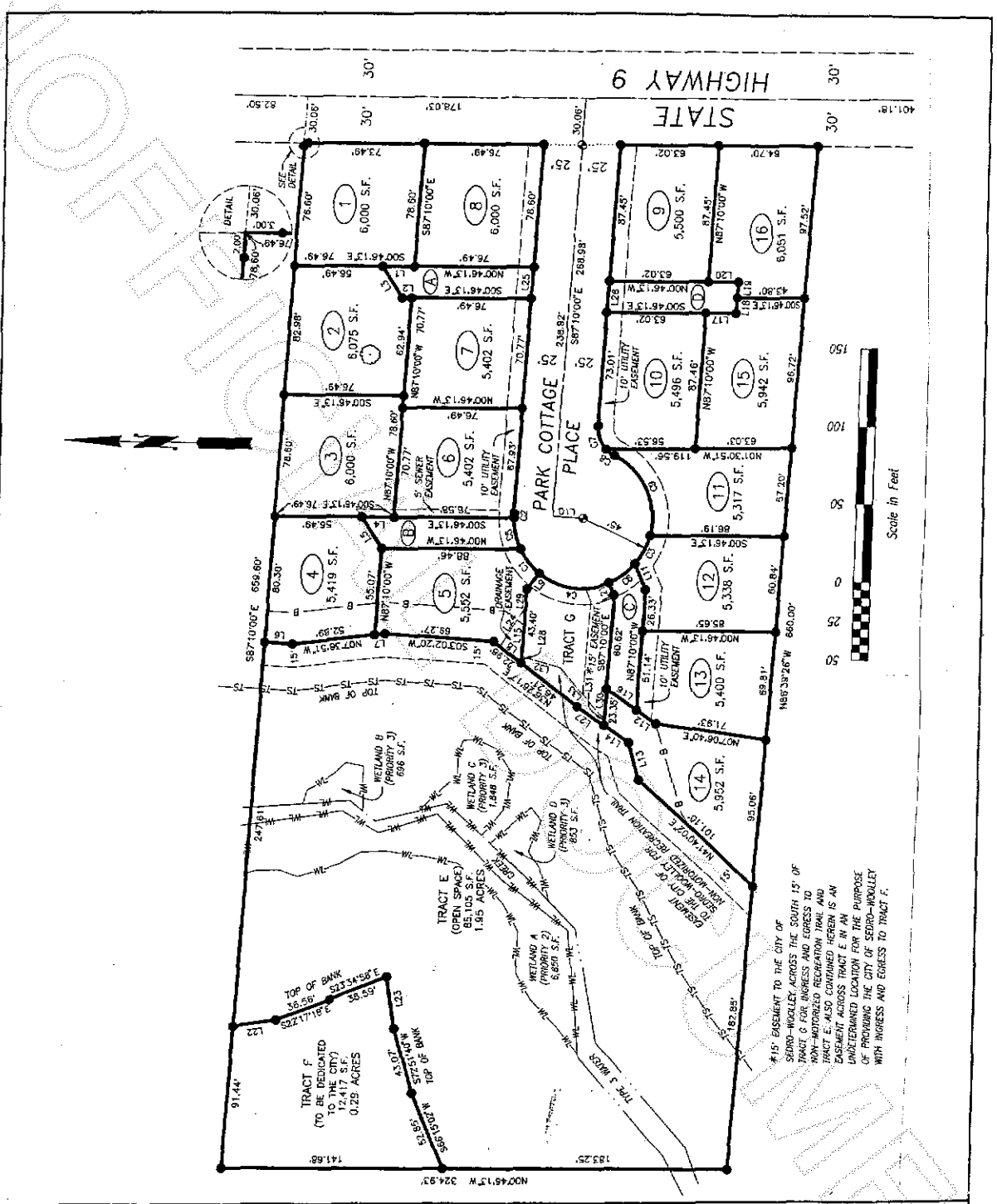
VII. RECORD KEEPING

As explained in the previous sections, it is important to keep a log of all inspections and maintenance performed on your stormwater collection and detention system. These maintenance procedures are required by the Declaration of Covenants, Conditions and Restrictions for PARK COTTAGES and are to be performed by the Homeowners Association. This log is to be available for inspection by the City of Sedro-Woolley. By keeping this log up to date and kept in a binder, you will be ready for any unexpected inspection.

VIII. EMERGENCIES

If there is a situation, such as a major oil spill into your collection system, or if there is any other type of major damage to the stormwater collection or detention system, be sure to call the City of Sedro-Woolley Public Works Department at 360-855-0771 and report it to them. Inform the City what happened, what you are doing about it, and solicit any help you may need.

