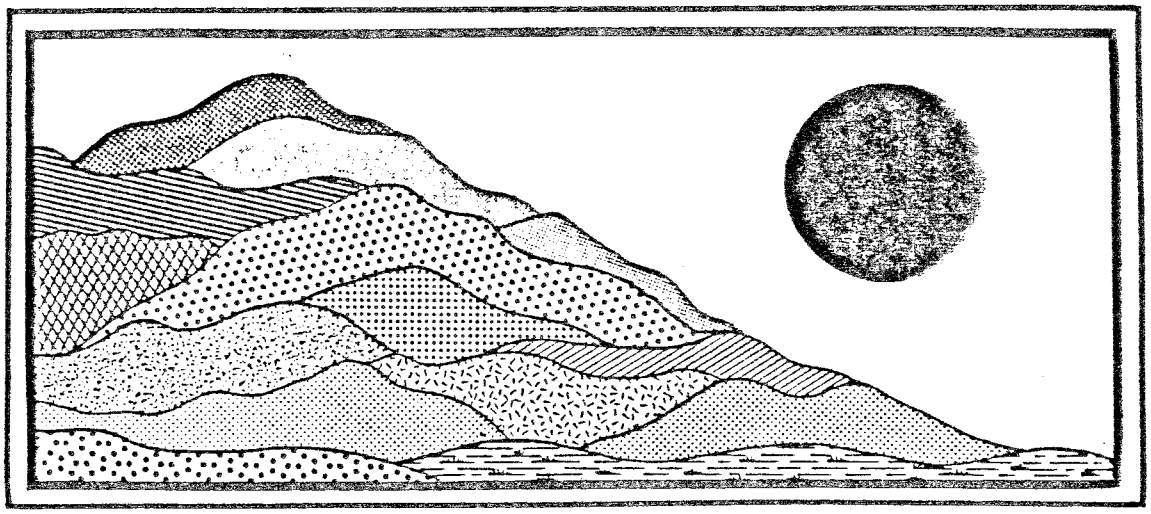
Dugg Hill Estates

Woodstock, Connecticut

February 1987



ENVIRONMENTAL REVIEW TEAM REPORT

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Dugg Hill Estates

Woodstock, Connecticut

Review Date: JANUARY 20, 1987

Report Date: FEBRUARY 1987

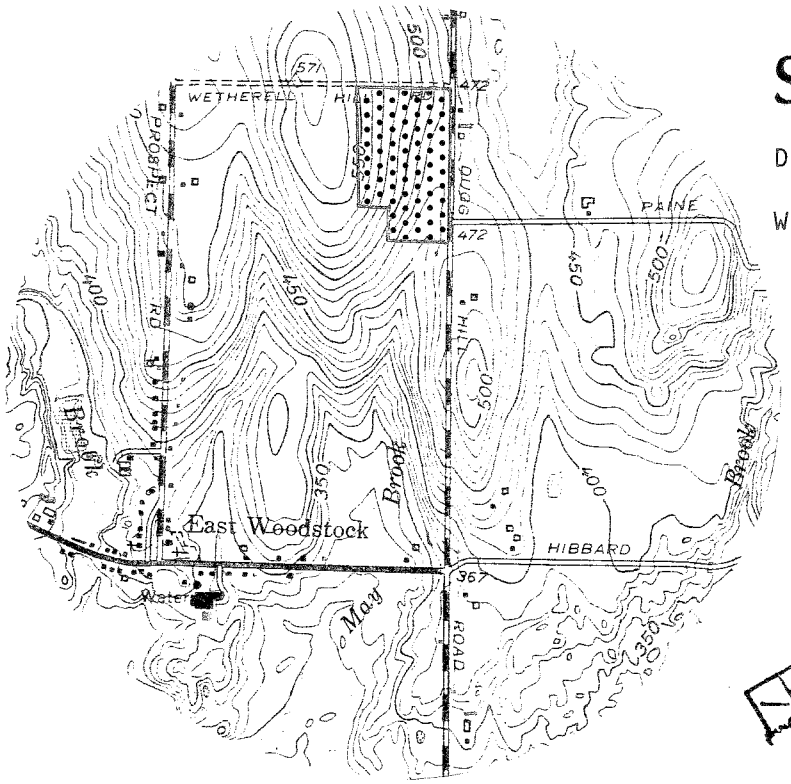
RC&D

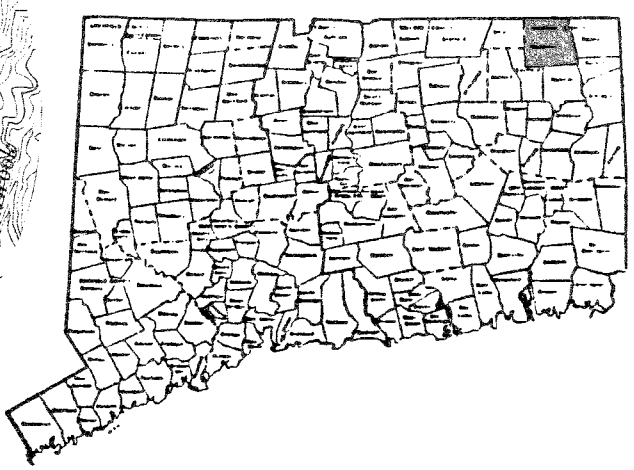
ENVIRONMENTAL REVIEW TEAM
PO BOX 198
BROOKLYN, CONNECTICUT 06234

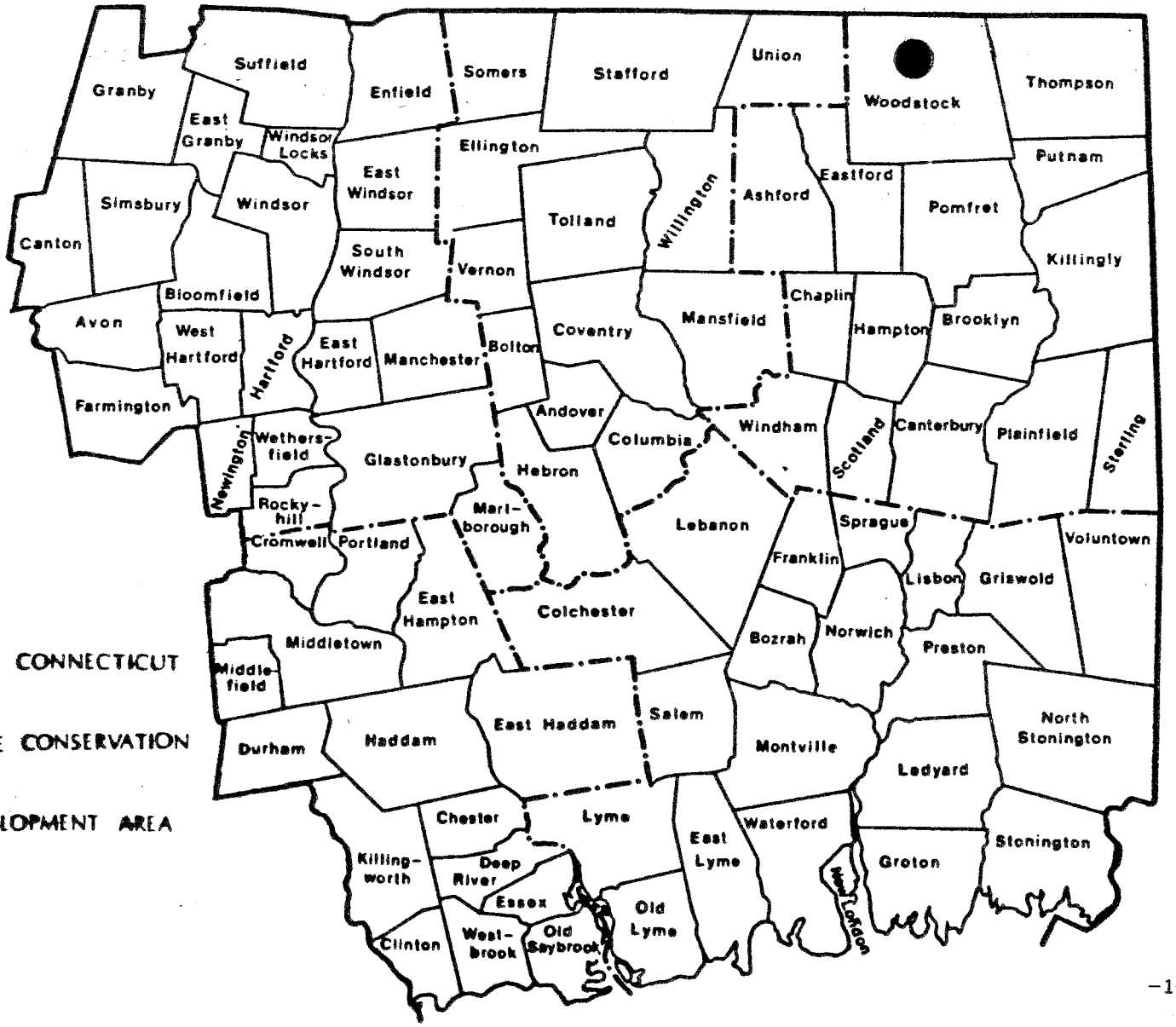
Site Location

DUGG HILL ESTATES

WOODSTOCK, CONNECTICUT







EASTERN CONNECTICUT

RESOURCE CONSERVATION

& DEVELOPMENT AREA

ENVIRONMENTAL REVIEW TEAM REPORT

ON

DUGG HILL ESTATES

WOODSTOCK, CONNECTICUT

THIS REPORT IS AN OUTGROWTH OF A REQUEST FROM THE WOODSTOCK PLANNING COMMISSION TO THE WINDHAM COUNTY SOIL AND WATER CONSERVATION DISTRICT (S&WCD). THE S&WCD REFERRED THIS REQUEST TO THE EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT (RC&D) AREA EXECUTIVE COMMITTEE FOR THEIR CONSIDERATION AND APPROVAL. THE REQUEST WAS APPROVED AND THE MEASURE REVIEWED BY THE EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM (ERT).

THE ERT MET AND FIELD CHECKED THE SITE ON TUESDAY, JANUARY 20, 1987. TEAM MEMBERS PARTICIPATING ON THIS REVIEW INCLUDED:

HOWARD DENSLOW	--DISTRICT CONSERVATIONIST - U.S.D.A., SOIL CONSERVATION SERVICE
ALFRED ROBERTS	--SOIL RESOURCE SPECIALIST - U.S.D.A., SOIL CONSERVATION SERVICE
ELAINE SYCH	--ERT COORDINATOR - EASTERN CONNECTICUT RC&D AREA
