

NASSAU COUNTY DEPARTMENT OF HEALTH

240 OLD COUNTRY ROAD, MINEOLA, N. Y., 11501

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BRIEFING REPORT ON WATER SUPPLY
NASSAU COUNTY, NEW YORK

DECEMBER 12, 1979

I. SOURCE OF WATER

A. HYDROLOGICAL CYCLE

1. RAINFALL

a. 44 INCHES PER YEAR OR 470 MGD AVERAGE FOR NASSAU

2. RUNOFF

a. 1 INCH PER YEAR OR 11 MGD AVERAGE FOR NASSAU

3. EVAPOTRANSPIRATION

a. 50 PERCENT OF RAINFALL OR 235 MGD AVERAGE FOR NASSAU

4. RECHARGE

a. APPROXIMATELY 50 PERCENT OF RAINFALL OR 224 MGD
AVERAGE FOR NASSAU

b. APPROXIMATELY 36 MGD FROM CESSPOOLS

B. HYDROGEOLOGIC UNITS (SEE FIGURE 1)

1. GLACIAL AQUIFER

a. UPPERMOST AQUIFER, 50 TO 250 FEET THICK.

b. 2.5 PERCENT OF PUBLIC SUPPLY PUMPAGE (1978)

2. JAMECO AQUIFER

a. UNDERLIES GLACIAL SOUTHWEST NASSAU, 0 TO 150 FEET THICK.

b. 2.7 PERCENT OF PUBLIC SUPPLY PUMPAGE (1978)

3. MAGOTHY AQUIFER

a. UNDERLIES GLACIAL AND/OR JAMECO AQUIFERS, 0 TO 500 FEET THICK.

b. 87.6 PERCENT OF PUBLIC SUPPLY PUMPAGE (1978).

- 4. LLOYD AQUIFER
 - a. DEEPEST AQUIFER, 250 FOOT AVERAGE THICKNESS.
 - b. 7.2 PERCENT OF PUBLIC SUPPLY PUMPAGE (1978).
 - c. USE RESTRICTED TO BARRIER BEACHES AND EXTREME NORTH SHORE.
- C. PUBLIC WATER SUPPLY
 - 1. 71 PUBLIC WATER SUPPLIERS
 - a. 48 COMMUNITY (SEE FIGURE 2) AND 23 NON-COMMUNITY
 - 2. 434 PUBLIC SUPPLY WELLS
 - a. 389 COMMUNITY WELLS AND 45 NON-COMMUNITY WELLS
 - b. 53 GLACIAL, 336 MAGOTHY, AND 45 LLOYD.

II. SUFFICIENCY OF WATER

- A. COMPREHENSIVE PUBLIC WATER SUPPLY STUDY, CPWS-60 (GREELEY-HANSEN, 1971)
 - 1. BASED ON DATA THROUGH 1968.
 - 2. PROJECTED WATER SUPPLY DEFICITS(1978 PUBLIC SUPPLY PUMPAGE - 181 MGD)
 - a. 1980 42.0 MGD
 - b. 1990 92.0 MGD
 - c. 2000 125.7 MGD
 - d. 2010 152.0 MGD
 - e. 2020 177.0 MGD
- B. NASSAU COUNTY HEALTH DEPARTMENT WATER BUDGET ESTIMATE (1975)
 - 1. BASED ON DATA THROUGH 1973.
 - 2. POPULATION PROJECTION BY NASSAU COUNTY PLANNING COMMISSION 1975
 - 3. PROJECTED WATER SUPPLY DEFICITS
 - a. 1980 5.8 MGD
 - b. 1990 33.7 MGD
 - c. 2000 47.0 MGD
 - d. 2010 60.6 MGD
 - e. 2020 74.6 MGD

C. GROUNDWATER LEVELS

1. GROUNDWATER LEVELS HAVE INCREASED STEADILY SINCE 1966, THE END OF THE DROUGHT PERIOD (SEE FIGURE 3).
2. CURRENT LEVEL IS AT HIGHEST POINT SINCE 1962, THE BEGINNING OF THE DROUGHT.

D. CURRENT LOCALIZED PROBLEMS

1. SALT WATER INTRUSION AT BARRIER ISLANDS AND GREAT NECK PENINSULA

III. QUALITY OF WATER

A. INORGANIC CHEMICALS

1. NITRATES (DRINKING WATER STANDARD IS 10 mg/l AS NITROGEN).

a. LEVELS DETECTED

| <u>AQUIFER</u> | <u>WELLS TESTED</u> | <u>≤1.0 mg/l</u> | <u>>1.0 TO ≤10.0 mg/l</u> | <u>>10.0 mg/l</u> |
|----------------|---------------------|------------------|------------------------------|----------------------|
| GLACIAL | 167 | 24 (16%) | 118 (71%) | 22 (13%) |
| MAGOTHY | 379 | 164 (43%) | 198 (52%) | 17 (5%) |
| LLOYD | 41 | 30 (73%) | 11 (27%) | 0 (0%) |

b. TRENDS

- (1) LEVELS INCREASING IN 31 PERCENT (14 OF 45) OF GLACIAL; 40 PERCENT (133 OF 332) OF MAGOTHY AND; 22 PERCENT (10 OF 45) OF LLOYD PUBLIC SUPPLY WELLS.
- (2) LEVELS DECREASING IN 24 PERCENT OF GLACIAL; 7 PERCENT OF MAGOTHY and, 9 PERCENT OF LLOYD PUBLIC SUPPLY WELLS.
- (3) EFFECT OF SEWERING EVIDENCED BY DECREASING LEVELS IN 32 PERCENT OF GLACIAL WELLS TESTED IN SEWERED AREAS.