If any major repairs are necessary make sure they are done consistent with the initial plans and construction of your facilities. A copy of the construction plans is to be readily available to the maintenance person at all times.



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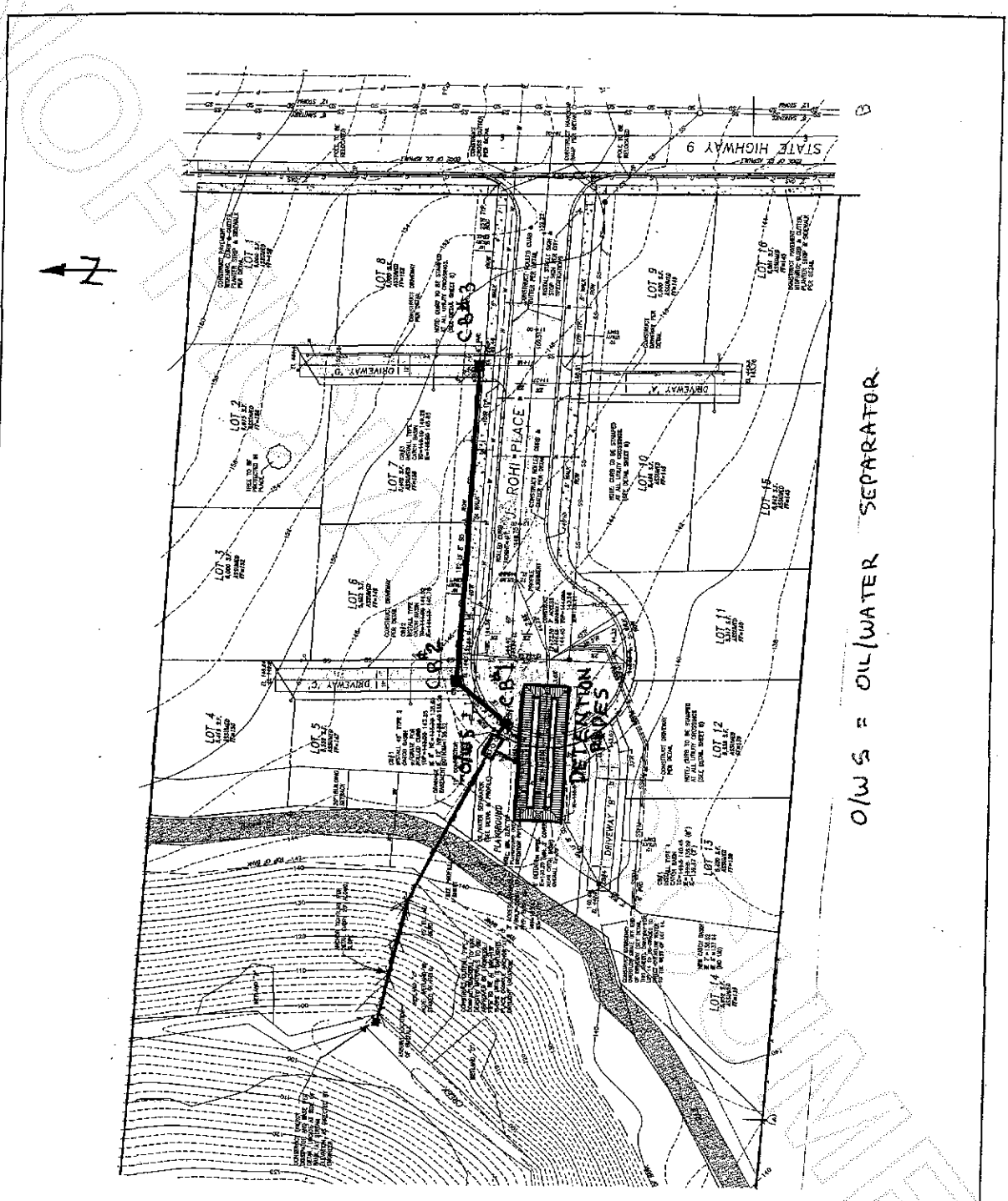
PARK COTTAGES O &M MANUAL

LOT LAYOUT

EXHIBIT "A"



