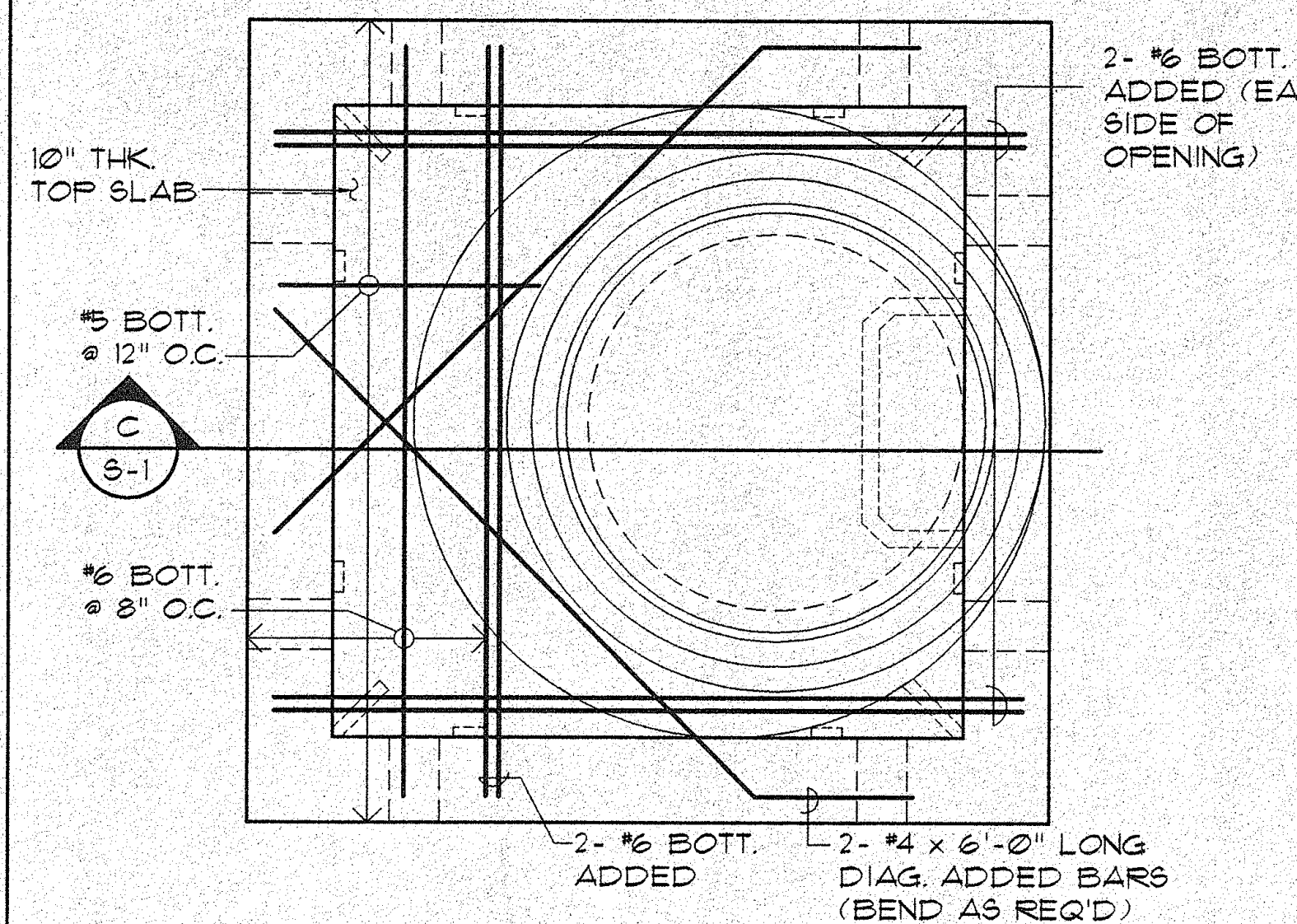
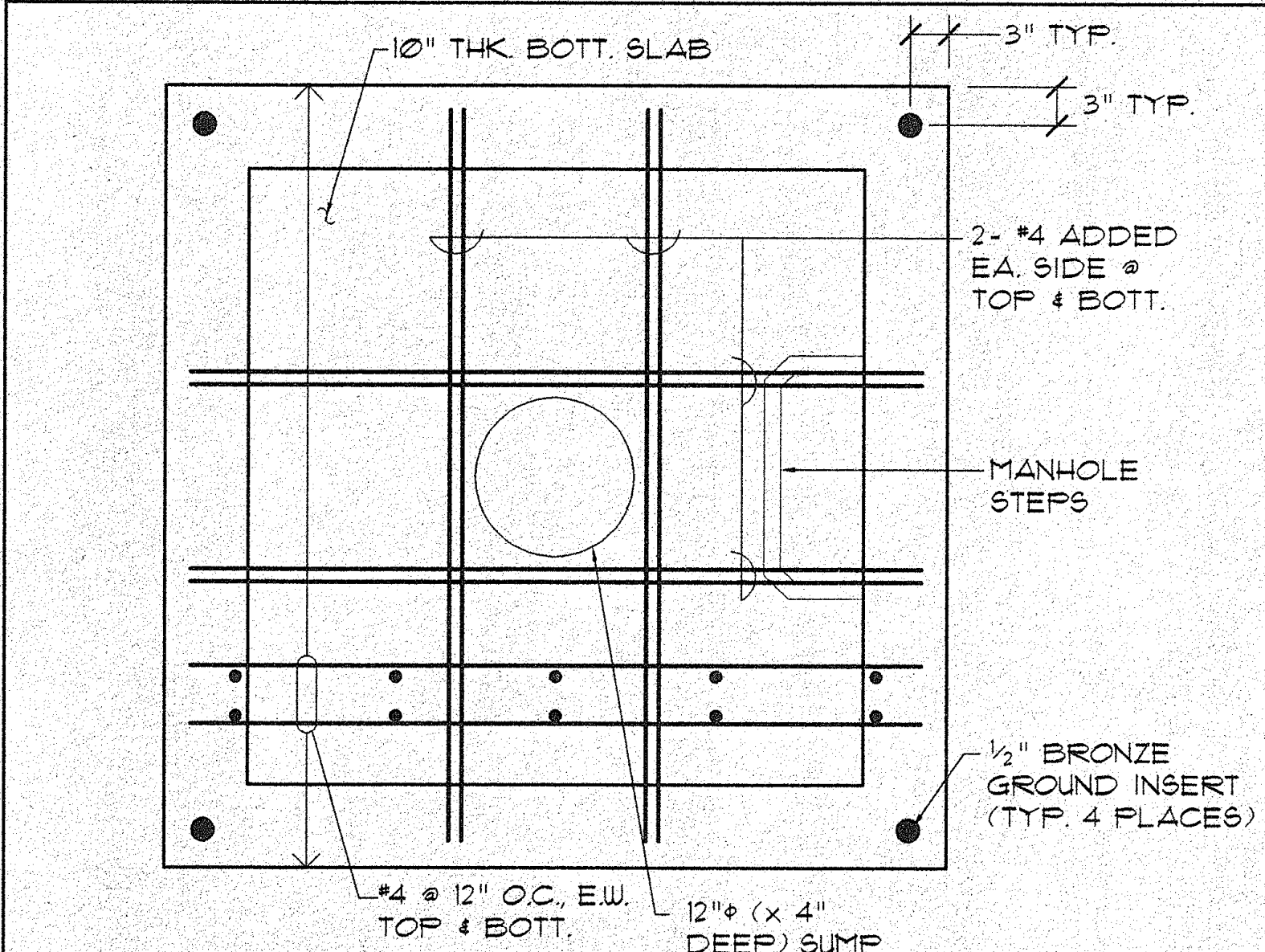
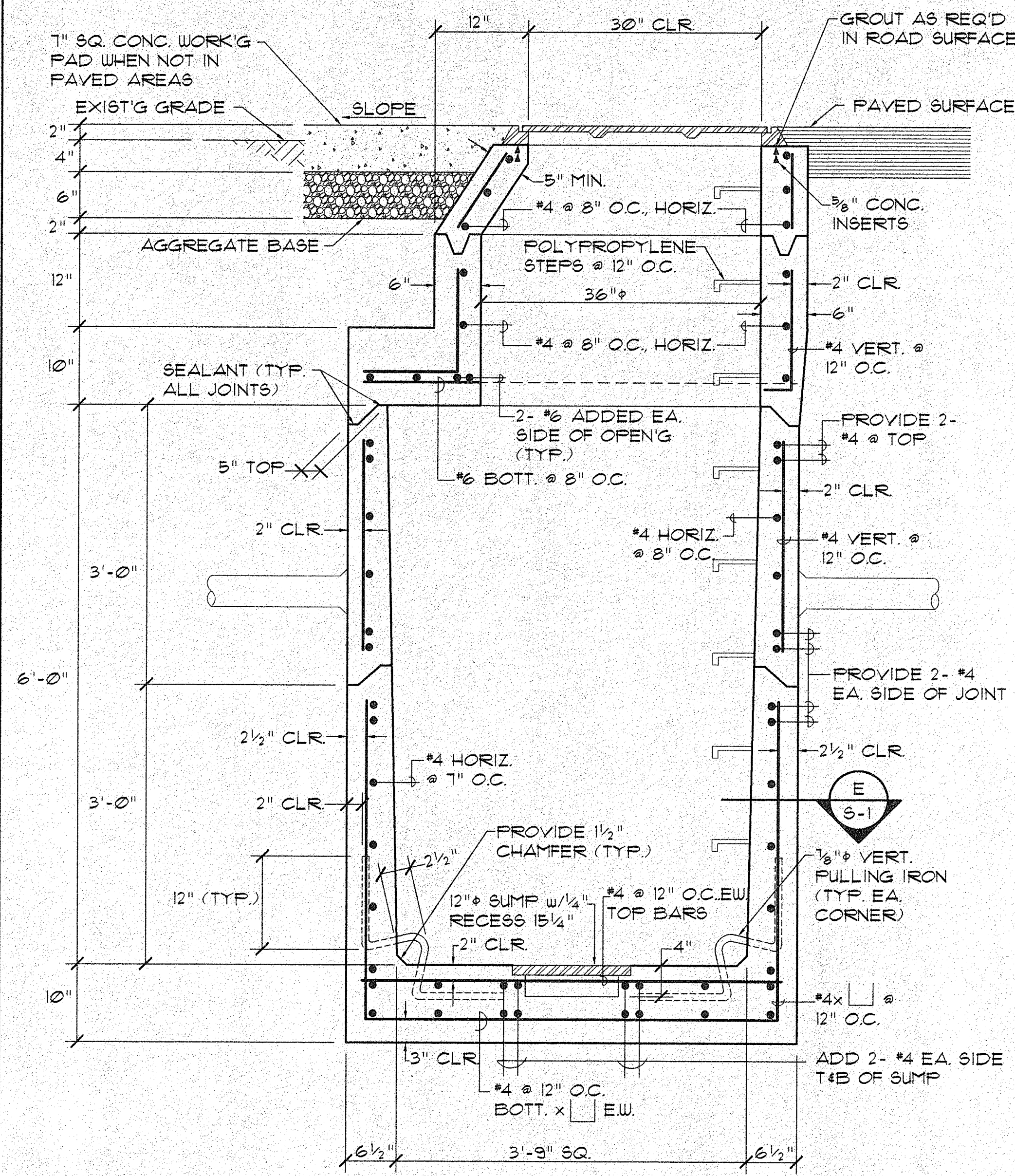