BILL WARZECHA	--GEOLOGIST - DEP, NATURAL RESOURCES CENTER

PRIOR TO THE REVIEW DAY, EACH TEAM MEMBER RECEIVED A SUMMARY OF THE PROPOSED PROJECT, A LIST OF THE TOWN'S CONCERNS, A LOCATION MAP, AND A TOPOGRAPHIC MAP. DURING THE FIELD REVIEW THE TEAM MEMBERS WERE GIVEN SOILS INFORMATION AND SITE PLANS. THE TEAM MET WITH, AND WERE ACCOMPANIED BY THE CHAIRMEN OF THE WOODSTOCK PLANNING COMMISSION AND THE INLAND WETLANDS AND WATERCOURSES AGENCY, A DISTRICT HEALTH OFFICIAL, THE APPLICANT AND HIS ENGINEER AND SURVEYOR. FOLLOWING THE REVIEW, REPORTS FROM EACH TEAM MEMBER WERE SUBMITTED TO THE ERT COORDINATOR FOR COMPILATION AND EDITING INTO THIS REPORT.

THIS REPORT REPRESENTS THE TEAM'S FINDINGS. IT IS NOT MEANT TO COMPETE WITH PRIVATE CONSULTANTS BY PROVIDING SITE DESIGNS OR DETAILED SOLUTIONS TO DEVELOPMENT PROBLEMS. THE TEAM DOES NOT RECOMMEND WHAT FINAL ACTION SHOULD BE TAKEN ON A PROPOSED PROJECT -- ALL FINAL DECISIONS AND CONCLUSIONS REST WITH THE TOWN AND LANDOWNER. THIS REPORT IDENTIFIES THE EXISTING RESOURCE BASE AND EVALUATES ITS SIGNIFICANCE TO THE PROPOSED DEVELOPMENT, AND ALSO SUGGESTS CONSIDERATIONS THAT SHOULD BE OF CONCERN TO THE DEVELOPER AND THE TOWN. THE RESULTS OF THIS TEAM ACTION ARE ORIENTED TOWARD THE DEVELOPMENT OF BETTER ENVIRONMENTAL QUALITY AND THE LONG-TERM ECONOMICS OF LAND USE.

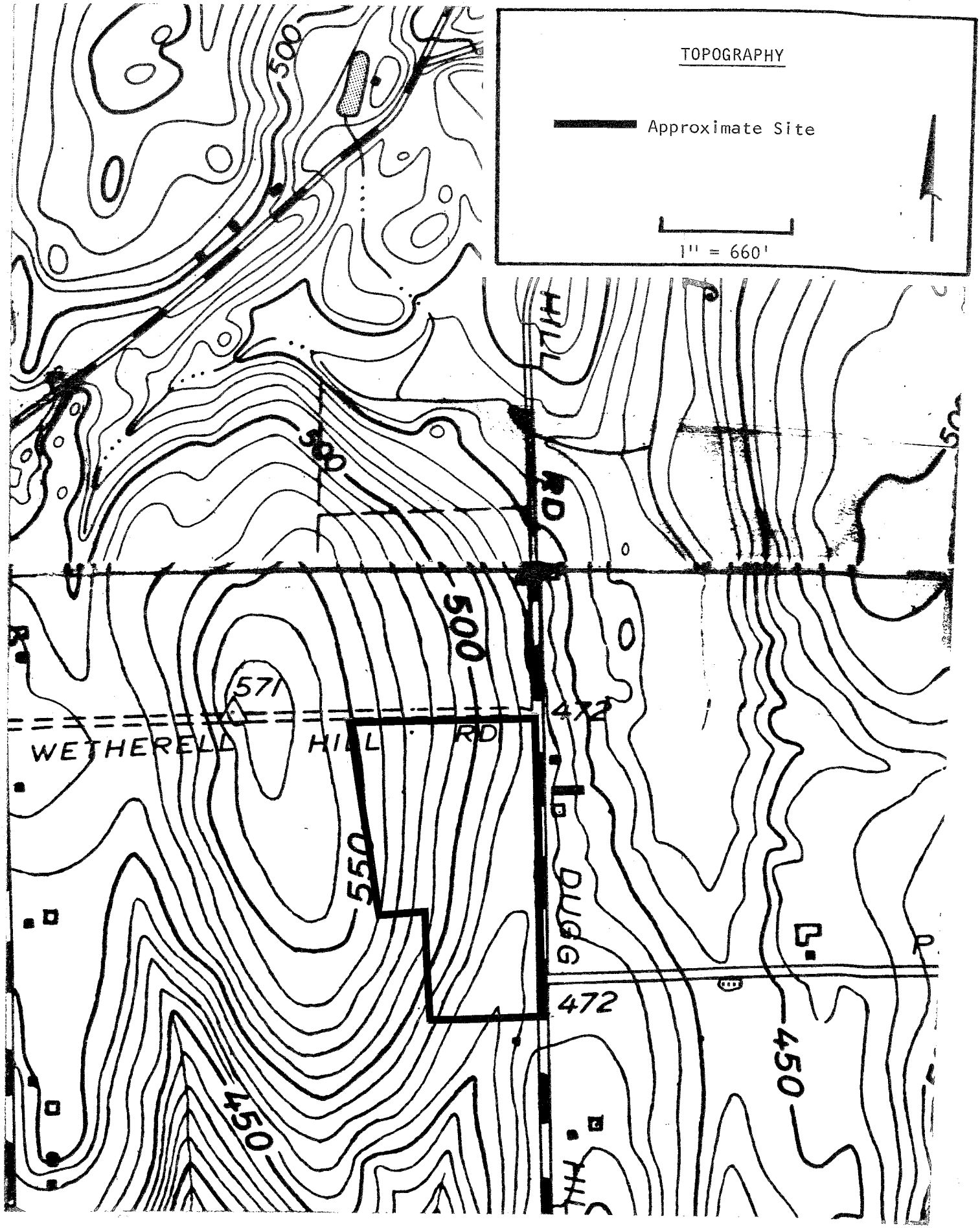
THE EASTERN CONNECTICUT RC&D EXECUTIVE COMMITTEE HOPES YOU WILL FIND THIS REPORT OF VALUE AND ASSISTANCE IN MAKING YOUR DECISIONS ON THIS PROPOSED SUBDIVISION.