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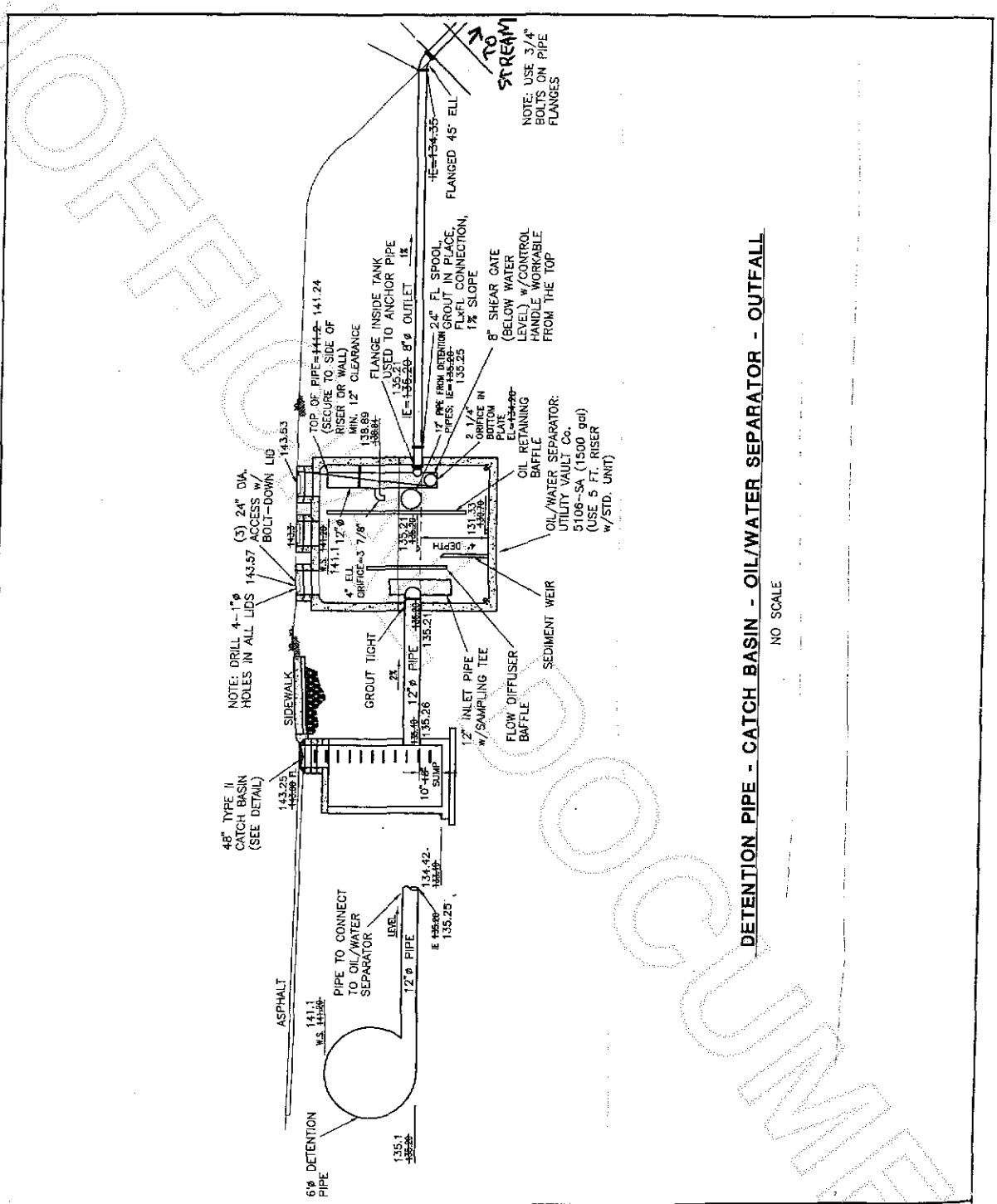
PARK COTTAGES O &M MANUAL

STORMWATER SYSTEM LAYOUT

EXHIBIT "R"



DETENTION PIPE - CATCH BASIN - OIL/WATER SEPARATOR - OUTFALL

NO SCALE

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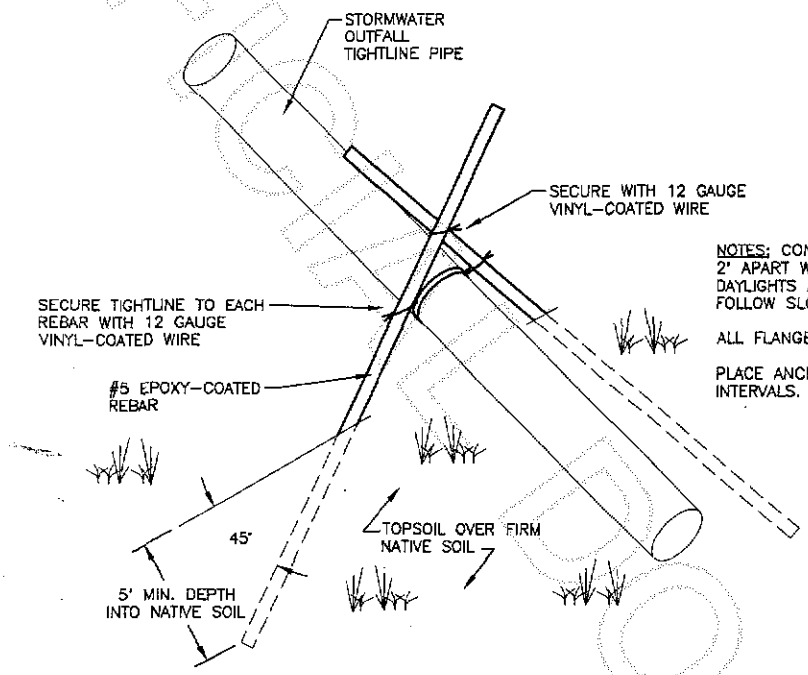
OIL / WATER SEPARATOR