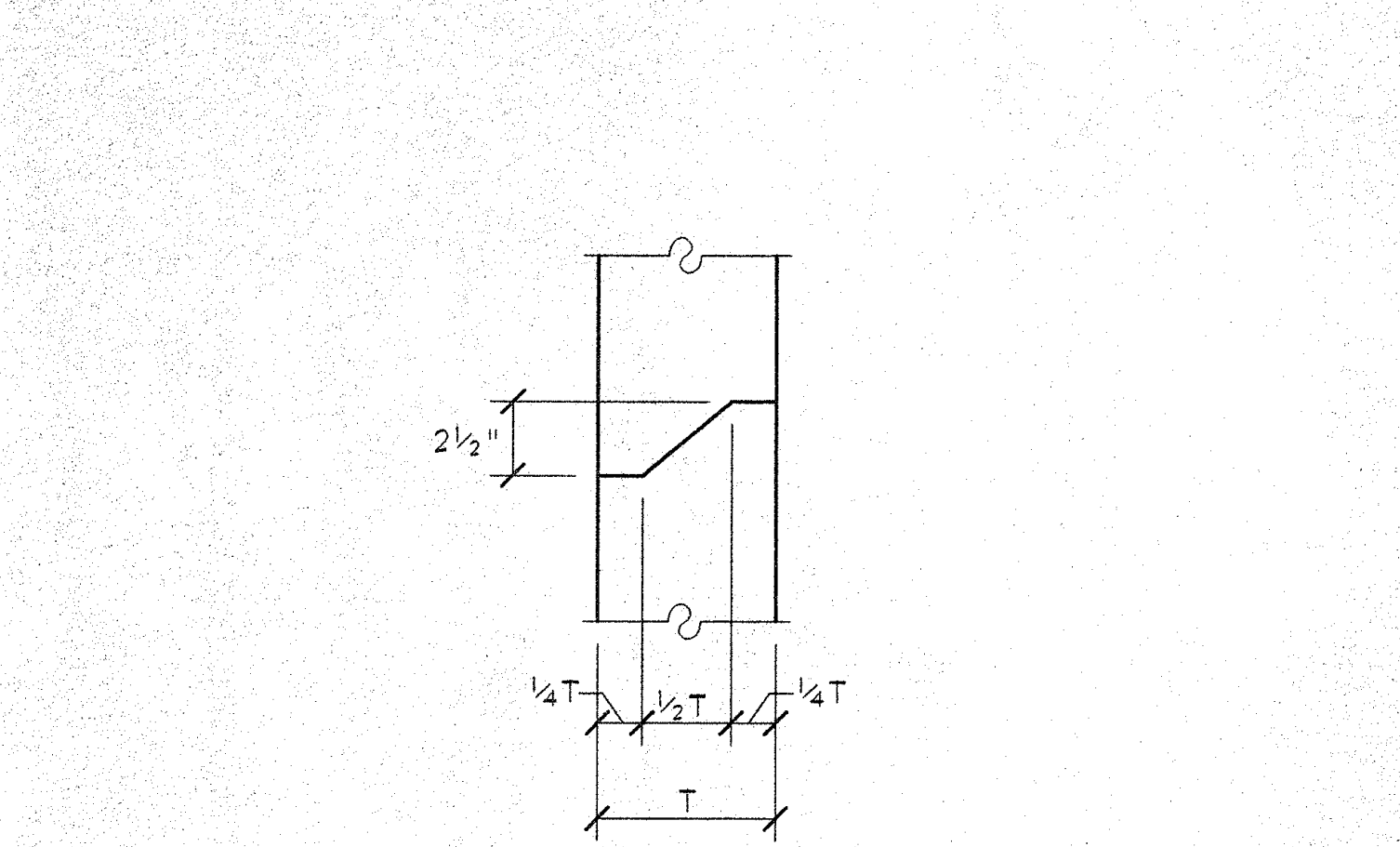
A TOP SLAB REINF. PLAN
SCALE: 1" = 1'-0"