IF YOU REQUIRE ANY ADDITIONAL INFORMATION, PLEASE CONTACT:

ELAINE A. SYCH
ERT COORDINATOR
EASTERN CONNECTICUT RC&D AREA
P. O. BOX 198
BROOKLYN, CT 06234
(203) 774-1253

TABLE OF CONTENTS

TABLE OF MAPS


TOPOGRAPHY
Approximate Site
1" = 660'
500
500
500
571
472
472
550
450
450
WETHERELL HILL RD
RD
DUGG

1. INTRODUCTION

THE EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM HAS BEEN ASKED BY THE WOODSTOCK PLANNING COMMISSION TO PERFORM AN ENVIRONMENTAL REVIEW OF THE PROPOSED **Dugg Hill Estates** SUBDIVISION.

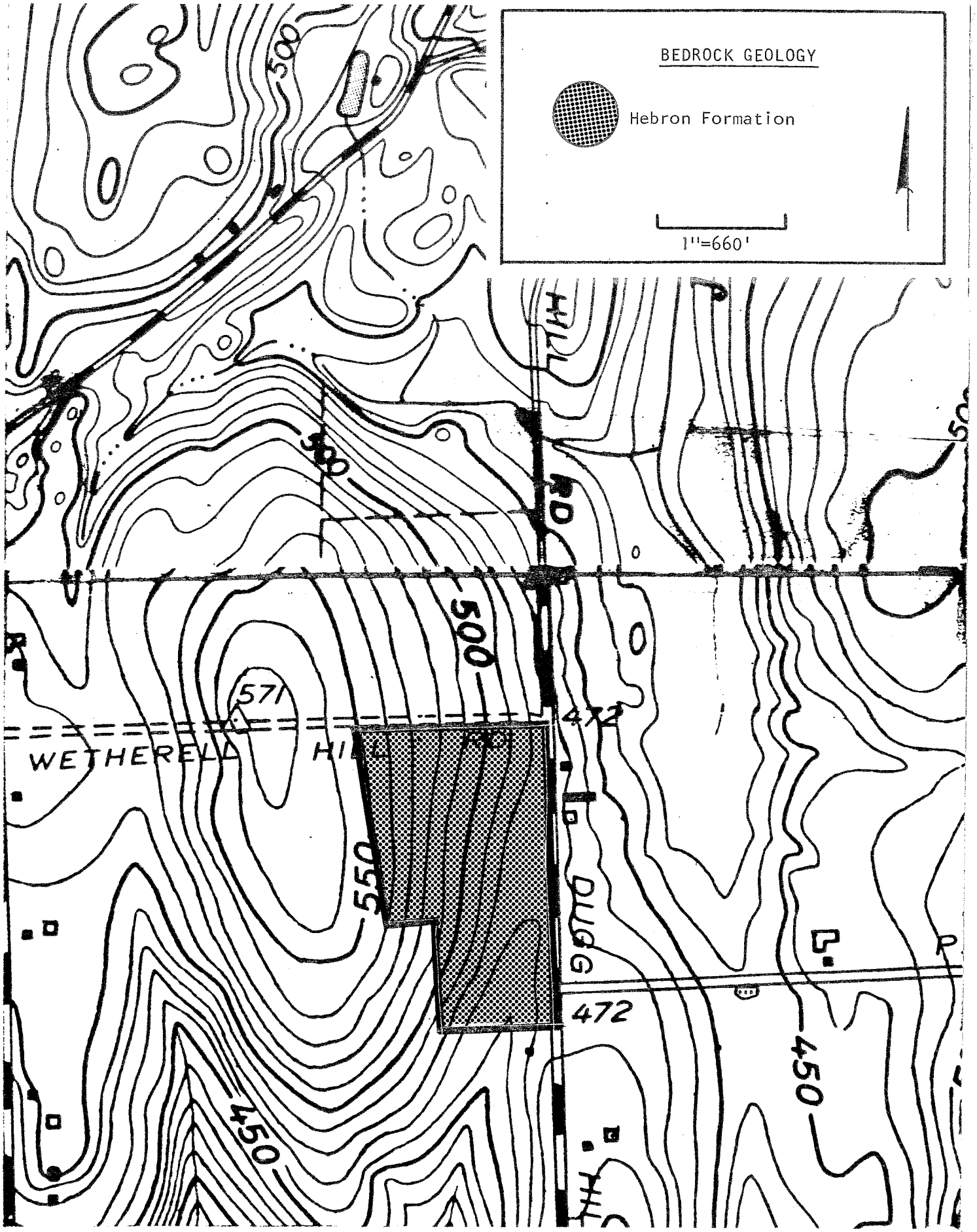
THE TOWN HAS ASKED FOR AN EVALUATION WITH REGARD TO THE SITE'S ABILITY TO HANDLE THE PROPOSED 17 LOTS. THIS REPORT FOCUSES ON CONCERNS AND RECOMMENDATIONS DEALING WITH THE LIMITATIONS AND POTENTIALS OF THE GEOLOGY, SOILS, HYDROLOGY, STORM WATER DRAINAGE, SEWAGE DISPOSAL AND WATER SUPPLY OF THE SITE.