EXHIBIT "C"



STORMWATER OUTFALL PIPE ANCHOR DETAIL

NO SCALE

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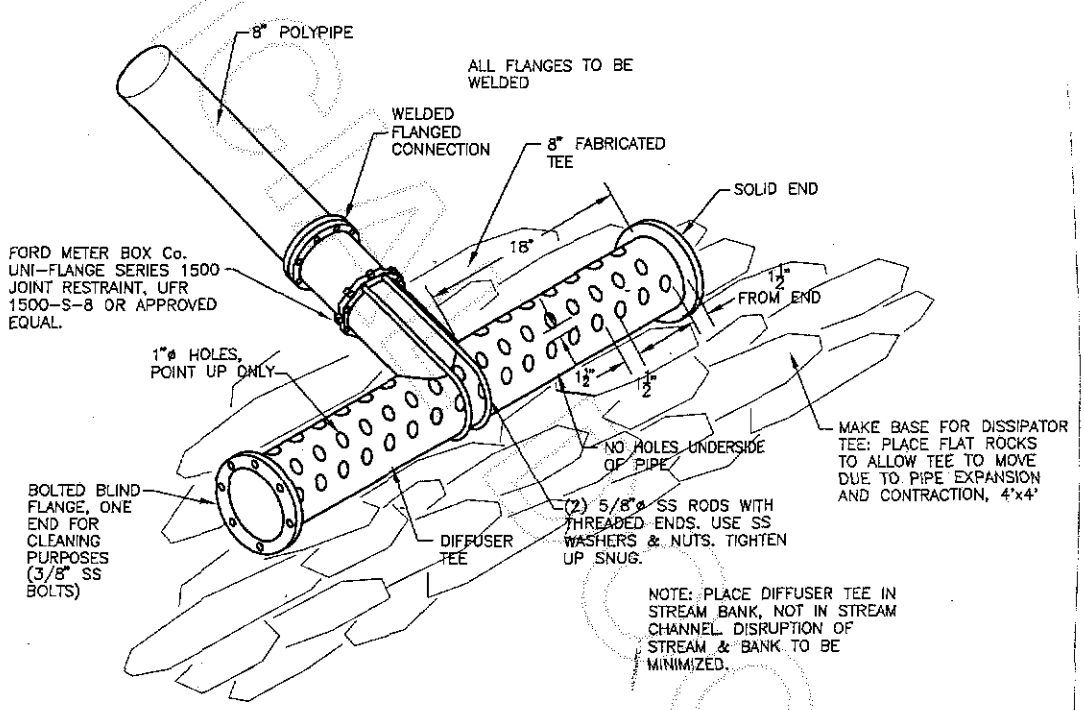
PARK COTTAGES O &M MANUAL

OUTFALL PIPE ANCHOR

EXHIBIT "D"



STORMWATER OUTFALL ENERGY DISSIPATOR DETAIL

NO SCALE

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PARK COTTAGES O &M MANUAL

OUTFALL ENERGY DISSIPATOR

EXHIBIT "E"

PARK COTTAGES O &M MANUAL

MAINTENANCE LOG FORM

EXHIBIT "F"

MASTER COPY

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PARK COTTAGES O &M MANUAL

MAINTENANCE LOG FORM

EXHIBIT "F"

PARK COTTAGES STORMWATER SYSTEM

Maintenance Log

DATE	NAME	DESCRIPTION OF INSPECTION/WORK

Page _____

ACTIVE MAINTENANCE LOG

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PARK COTTAGES O &M MANUAL

ACTIVE MAINTENANCE LOG

EXHIBIT "G"

PARK COTTAGES STORMWATER SYSTEM

Maintenance Log

DATE	NAME	DESCRIPTION OF INSPECTION/WORK

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