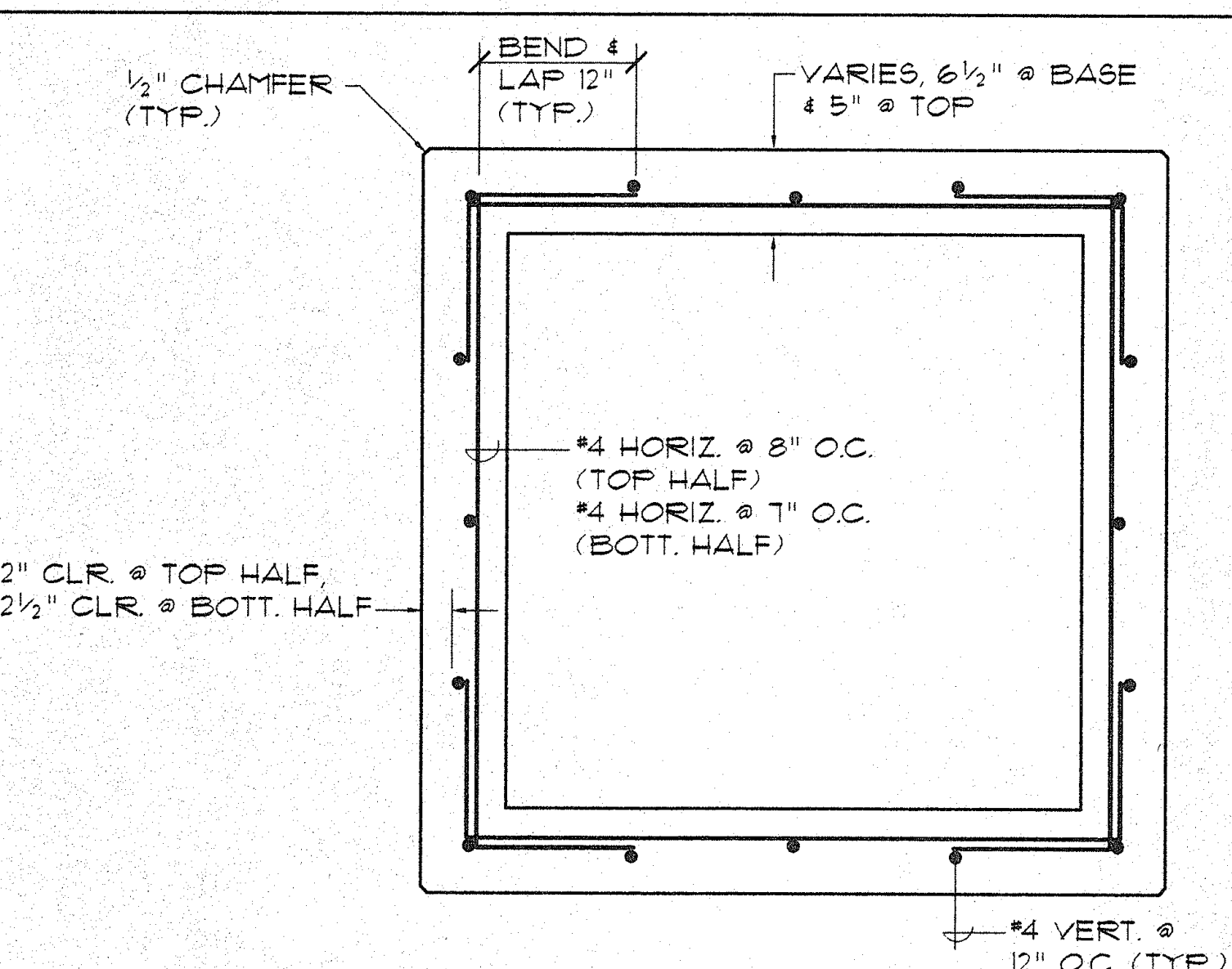
B BOTTOM SLAB REINF. PLAN
SCALE: 1" = 1'-0"