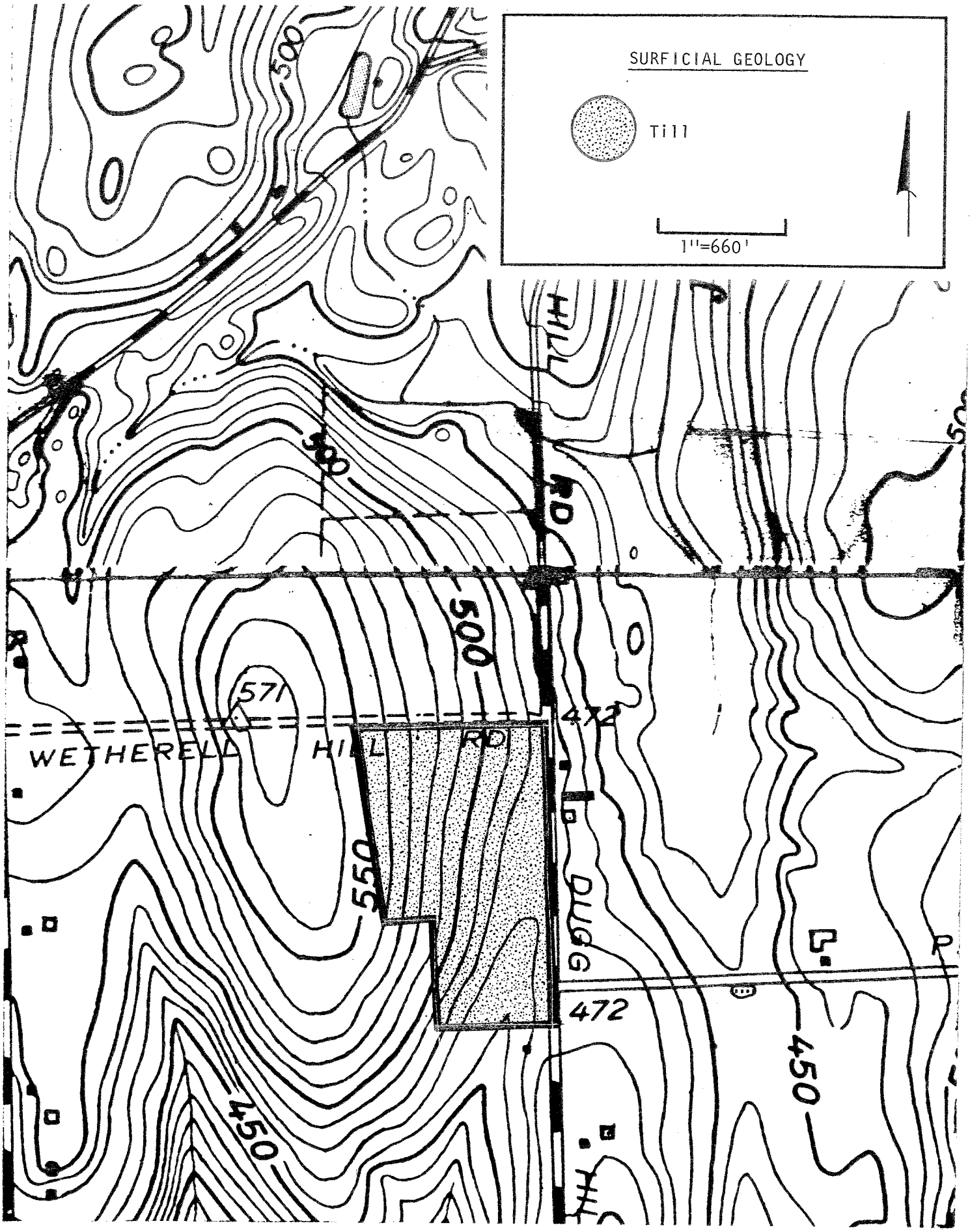
2. TOPOGRAPHY AND GEOLOGY

THE PROPOSED ± 30 ACRE SUBDIVISION LOCATED IN EAST WOODSTOCK, HAS FRONTAGE ALONG WETHERELL HILL ROAD (A.K.A., CHILD DOME ROAD) ON THE NORTH AND DUGG HILL ROAD ON THE EAST. THE SITE FLANKS THE EAST SIDE OF A GEOLOGIC FEATURE KNOWN AS A DRUMLIN; A LARGE, EGG-SHAPED HILL COMPOSED OF A GLACIAL SEDIMENT KNOWN AS TILL. THE TILL CONSISTS OF GROUND-UP ROCK FRAGMENTS AND PARTICLES WHICH WERE PLASTERED BY MOVING GLACIAL ICE ONTO THE UNDERLYING BEDROCK. BECAUSE OF THIS 'MODE OF DEPOSITION', A RELATIVELY SHALLOW "HARDPAN" LAYER IS PRESENT TWO (2) TO THREE (3) FEET BELOW GROUND SURFACE. THIS "HARDPAN" ZONE IS LOCATED BENEATH THE WEATHERED AND ROOTED SURFICIAL SOIL ZONE. THE TILL ON THE SITE IS PROBABLY QUITE THICK, PERHAPS FORTY (40) FEET OR MORE. ACCORDING TO PLANS SUBMITTED TO TEAM MEMBERS, REGULATED WETLAND SOILS HAVE BEEN FLAGGED ON THE SITE BY A CERTIFIED SOIL SCIENTIST AND THE BOUNDARIES SUPERIMPOSED ONTO THE SUBDIVISION PLAN. THESE SOILS, DELINEATED AS **Rn** (RIDGEBURY SOILS) REPRESENTS ABOUT SEVENTEEN PERCENT (17%) OF THE SITE.

ALTHOUGH THE SITE WAS COVERED BY SNOW, IT IS KNOWN THAT THE BEDROCK SURFACE DOES NOT BREAK GROUND SURFACE ON THE PARCEL, NOR IS IT CLOSE TO THE GROUND SURFACE.

THE BEDROCK GEOLOGY OF THE SITE IS DESCRIBED BY H. ROBERTA DIXON (MAP GQ-1562, BEDROCK GEOLOGIC MAP OF THE PUTNAM QUADRANGLE, WINDHAM COUNTY, 1982). DIXON CLASSIFIES THE UNDERLYING BEDROCK AS HEBRON FORMATION. IT IS DESCRIBED AS A DARK GRAY, GREENISH GRAY AND PURPLISH-GRAY, FINE TO MEDIUM GRAINED, THINLY LAYERED SCHIST. IT IS A CALC-SILICATE RICH ROCK WHOSE MAJOR MINERALS INCLUDE QUARTZ, ANDESINE, BIOTITE, EPIDOTE AND ACTINOLITE. A "SCHIST" IS A CRYSTALLINE ROCK, WHICH HAS PRONOUNCED FOLIATION; THAT IS, LAYERS RICH IN PLATY OR FLAKY MINERALS THAT ALTERNATE WITH THIN LAYERS OF GRANULAR MINERALS. BECAUSE THE BEDROCK SURFACE IS QUITE DEEP (POSSIBLY 40'), THE UNDERLYING BEDROCK SHOULD NOT POSE ANY MAJOR PROBLEM IN TERMS OF THE PROPOSED SUBDIVISION. IT WILL, HOWEVER, BE A SOURCE OF WATER FOR EACH LOT IN THE PROPOSED SUBDIVISION. AS A RESULT, IT IS EXPECTED TO HAVE SOME IMPACT ON WATER QUALITY AND QUANTITY OF WELLS DRILLED ON THE SITE. (SEE **Water Supply** SECTION).


BEDROCK GEOLOGY
Hebron Formation
1"=660'
500
HILL
RD
500
571
472
WETHERELL HILL
550
DUGG
472
450
450


SURFICIAL GEOLOGY
Till
1"=660'
500
HILL
RD
500
500
571
472
WETHERELL HILL RD
550
DUDG
472
450
450

SCS-CONS-15
OCTOBER 1974

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MAP

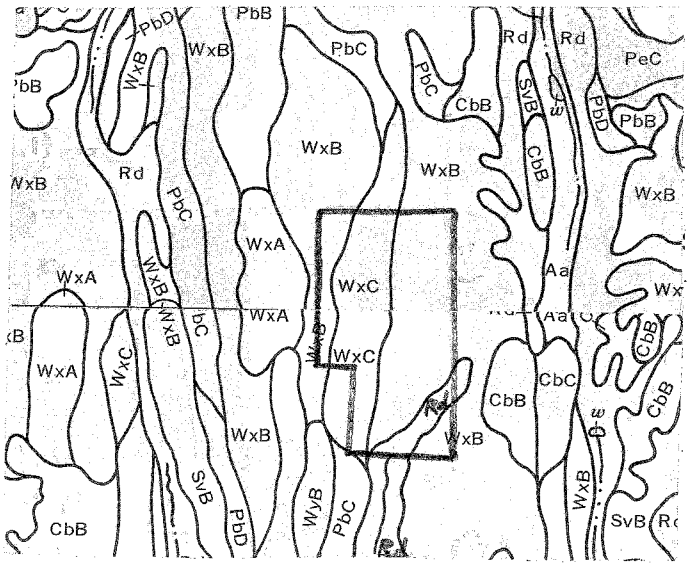
Duck Hill Estates Operator Robert Willis, Jr.

County Windham State Conn.

Soil survey sheet(s) or code nos. 2, 7 Approximate scale 1" = 1320'

N

Prepared by U. S. Department of Agriculture, Soil Conservation Service cooperating with Windham County Soil & Water Conservation District



* WxB - Woodbridge fine sandy loam, 3-8% slopes

** WxC - Woodbridge fine sandy loam, 8-15% slopes

*** Rd - Ridgebury fine sandy loam

* Prime Farmland

** Farmland Important in Connecticut

*** Wetland

3. SOILS

THE ATTACHED SOIL MAP, A COMPOSITE OF SOIL SURVEY SHEETS NUMBER 2 AND NUMBER 7 FROM THE WINDHAM COUNTY SOIL SURVEY REPORT, SHOW THE APPROXIMATE AREAS OF SOILS OVER THIS PARCEL. THE MORE DETAILED SOIL MAP SUPPLIED BY THE PROJECT ENGINEER WAS MADE BY A CONSULTING SOIL SCIENTIST AND WILL SHOW AREAS OF ALLOWABLE SOIL INCLUSIONS AS DESCRIBED IN THE ENCLOSED DESCRIPTION OF EACH SOIL DELINEATION. THIS DETAILED SOIL MAP HAS BEEN SUPERIMPOSED ON THE SUBDIVISION PLOT PLAN WITH BOUNDARIES OF SOIL INDICATED AS REGULATED INLAND-WETLANDS SURVEYED FROM ON-SITE FIELD MARKERS.

THE LANDSCAPE AT THIS SITE IS DRUMLOIDAL AND IS GENTLY SLOPING TO SLOPING. SLOPES RANGE FROM THREE (3) TO FIFTEEN PERCENT (15%) WITH AN AVERAGE SLOPE OF ABOUT SEVEN PERCENT (7%).