C SECTION
SCALE: 1" = 1'-0"



D TYP. KEYWAY DETAIL
SCALE: 3" = 1'-0"



E TYP. BOX SECTION
SCALE: 1" = 1'-0"

GENERAL NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL FIELD DIMENSIONS AND LOCATIONS OF DUCTS AND PIPES BEFORE POURING CONCRETE. COORDINATE INFORMATION SHOWN ON STRUCTURAL DRAWINGS WITH CIVIL DRAWINGS BEFORE COMMENCEMENT OF WORK. ALL DISCREPANCIES SHALL BE PROMPTLY REPORTED TO THE ENGINEER.
2. ALL OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND/OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER BEFORE PROCEEDING WITH ANY WORK SO INVOLVED.
3. ALL WORK SHALL CONFORM TO THE UNIFORM BUILDING CODE, LATEST EDITION, AS ADOPTED BY THE CITY AND COUNTY OF HONOLULU.
4. UNLESS SPECIFICALLY DETAILED ELSEWHERE, CONTRACTOR SHALL FOLLOW TYPICAL DETAILS ON THIS SHEET.

REINFORCING STEEL

1. UNLESS OTHERWISE INDICATED ON PLANS AND/OR SCHEDULE, ALL REINFORCING STEEL SHALL BE HIGH STRENGTH GRADE DEFORMED BARS WHICH SHALL CONFORM TO THE STANDARD OF ASTM A615 GRADE 60.
2. LOW HYDROGEN WELDING RODS SHALL BE USED FOR ALL WELDING TO REINFORCING BARS.
3. REINFORCING SHALL BE SPLICED ONLY AS SHOWN OR NOTED. SPLICES AT OTHER LOCATIONS SHALL BE APPROVED BY THE ENGINEER UNLESS OTHERWISE NOTED. ALL CONTINUOUS BARS IN WALLS, SLABS, AND FOOTINGS SHALL BE LAPPED 40 BAR DIAMETERS AT ALL SPLICES, CORNERS, AND INTERSECTIONS.
4. ALL REINFORCING STEEL, ANCHOR BOLTS, AND OTHER INSERTS SHALL BE SECURED IN POSITION PRIOR TO PLACING CONCRETE.
5. MINIMUM CONCRETE PROTECTION FOR REINFORCING STEEL UNLESS OTHERWISE SHOWN:
CONCRETE CAST AGAINST EARTH _____ 3"
TOP BARS IN BOTTOM SLAB OR FOOTING _____ 2"
TOP AND BOTTOM BARS IN TOP SLAB _____ 2"
WALL - INTERIOR AND EXTERIOR _____ 2"