THE SOILS AT THIS SITE ARE MODERATELY WELL DRAINED TO POORLY DRAINED. THEY FORMED IN COMPACT GLACIAL TILL DERIVED MAINLY FROM SCHIST AND GNEISS. THESE SOILS HAVE FRIABLE LOAMY TOPSOIL AND SUBSOIL WITH A FIRM TO VERY FIRM LOAMY SUBSTRATUM. THIS FIRM SUBSTRATUM MAY BEGIN AT ANY DEPTH BETWEEN 15 AND 36 INCHES AND CONTINUE TO DEPTHS GREATER THAN 60 INCHES. THE DEPTH TO THE START OF THIS FIRM SUBSTRATUM IS COMMONLY AROUND 20 INCHES FROM THE SURFACE. THESE SOILS ALSO HAVE SEASONAL HIGH WATER TABLES FROM FALL TO SPRING. THESE TWO (2) ITEMS ARE THE MAIN SOIL LIMITATIONS AND CONCERNS THAT SHOULD BE ADDRESSED FOR THE PROPOSED USE OF THIS SITE. COUPLED WITH THE FIRM SUBSTRATUM AND THE SEASONAL HIGH WATER TABLE, THESE SOILS GENERALLY REQUIRE SPECIFIC DESIGNS FOR ON-LOT SEPTIC DISPOSAL.

ADDITIONAL CONCERNS ARE THE THREE (3) LOTS PROPOSED ON THE SOUTH END OF THE PARCEL - LOTS 1, 2 AND 3. BECAUSE OF THEIR PROXIMITY TO THE HEAD WATERS OF MAY BROOK, A MAJOR TRIBUTARY IN EAST WOODSTOCK, THE TOWN MAY WANT TO CONSIDER ASKING THE ENGINEER AND DEVELOPER TO REDESIGN THE PLAN SO THAT NONE OF THE WETLAND SOILS WILL BE DISTURBED IN THIS AREA. CURRENTLY, A DRIVE IS PLANNED THROUGH THE LARGER WETLAND SOIL AREA.

LISTED BELOW ARE SOIL MAP SYMBOLS USED IN THE PUBLISHED SOIL SURVEY REPORT WITH THEIR CURRENT INTERPRETIVE NAMES.

***WxB - Woodbridge fine sandy loam, 3 to 8 percent slopes.**
WxC - Woodbridge fine sandy loam, 8 to 15 percent slopes.
#Rd - Ridgebury fine sandy loam.

DETAILED SOIL MAP UNIT DESCRIPTIONS:

WxB - Woodbridge fine sandy loam, 3 to 8 percent slopes.
THIS SOIL IS GENTLY SLOPING AND MODERATELY WELL DRAINED. IT IS ON TOPS AND LOWER SIDE SLOPES OF LARGE DRUMLINS AND HILLS ON GLACIAL TILL UPLANDS. THE AREAS ARE MOSTLY LONG AND NARROW AND RANGE FROM 3 TO 50 ACRES.

TYPICALLY, THE SURFACE LAYER IS VERY DARK GRAYISH BROWN FINE SANDY LOAM 8 INCHES THICK. THE SUBSOIL IS MOTTLED, DARK YELLOWISH BROWN AND YELLOWISH

BROWN FINE SANDY LOAM 22 INCHES THICK. THE SUBSTRATUM IS FIRM AND VERY FIRM, OLIVE GRAY FINE SANDY LOAM AND GRAVELLY FINE SANDY LOAM TO A DEPTH OF 60 INCHES OR MORE.

INCLUDED WITH THIS SOIL IN MAPPING ARE SMALL AREAS OF WELL DRAINED PAXTON SOILS, MODERATELY WELL DRAINED SUTTON SOILS, AND POORLY DRAINED LEICESTER AND RIDGEBURY SOILS. A FEW AREAS HAVE A SURFACE LAYER AND SUBSOIL OF SILT LOAM. INCLUDED AREAS MAKE UP ABOUT 15 PERCENT OF THE UNIT.

THIS WOODBRIDGE SOIL HAS A SEASONAL HIGH WATER TABLE AT A DEPTH OF ABOUT 20 INCHES FROM FALL TO SPRING. IT HAS MODERATE AVAILABLE WATER CAPACITY. THE SOIL HAS MODERATE PERMEABILITY IN THE SURFACE LAYER AND SUBSOIL AND SLOW TO VERY SLOW PERMEABILITY IN THE SUBSTRATUM. RUNOFF IS MEDIUM. THE SOIL IS VERY STRONGLY ACID TO MEDIUM ACID IN THE SURFACE LAYER AND SUBSOIL AND VERY STRONGLY ACID TO SLIGHTLY ACID IN THE SUBSTRATUM.

THE WATER TABLE AND THE SLOW OR VERY SLOW PERMEABILITY IN THE SUBSTRATUM ARE THE MAIN LIMITATIONS OF THIS SOIL FOR COMMUNITY DEVELOPMENT, ESPECIALLY FOR ON-SITE SEPTIC SYSTEMS. LAWNS ON THIS SOIL ARE SOGGY IN THE AUTUMN AND SPRING AND AFTER HEAVY RAINS.

WxC - Woodbridge fine sandy loam, 8 to 15 percent slopes. THIS SOIL IS SLOPING AND MODERATELY WELL DRAINED. IT IS ON SIDE SLOPES OF LARGE DRUMLINS AND HILLS ON GLACIAL TILL UPLANDS. THE AREAS ARE MOSTLY LONG AND NARROW AND RANGE FROM 3 TO 25 ACRES.

TYPICALLY, THE SURFACE LAYER IS VERY DARK GRAYISH BROWN FINE SANDY LOAM 8 INCHES THICK. THE SUBSOIL IS DARK YELLOWISH BROWN AND YELLOWISH BROWN FINE SANDY LOAM 22 INCHES THICK. THE SUBSTRATUM IS FIRM AND VERY FIRM, OLIVE GRAY FINE SANDY LOAM AND GRAVELLY FINE SANDY LOAM TO A DEPTH OF 60 INCHES OR MORE.

INCLUDED WITH THIS SOIL IN MAPPING ARE SMALL AREAS OF WELL DRAINED PAXTON SOILS, MODERATELY WELL DRAINED SUTTON SOILS, AND POORLY DRAINED RIDGEBURY SOILS. INCLUDED AREAS MAKE UP ABOUT 10 PERCENT OF THE UNIT.

THIS WOODBRIDGE SOIL HAS A SEASONAL HIGH WATER TABLE AT A DEPTH OF ABOUT 20 INCHES FROM FALL TO SPRING. IT HAS MODERATE AVAILABLE WATER CAPACITY. THE SOIL HAS MODERATE PERMEABILITY IN THE SUBSTRATUM. RUNOFF IS RAPID. THIS SOIL IS VERY STRONGLY ACID TO MEDIUM ACID IN THE SURFACE LAYER AND SUBSOIL AND VERY STRONGLY ACID TO SLIGHTLY ACID IN THE SUBSTRATUM.

THE SEASONAL HIGH WATER TABLE, SLOPE, AND THE SLOW OR VERY SLOW PERMEABILITY IN THE SUBSTRATUM ARE THE MAIN LIMITATIONS OF THIS SOIL FOR COMMUNITY DEVELOPMENT, ESPECIALLY FOR ON-SITE SEPTIC SYSTEMS. LAWNS ON THIS SOIL ARE SOGGY IN FALL AND SPRING AND AFTER HEAVY RAINS.

Rd - Ridgebury fine sandy loam. THIS SOIL IS NEARLY LEVEL AND POORLY DRAINED. IT IS ON CONCAVE SLOPES, IN DEPRESSIONS, AND IN SMALL DRAINAGEWAYS OF GLACIAL TILL UPLANDS. THE AREAS ARE IRREGULAR IN SHAPE AND RANGE FROM 10 TO 50 ACRES. THIS SOIL HAS SLOPES OF 0 TO 3 PERCENT.

TYPICALLY, THE SURFACE LAYER IS VERY DARK BROWN FINE SANDY LOAM 8 INCHES THICK. THE SUBSOIL IS MOTTLED, LIGHT BROWNISH GRAY FINE SANDY LOAM 8 INCHES THICK. THE SUBSTRATUM IS VERY FIRM TO FIRM, GRAYISH BROWN AND LIGHT BROWNISH GRAY FINE SANDY LOAM AND SANDY LOAM TO A DEPTH OF 60 INCHES FOR MORE.

INCLUDED WITH THIS SOIL IN MAPPING ARE SMALL AREAS OF MODERATELY WELL DRAINED SUTTON AND WOODBRIDGE SOILS, POORLY DRAINED LEICESTER SOILS, AND VERY POORLY DRAINED WHITMAN SOILS. ALSO INCLUDED ARE A FEW LARGE AREAS THAT HAVE A FRIABLE SUBSTRATUM. INCLUDED AREAS MAKE UP ABOUT 10 PERCENT OF THE UNIT.

THIS RIDGEBURY SOIL HAS A SEASONAL HIGH WATER TABLE AT A DEPTH OF ABOUT 10 INCHES FROM FALL TO SPRING. THIS SOIL HAS MODERATE OR MODERATELY RAPID PERMEABILITY IN THE SURFACE LAYER AND SUBSOIL AND SLOW TO VERY SLOW PERMEABILITY IN THE SUBSTRATUM. RUNOFF IS SLOW. THE SOIL HAS MODERATE AVAILABLE WATER CAPACITY AND IS VERY STRONGLY ACID TO MEDIUM ACID.

THE SEASONAL WATER TABLE AND THE SLOW TO VERY SLOW PERMEABILITY OF THE SUBSTRATUM ARE MAJOR LIMITATIONS OF THIS SOIL FOR COMMUNITY DEVELOPMENT, EXPECIALLY FOR ON-SITE SEPTIC SYSTEMS. STEEP SLOPES OF EXCAVATIONS IN THIS SOIL SLUMP WHEN SATURATED. LAWNS ARE COMMONLY SOGGY IN FALL AND SPRING AND AFTER HEAVY RAINS DURING THE SUMMER.

4. RESOURCE CONCERNS

TO DEVELOP BUILDING LOTS AND CONSTRUCT HOMES ON THIS SEASONALLY WET GROUND WILL REQUIRE SPECIAL PRECAUTIONS. FOR EXAMPLE, ANY CELLAR HOLES EXCAVATED IN LATE WINTER/SPRING CAN BE EXPECTED TO FILL WITH WATER DUE TO THE PERCHED GROUNDWATER TABLE.

DURING THIS TIME OF YEAR (WINTER/SPRING) DISTURBED GROUND (BARE SOIL) CAN BE EXPECTED TO BE VERY SLIPPERY. IT WOULD BE BEST TO DISTURB GROUND FOR THE CELLAR, SEPTIC FIELD INSTALLATION, AND DRIVEWAY IN DRIER SUMMER MONTHS. ALL GRADING SHOULD BE DONE IN TIME TO SEED, AND/OR HAY MULCH TO BE PLACED IN BARE AREAS BEFORE THE END OF OCTOBER. CELLAR FOUNDATION FOOTING DRAINS SHOULD BE INSTALLED WITH PREDETERMINED ADEQUATE OUTLET LOCATIONS THAT WILL NOT HARM A DOWNSLOPE NEIGHBOR.

SURFACE RAINFALL RUNOFF WILL BE INCREASED DUE TO GROUND DISTURBANCE DURING CONSTRUCTION AND NEW IMPERVIOUS SURFACES. DEVELOPMENT WILL CAUSE LANDSCAPE ALTERATIONS TO THE EXTENT THAT SURFACE AND GROUNDWATER WILL BE DIRECTED OFF THE HILLSIDE MORE QUICKLY. CONSTRUCTING A STABLE DRAINAGE SWALE ACROSS THE TOP OF THE DEVELOPMENT IS A GOOD IDEA. THIS WILL HELP KEEP THE UPPER LOTS DRIER. THE SWALE RUNOFF WILL FLOW TO CHILD DOME ROAD, POSSIBLE DRIVEWAY RUNOFF FROM LOTS 13, 14, 15, 16, 17, AND ALTERING OF THE ROAD, IS LIKELY TO INCREASE THE FLOW DOWN THE ROADSIDE. THE PROPOSED DRAINAGE SWALE ON THE SOUTHSIDE OF THE ROAD MAY NEED PAVING OR RIPRAPPING BASED ON VELOCITY CALCULATIONS. PERHAPS A BETTER AND SAFER IDEA IS A STORM SEWER LINE WHICH COULD BE INSTALLED UP THIS HILL. WITH A STORM SEWER LINE, THE DRAINAGE SWALE

ON THE NORTH EDGE OF THE ROAD COULD BE NEARLY ELIMINATED. THE TOWN SHOULD BE ASSURED THAT THE DRAINAGE SWALE RUNNING ALONG THE EDGE OF DUGG HILL ROAD NORTH OF CHILD DOME ROAD CAN HANDLE THE INCREASED STORM FLOW, ALSO THE CULVERTS UNDER DUGG HILL ROAD CAN ACCEPT THE FLOW. THE DEVELOPER'S ENGINEER INDICATED HE WOULD PROVIDE CALCULATIONS TO THE TOWN. THE TOWN SHOULD CONSIDER BONDING ALL WORKING IMPROVEMENTS TO CHILD DOME ROAD.

THE UPSLOPE DRAINAGE SWALE, WHERE IT OUTLETS TO THE WETLANDS ALONG THE SOUTHSIDE OF THE DEVELOPMENT, SHOULD EXIT OVER ROCK TO SLOW ITS FLOW INTO THE WETLANDS AND PREVENT EROSION. THE TYPICAL DRAINAGE SWALE DETAIL ON THE PLANS SHOWS MODIFIED RIPRAP IN THE SWALE. USE OF THIS, PREFERABLY PLACED IN A 6 INCH BED OF GRAVEL BINDER, WILL BE ESPECIALLY IMPORTANT WHERE THE SWALE TURNS DOWN THE SLOPE.