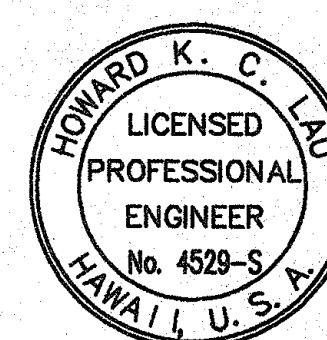
CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO ACI 318-95 AND AASHTO LRFD BRIDGE DESIGN SPECS., 2nd EDITION.
2. SLEEVES EXCEEDING ONE-THIRD THE SLAB OR WALL THICKNESS SHALL NOT BE PLACED IN STRUCTURAL CONCRETE UNLESS SPECIFICALLY DETAILED. PIPE MAY PASS THROUGH STRUCTURAL CONCRETE IN SLEEVES BUT SHALL NOT BE EMBEDDED THEREIN.
3. SECURE ALL BOLTS, ANCHORS, INSERTS, ETC. AND VERIFY ALL GROOVES, SLOTS, AND FINISHES PRIOR TO PLACING CONCRETE.
4. 48 HOURS PRIOR TO THE POURING OF ANY STRUCTURAL CONCRETE, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO AN INSPECTION CAN BE MADE OF ALL FORMS AND REINFORCING STEEL.
5. 28-DAY COMPRESSIVE STRENGTH AND MAXIMUM AGGREGATE SIZE OF CONCRETE SHALL BE AS FOLLOWS.

	STRENGTH (PSI)	MAX. AGGREGATE
BOTTOM SLAB, FOOTING	4,000	3/4"
TOP SLAB	4,000	3/4"
WALLS	4,000	3/4"
ALL OTHER STRUCTURAL CONCRETE	4,000	3/4"

FOUNDATION NOTES:

1. PRECAST MANHOLE STRUCTURES SHALL BEAR ON A MINIMUM 6 INCH THICK CUSHION LAYER CONSISTING OF No. 3B FINE GRAVEL (ASTM C33, No. 67 GRADATION).
2. SOME OF THE FOUNDATION EXCAVATIONS MIGHT ENCOUNTER SOFT AND/OR LOOSE SOIL DEPOSITS NEAR THE BOTTOM OF EXCAVATIONS. WHERE THIS SOFT AND/OR LOOSE SOILS ARE ENCOUNTERED AT THE BOTTOM OF THE EXCAVATION, THE SOFT AND/OR LOOSE SHALL BE OVER-EXCAVATED AND REPLACED WITH 24 INCHES OF No. 3B FINE GRAVEL WRAPPED IN A NON-WOVEN GEOTEXTILE FABRIC (MIRAFI 180N OR APPROVED EQUAL).
3. BACKFILL ALL AROUND MANHOLES SHALL BE GRANULAR SOILS LESS THAN 3 INCHES IN MAXIMUM DIMENSION. BACKFILL SHALL BE COMPACTED TO BETWEEN 90 AND 95 PERCENT RELATIVE COMPACTION. OVER COMPACTION OF THE BACKFILL MATERIAL SHALL BE AVOIDED.
4. SOIL DESIGN VALUES AS REPORTED BY THE SOILS INVESTIGATION REPORT BY GEOLABS-HAWAII DATED JUNE 19, 1999 AND USED IN THE DESIGN OF THE MANHOLES ARE AS FOLLOWS:
A. ALLOWABLE BEARING PRESSURE = 2,000 psf
B. AT-REST LATERAL EARTH PRESSURE (LEVEL BACKFILL) = 90 pcf (BELOW GROUNDWATER CONDITION)
C. COEFFICIENT OF FRICTION = 0.35
5. SOILS INVESTIGATION REPORT BY GEOLABS-HAWAII SHALL BE MADE A PART OF THESE PLANS. A COPY OF THIS REPORT IS AVAILABLE FROM THE CIVIL ENGINEER UPON REQUEST.



REVISIONS:

NOTES:

SHIGEMURA, LAU, SAKANASHI, HIGUCHI, AND ASSOCIATES, INC.
CONSULTING STRUCTURAL ENGINEERS
615 Piikoi Street-Suite 205-Honolulu, Hawaii 96814



PREPARED FOR RECORD

APPROVED FOR _____
OUTSIDE PLANT ENGINEER DATE _____
I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF HAWAII.
SIGNED _____
DATE _____ REG. No. 5448-C

ParEn, Inc.
dba Park Engineering
SUITE 300, WAIKIKIA PLAZA
267 SOUTH KING STREET
HONOLULU, HAWAII 96813
TELEPHONE: (808) 531-1676