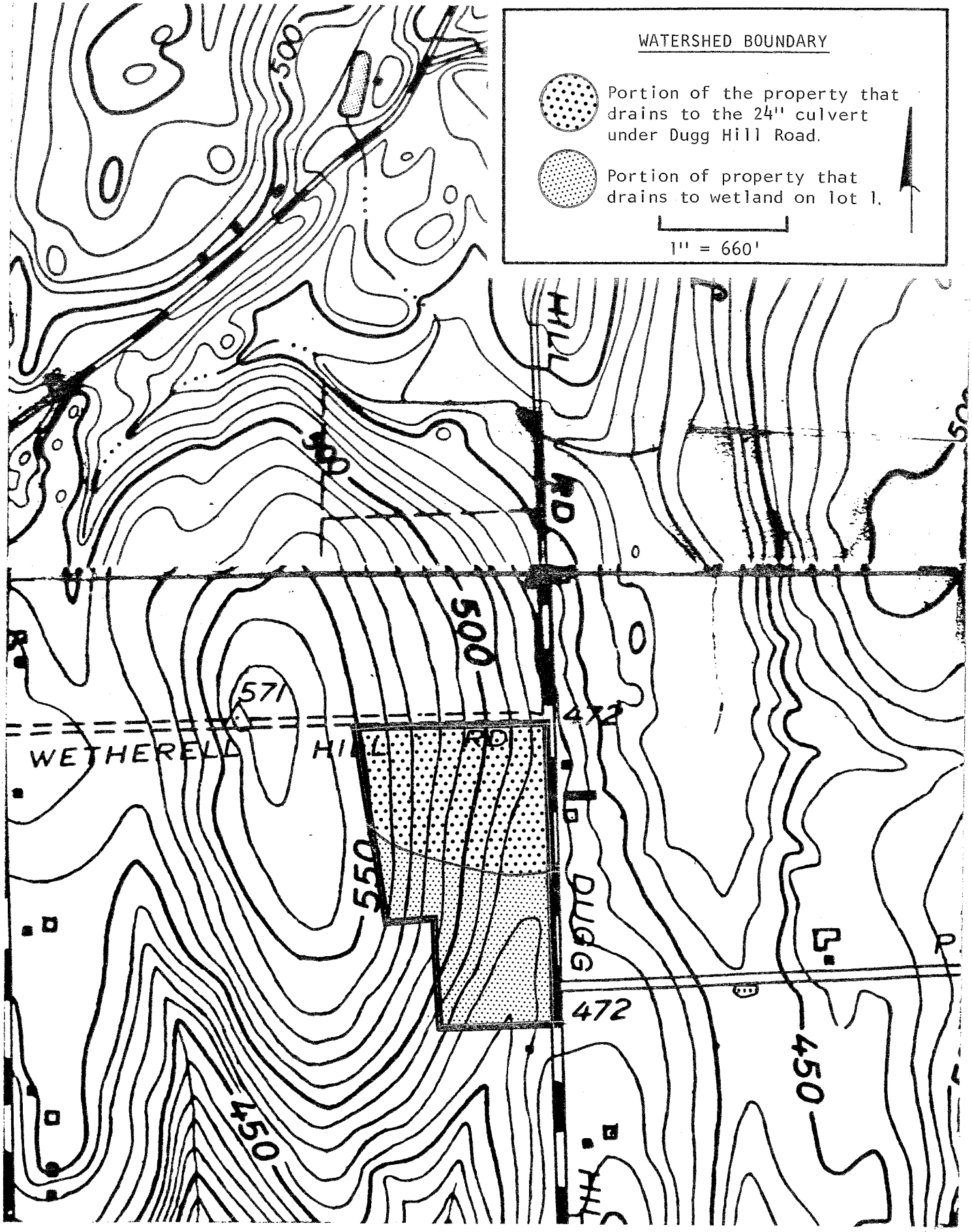
THE WOODSTOCK INLAND WETLANDS COMMISSION AND THE ENVIRONMENT REVIEW TEAM CONSIDERED REQUIRING A HYDRAULIC ANALYSIS OF THE MOVEMENT OF WATER ON THE HILLSIDE TO THE WETLANDS HEADING THE FLOW IN MAY BROOK. THE TOPOGRAPHY OBVIOUSLY DIRECTS SURFACE AND GROUNDWATER TO THIS AREA. RETENTION OF THE RIDGEWAY AND WHITMAN WETLAND SOILS AS A NATURAL WETLAND SPONGE AND FILTER WOULD BE BEST. IT IS SUGGESTED THAT LOTS 1, 2, AND 3 BE RE-DESIGNED TO MAKE TWO (2) LOTS, THUS HAVING ONE OR TWO DRIVES AT THE UPPER END OF THIS WETLAND AREA. ANOTHER ALTERNATIVE IS TO ELIMINATE PLACING A DRIVEWAY SEVERAL HUNDRED FEET ACROSS THE WETLAND SOIL AS PRESENTLY PROPOSED. TO LOSE ONE LOT SEEMS A FAIR COMPROMISE TO AVOID A DELAY FOR HYDRAULIC ANALYSIS, AND HAVE PERMITTED USE OF RECOGNIZED UPSLOPE WETLAND AREAS.

CONTROLLING EROSION WILL BE EXTREMELY IMPORTANT WHEN DEVELOPING THIS SUBDIVISION. IT IS SUGGESTED THAT A TOTAL EROSION AND SEDIMENT CONTROL PLAN BE SUBMITTED FOR SUBDIVISION APPROVAL. CONTENTS WOULD BE BASED ON WOODSTOCK PLANNING REGULATION REQUIREMENTS. THE PLAN SHOULD STATE WHICH CONTROL MEASURES, INCLUDING CHILD DOME ROAD WORK (STORM DRAINAGE TO ACCEPT TOP OF HILL DRAINAGE SWALE), WILL BE INSTALLED FIRST BEFORE BUILDING BEGINS. IT IS OF THE UTMOST IMPORTANCE THAT MEASURES TO PREVENT OFF-SITE PROBLEMS FROM THE TOP SLOPE DRAINAGE SWALE, SWALE OUTLETS, CHILD DOME ROAD WORK AND WETLAND PROTECTION BE DONE DURING THE EARLY STAGES OF DEVELOPMENT. THE SOIL CONSERVATION SERVICE WILL CONSULT WITH THE DEVELOPER AND TOWN OFFICIALS ON APPROPRIATE CONTROLS.

5. HYDROLOGY

PRIOR TO THE PLACEMENT OF A 24" CONCRETE PIPE BENEATH DUGG HILL ROAD IN FRONT OF LOT 6, IT APPEARS THAT MOST OF THE ± 30 ACRE SITE DRAINED TO THE WETLAND AREA AT THE SOUTHERN LIMITS (LOTS 1 AND 2). THIS WETLAND FORMS THE HEADWATER REGION FOR MAY BROOK. THE PLACEMENT OF THE 24 INCH CONCRETE PIPE NOW INTERCEPTS SURFACE WATER FROM THE NORTHERN HALF OF THE SITE AND ROUTES IT TO THE EASTSIDE OF DUGG HILL ROAD. IT ULTIMATELY EMPTIES TO A WETLAND AREA BEHIND MONTOWESE FARMS, WHICH FORMS THE HEADWATER REGION FOR JORDAN BROOK.

THE SUBDIVISION OF THE PARCEL AS PLANNED, FOLLOWED BY CONSTRUCTION OF NEW HOMES, DRIVEWAYS, ETC., WOULD BE EXPECTED TO LEAD TO SOME INCREASES IN RUNOFF FROM THE SITE. ORDINARILY, THE TEAM'S GEOLOGIST WOULD RECOMMEND THAT


WATERSHED BOUNDARY
Portion of the property that drains to the 24" culvert under Dugg Hill Road.
Portion of property that drains to wetland on lot 1.
1" = 660'
500
HILL
RD
500
571
472
WETHERELL
HILL
RD
550
DUGG
472
450
450

CONSIDERATION BE GIVEN TO MEASURES THAT WOULD MITIGATE THE EFFECTS OF THESE INCREASES (E.G., A STORM WATER DETENTION BASIN). AS MENTIONED EARLIER, DRAINAGE ON THE SITE IS DIVIDED BETWEEN TWO (2) SUBWATERSHED AREAS. IT IS ESTIMATED THAT A LITTLE OVER 60% OF THE LOTS WOULD DRAIN TO THE 24" PIPE IN FRONT OF LOT 6. THE OUTLET STREAM FOR THE CULVERT ROUTES THE WATER TO A WETLAND ABOUT 1,000 FEET EAST OF THE PROPERTY. THE REMAINDER OF THE LOTS ON THE SITE DRAIN TO THE WETLAND AT THE SOUTHERN BORDER OF THE SITE. BOTH WETLAND AREAS HAVE THE ABILITY TO NATURALLY DETAIN THE POST-DEVELOPMENT RUNOFF FLOWS FROM THE SITE DURING RAINY PERIODS. IN ADDITION, THE OVERALL DENSITY IN EACH SUBWATERSHED IS RELATIVELY LOW. THEREFORE, IT SEEMS LIKELY THAT ANY PEAK FLOWS WOULD BE SMALL. UNDER THESE CIRCUMSTANCES, RUNOFF RETENTION DOES NOT SEEM NECESSARY. HOWEVER, A CLOSE LOOK AT THE 24" PIPE BY THE PROJECT ENGINEER IS WARRANTED. PRE AND POST-DEVELOPMENT RUNOFF CALCULATIONS SHOULD BE CALCULATED BY THE PROJECT ENGINEER TO ASSURE THAT FLOODING CONDITIONS DO NOT OCCUR AT THIS POINT.

SLOPES FLANKING THE CENTRAL PARTS OF THE SITE ARE MODERATE. FOR THIS REASON, EVERY EFFORT SHOULD BE MADE TO PREVENT POTENTIAL EROSION AND SILTATION PROBLEMS. IN THIS REGARD, IT IS STRONGLY RECOMMENDED THAT A COMPREHENSIVE EROSION AND SEDIMENT CONTROL PLAN BE DEVELOPED COVERING EACH STAGE OF THE PROPOSED DEVELOPMENT. DISTURBED AREAS SHOULD BE KEPT TO A MINIMUM UNDER THE SUBDIVISION PLAN BECAUSE OF THE ERODIBLE SOILS PRESENT. THE EROSION AND SEDIMENT CONTROL MEASURES CALLED FOR UNDER THE PLAN SHOULD BE SHOWN ON THE SUBDIVISION PLAN.