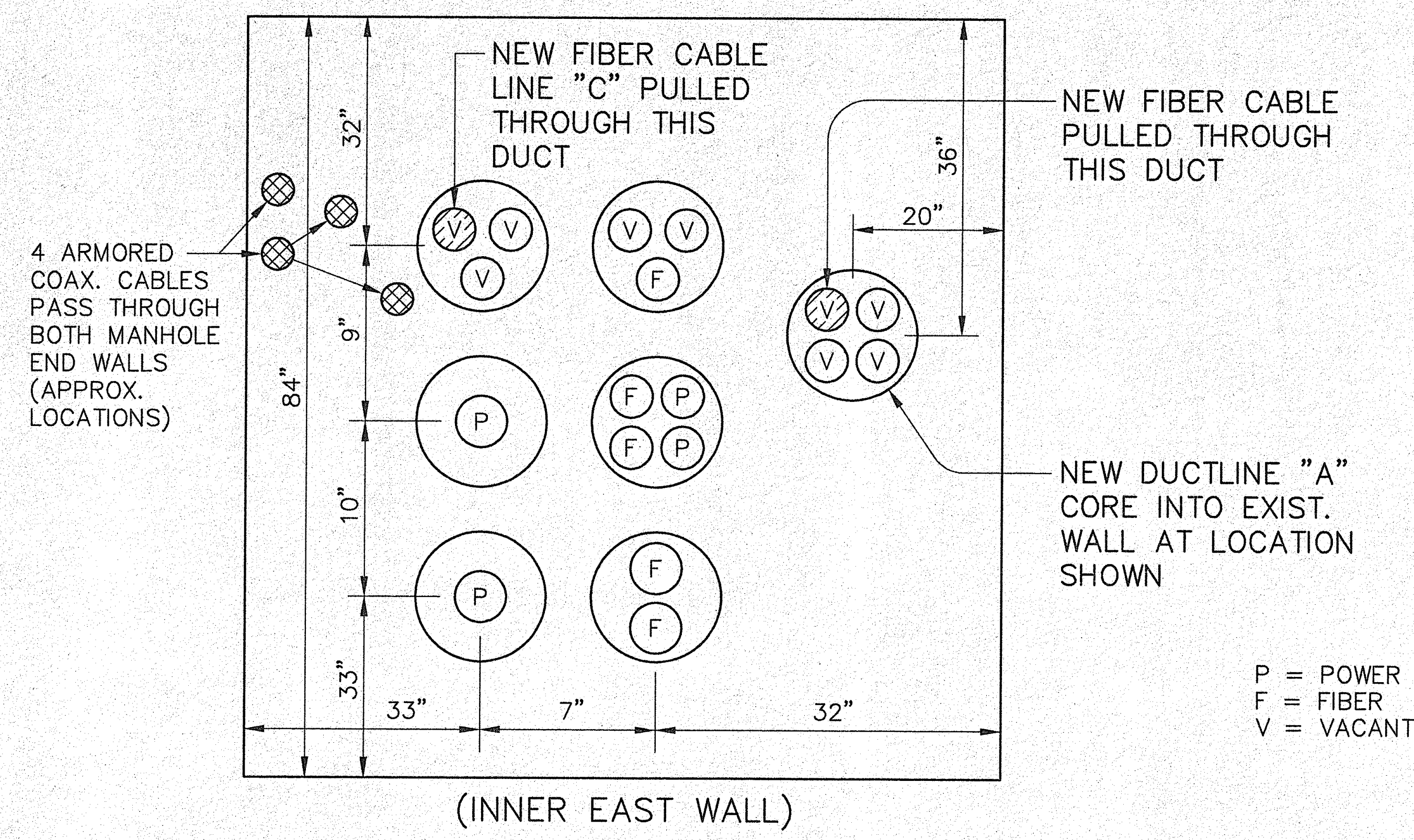
PROPRIETARY
USE PURSUANT TO COMPANY INSTRUCTIONS
SPECIFICATION WT35956
ESTIMATE 73