ACCORDING TO PRESENT PLANS, A TOTAL OF SEVEN (7) WETLAND DRIVEWAY CROSSINGS OF ABOUT 850 FEET WILL BE REQUIRED FOR ACCESS TO LOTS 1, 2, 4-7 AND 9. ALL WETLAND CROSSINGS WILL UNDOUBTEDLY REQUIRE FILLING WITH AT LEAST TWO (2) MAJOR WETLAND CROSSINGS. THE TWO (2) MAJOR CROSSINGS WILL OCCUR ON LOTS 1 AND 9.

WETLAND ROAD CROSSINGS ARE FEASIBLE, PROVIDED THEY ARE PROPERLY ENGINEERED. PROVISIONS SHOULD BE MADE FOR REMOVING UNSTABLE MATERIAL BENEATH THE ROADBED, BACKFILLING WITH A PERMEABLE ROAD BASE FILL MATERIAL AND INSTALLING CULVERTS AS NECESSARY. WHEN CROSSING ANY WETLANDS, THE ROADS SHOULD BE AT LEAST 1.5 FEET AND PREFERABLY 2 FEET ABOVE THE SURFACE ELEVATION OF WETLANDS. THIS WILL ALLOW FOR BETTER DRAINAGE OF THE ROAD. IT WILL ALSO DECREASE THE FROST HEAVING POTENTIAL OF THE ROAD. ROAD CONSTRUCTION THROUGH WETLANDS SHOULD PREFERABLY BE DONE DURING THE DRY TIME OF THE YEAR AND SHOULD INCLUDE PROVISIONS FOR EFFECTIVE EROSION AND SEDIMENT CONTROL.

MORE INFORMATION, I.E., AMOUNT OF FILL REQUIRED, CULVERT PLACEMENT, FILL LINES, ETC. SHOULD BE PROVIDED ON THE PLAN FOR REVIEW PURPOSES BY TOWN OFFICIALS. AS MENTIONED ABOVE THE MAJOR FILLINGS WOULD TAKE PLACE ON LOTS 1 AND 9. BECAUSE THE WETLAND ON LOT 1 HAS NATURAL CLEANSING ABILITIES AND WILL PROBABLY BE USEFUL FOR CONTROLLING POST DEVELOPMENT INCREASES IN RUNOFF FROM HOUSES CONSTRUCTED IN THE SOUTHERN PARTS, CONSIDERATION SHOULD BE GIVEN TO MINIMIZING THE PROPOSED WETLAND CROSSINGS IN THIS AREA. AS DISCUSSED ON THE REVIEW DAY, ONE ALTERNATIVE WOULD BE TO REDUCE THE NUMBER OF LOTS FROM 3 TO 2 AND PROVIDE ACCESS VIA NON-WETLAND SOILS.

6. GEOLOGIC DEVELOPMENT CONCERNS

THE MAJOR GEOLOGIC CONSTRAINT ON THE SITE IS THE WIDESPREAD PRESENCE OF COMPACT GLACIAL TILL. BECAUSE THE HARDPAN LAYER HAS A VERY LOW PERMEABILITY, PERCOLATING GROUNDWATER MOVES THROUGH THE TILL VERY SLOWLY. DURING THE WET TIME OF THE YEAR (SPRINGTIME), THE MORE PERMEABLE ZONE ABOVE THE COMPACT SOIL ZONE BECOMES SATURATED WITH GROUNDWATER. EXAMINATION OF AIR PHOTOS FOR THE SITE DATED MARCH 23, 1986 REVEALED NUMEROUS EAST FLOWING DRAINAGEWAYS ACROSS THE SITE. THESE WET AREAS APPARENTLY MARKED AREAS AT WHICH THE WATER TABLE HAS RISEN TO OR NEAR THE SURFACE. THE MAJOR CONCERN INVOLVING THE HIGH WATER TABLE IS THE POTENTIAL EFFECT UPON PROPER OPERATION OF SUBSURFACE SEWAGE DISPOSAL SYSTEMS. BASED ON SOILS DATA SUPPLIED TO TEAM MEMBERS, NEARLY ALL LOTS WILL REQUIRE ENGINEERED SEPTIC SYSTEMS. IT SEEMS LIKELY THAT THE PLACEMENT OF FILL ON THE SITES PROPOSED FOR LEACHING FIELDS WILL BE NECESSARY TO MAINTAIN REQUIRED DISTANCES ABOVE THE HIGH GROUNDWATER LEVEL. IN ADDITION, THE INSTALLATION OF CURTAIN DRAINS MAY ALSO BE USEFUL ON SOME LOTS. A PROPERLY DESIGNED AND CONSTRUCTED CURTAIN DRAIN, INSTALLED IN ACCORDANCE WITH THE STATE PUBLIC HEALTH CODE, CAN AID IN INTERCEPTING THE SEASONAL WATER TABLE SO THAT IT DOES NOT INTERFERE WITH THE FUNCTIONING OF THE LEACHING SYSTEM. A CURTAIN DRAIN WILL NEED TO BE CAREFULLY OUTLETTED.

ALTHOUGH PROPERLY ENGINEERED SEPTIC SYSTEMS CAN SURMOUNT HIGH GROUNDWATER LIMITATIONS, EXTREME CAUTION AND CAREFUL PLANNING IS WARRANTED. ENGINEERING SUPERVISION OF SEPTIC SYSTEMS INSTALLATION WILL BE AN IMPORTANT ASSURANCE OF SATISFACTORY PERFORMANCE.

ANOTHER WATER RELATED CONCERN ON THE SITE IS THE CHANCE FOR WET BASEMENTS DURING WET PERIODS. IN ORDER TO PREVENT WET BASEMENTS, IT IS SUGGESTED THAT BUILDING FOOTING DRAINS BE INCORPORATED FOR ALL HOUSE LOTS.

7. WATER SUPPLY

DOMESTIC WATER SUPPLIES ON ALL LOTS PROBABLY WOULD BE PROVIDED BY WELLS TAPPING THE UNDERLYING BEDROCK. YIELDS FROM SUCH WELLS DEPEND UPON THE NUMBER AND SIZE OF WATERBEARING FRACTURES ENCOUNTERED BY WELLS. ALTHOUGH THE SCHIST ROCK UNDERLYING THE SITE IS NOT A PROLIFIC AQUIFER, IT IS GENERALLY CAPABLE OF YIELD 2-5 GALLONS PER MINUTE WHICH SHOULD BE SUFFICIENT FOR DOMESTIC DEMANDS. A TYPICAL WELL DEPTH IS LIKELY TO PENETRATE 150 FEET OR MORE, BUT SOME WELLS MIGHT BE EXPECTED TO BE AS DEEP AS 200 FEET. IT SHOULD BE NOTED THAT THIS DOES NOT INCLUDE THE POSSIBLE $\pm$ 40 FEET OF OVERBURDEN ON THE SITE.

A PROPERLY CASED WELL, INSTALLED IN ACCORDANCE WITH STATE AND LOCAL REGULATION WOULD BE SAFE FROM EFFLUENT CONTAMINATION. SINCE SURFACE WATER CONTAMINATION CAN POSE A THREAT, WELLS WILL NEED TO BE CAREFULLY LOCATED. NATURAL GROUNDWATER QUALITY SHOULD BE GOOD, ALTHOUGH SOME POSSIBLITY OF ELEVATED IRON AND MANGANESE LEVELS MAY EXIST. SHOULD WELL WATER PROVE TO BE HIGH IN MINERAL CONTENT, SEVERAL FILTRATION METHODS ARE AVAILABLE TO OVERCOME PROBLEMS. ALSO, BECAUSE OF THE SITE'S PAST AGRICULTURAL HISTORY, WATER FROM BEDROCK WELLS MAY CONTAIN ELEVATED

NITRATE LEVELS. ELEVATED NITRATE LEVELS CAN CAUSE A DISEASE KNOWN AS "METHEMOGLOBINEMIA" IN ENFRANTS WHO HAVE BEEN GIVEN WATER OR FED FORMULA PREPARED WITH WATER HAVING HIGH NITRATES. IF NITRATE CONCENTRATION EXCEEDS THE 10 PART PER MILLION LEVEL IN DRINKING WATER, PREGNANT WOMEN AND CHILDREN UNDER ONE YEAR OF AGE SHOULD NOT DRINK THE WATER. IN THIS REGARD, CAREFUL REVIEW OF WATER QUALITY REPORTS BY LOCAL HEALTH AUTHORITIES IS WARRANTED.