OWNERSHIP: -
CABLE GEO: H10206
CABLE CLLI: WNAEHU0004

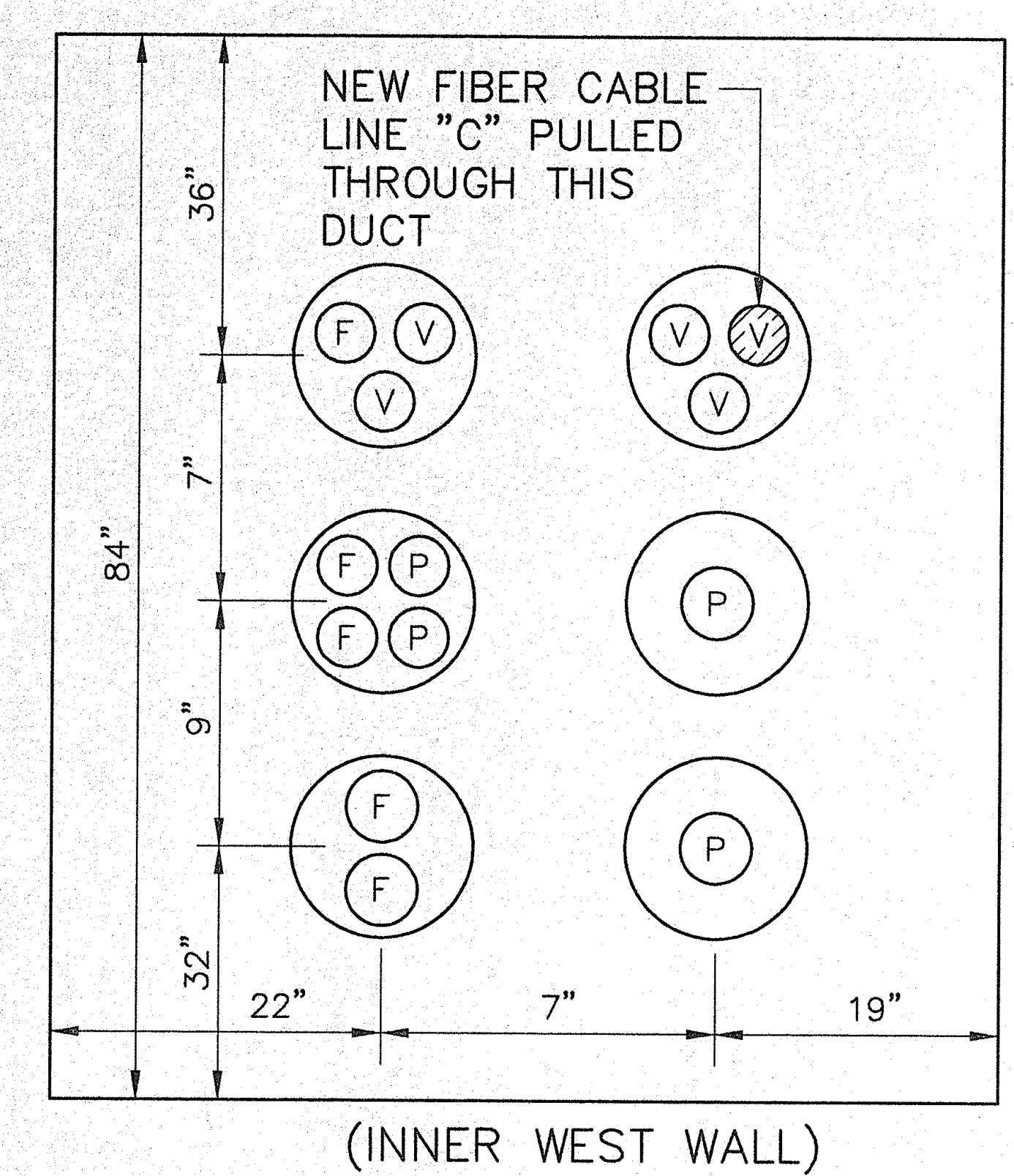
SCALE: AS SHOWN

MAKAHA CABLE STATION TO KEAWAULA CABLE STATION LIGHTGUIDE SYSTEM

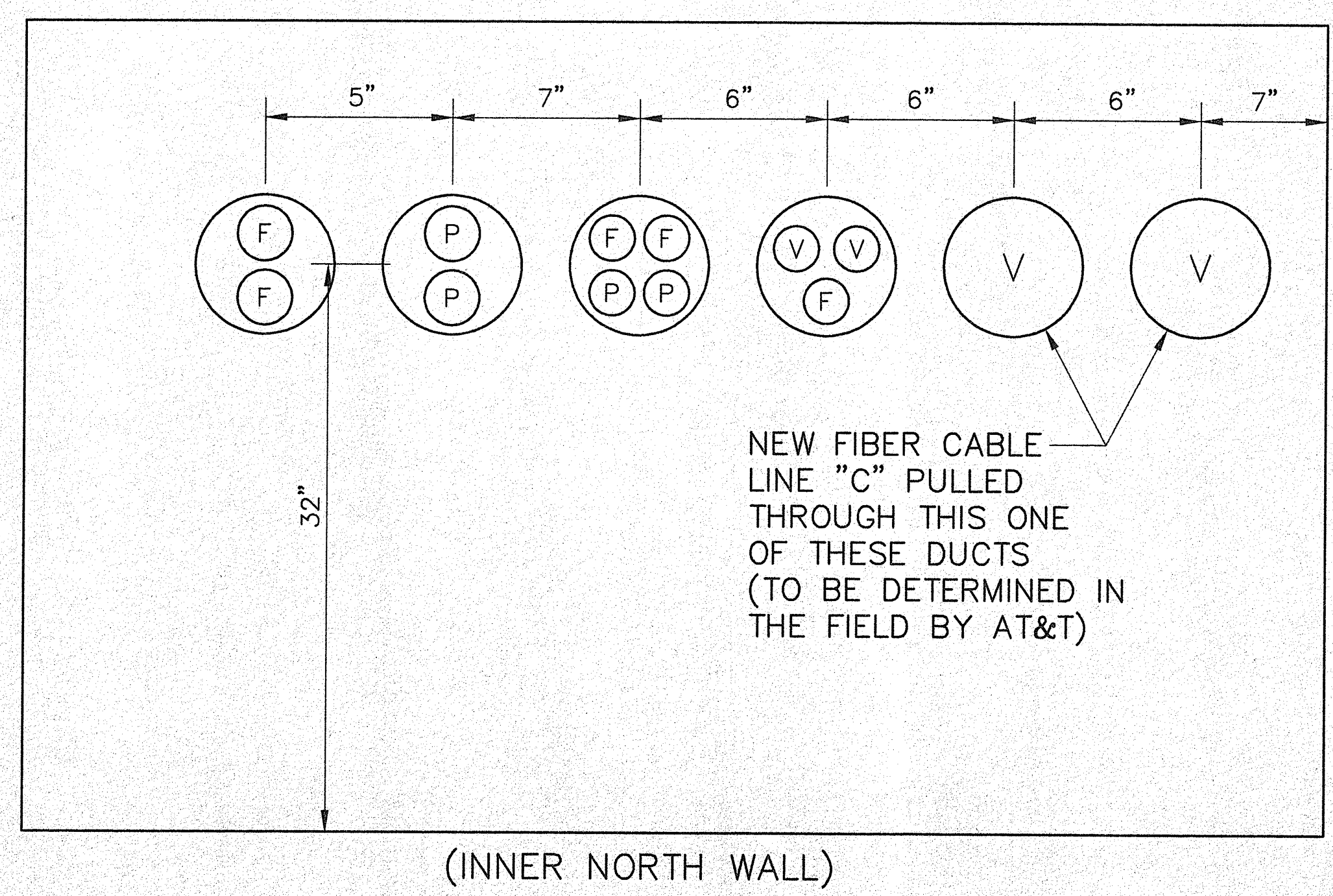
KEAWAULA TO MAKAHA FTA
SPECIAL DETAIL DRAWING



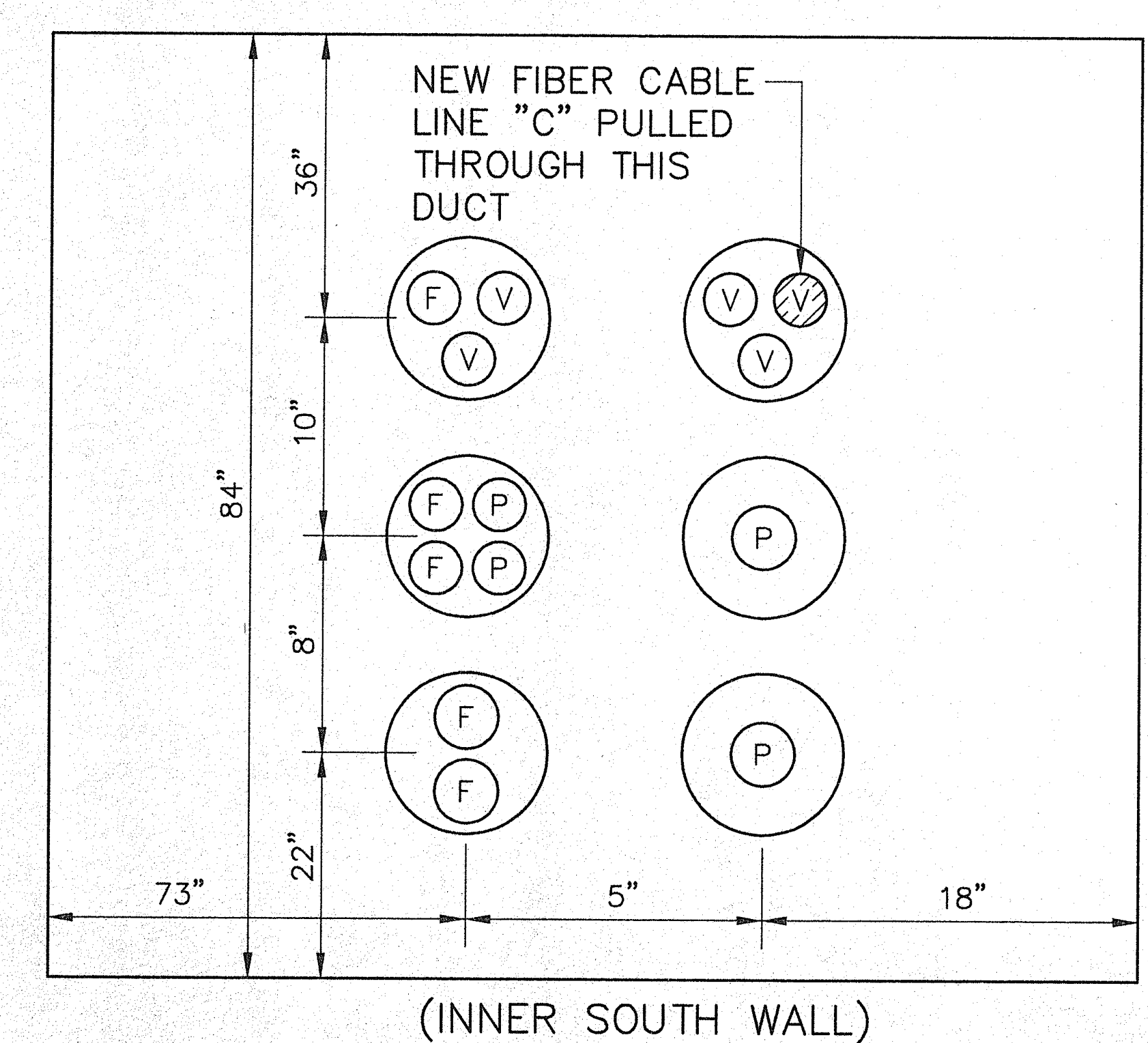
DETAIL "A"
BEACH MANHOLE AT KEAWAULA
(6'W X 12'L X 7'H)
NO SCALE



DETAIL "B"
KEAWAULA DRIVEWAY MANHOLE
(4'W X 8'L X 7'H)
NO SCALE



DETAIL "D"
KEAWAULA CABLE STATION BUILDING WALL
(LOOKING TOWARDS DRIVEWAY MANHOLE)
NO SCALE



DETAIL "C"
KEAWAULA DRIVEWAY MANHOLE
(4'W X 8'L X 7'H)
NO SCALE

REVISIONS:

NOTES:



PREPARED FOR RECORD

APPROVED FOR OUTSIDE PLANT ENGINEER DATE
I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF HAWAII.
SIGNED DATE 9/27/99 REG. NO. 5448-C

ParEn, Inc.
dba Park Engineering
SUITE 300 KAHANAHUA PLAZA
507 SOUTH KING STREET
HONOLULU, HAWAII 96813
TELEPHONE: (808) 531-1875

PROPRIETARY
USE PURSUANT TO COMPANY INSTRUCTIONS
SPECIFICATION WT 35956
ESTIMATE 73

OWNERSHIP: -
CABLE GEO: HIO206
CABLE CLI: WNAEHU0004

SCALE: AS SHOWN

MAKAHA CABLE STATION
TO KEAWAULA CABLE STATION
LIGHTGUIDE SYSTEM

MAKAHA TO KEAWAULA FTA
SPECIAL DETAIL DRAWING

WT 956D1101