c. GEOGRAPHICAL DISTRIBUTION (SEE FIGURES 4, 5, AND 6)

- (1) LEVELS >1.0 mg/l FOUND THROUGHOUT THE GLACIAL AND NORTH OF A LINE FROM ELMONT TO SOUTH FARMINGDALE IN THE MAGOTHY.
- (2) LEVELS >10.0 mg/l IN GLACIAL FOUND IN UNSEWERED, CENTRAL AREA FROM NEW CASSEL EAST TO SOUTH FARMINGDALE, AND FROM JERICHO SOUTH TO EAST MEADOW.
- (3) LEVELS >10.0 mg/l IN MAGOTHY FOUND IN CENTRAL AREA FROM GARDEN CITY PARK EAST TO BETHPAGE AND FROM SYOSSET SOUTH TO NORTH WANTAGH.

2. CHLORIDES (DRINKING WATER STANDARD IS 250 mg/l).

a. LEVELS DETECTED

- (1) CHLORIDE LEVELS GENERALLY RANGE FROM 10 TO 50 mg/l.
- (2) ONE PUBLIC SUPPLY WELL IN KINGS POINT EXCEEDS 1000 mg/l.

b. TRENDS

- (1) LEVELS INCREASING IN 59 PERCENT (37 OF 63) OF GLACIAL;
54 PERCENT (199 OF 366) OF MAGOTHY AND;
31 PERCENT (15 OF 49) OF LLOYD WELLS.

c. GEOGRAPHICAL DISTRIBUTION

- (1) CHLORIDE PROBLEMS ARE LOCALIZED, NOT COUNTY-WIDE.
- (2) CHLORIDES GREATER THAN 1000 mg/l IN KINGS POINT (SALT-WATER INTRUSION) AND IN PORT WASHINGTON (SANDMINING OPERATIONS)
- (3) CHLORIDES GREATER THAN 300 mg/l IN MINEOLA AND VALLEY STREAM (SALT STORAGE).

3. DETERGENTS

- a. NO DRINKING WATER STANDARD (STANDARD WAS 0.5 mg/l).
- b. DETECTED IN 75 OF 608 WELLS (12 PERCENT) INCLUDING 11 PUBLIC SUPPLY WELLS.
- c. GREATER THAN 0.5 mg/l IN 3 OF 608 WELLS (<1 PERCENT).
- d. 11 PUBLIC SUPPLY WELLS WITH DETERGENTS ALL SHOW A SIGNIFICANT DECREASE IN CONCENTRATION AND ALL LEVELS ARE LESS THAN 0.5 mg/l.

4. HEAVY METALS

| CONSTITUENT | WELLS TESTED | WELLS DETECTED | MAXIMUM LEVEL (mg/l) | DRINKING WATER STANDARD (mg/l) |
|-------------|--------------|----------------|----------------------|--------------------------------|
| ARSENIC | 330 | 3 (<1%) | 0.004 | 0.05 |
| BARIUM | 330 | 62 (19%) | 0.25 | 1.0 |
| CADMIUM | 330 | 5 (2%) | 0.005 | 0.010 |
| CHROMIUM | 330 | 0 (0%) | - | 0.05 |
| SELENIUM | 330 | 1 (<1%) | 0.006 | 0.01 |
| MERCURY | 330 | 53 (16%) | 0.0042* | 0.002 |
| LEAD | 334 | 54 (16%) | 0.09* | 0.05 |
| SILVER | 330 | 7 (2%) | 0.05 | 0.05 |
| ZINC | 330 | 244 (68%) | 0.30 | 5.0 |
| CYANIDE | 280 | 15 (5%) | 0.005 | NO STANDARD |
| COPPER | 327 | 166 (51%) | 1.85* | 1.0 |

*3 WELLS EXCEEDED MERCURY STANDARD, 1 THE COPPER STANDARD, AND 1 LEAD STANDARD. LEVELS IN RESAMPLES WERE LESS THAN DETECTION LIMITS.

B. ORGANIC CHEMICALS

1. VOLATILE HALOGENATED ORGANIC CHEMICALS

a. TETRACHLOROETHYLENE

(1) LEVELS DETECTED

| AQUIFER | WELLS TESTED | NOT DETECTED | DETECTED | | MAXIMUM LEVEL (ug/l) |
|---------|--------------|--------------|----------|----------|----------------------|
| | | | <50 ug/l | ≥50 ug/l | |
| GLACIAL | 208 | 149(69%) | 52(25%) | 12(6%) | 648 |
| MAGOTHY | 429 | 361(84%) | 51(14%) | 7(2%) | 688 |
| LLOYD | 45 | 43(96%) | 2(4%) | 0(0%) | 3 |

(2) GEOGRAPHICAL DISTRIBUTION (SEE FIGURES 7,8, AND 9)

(a) LEVELS >50 ug/l DETECTED IN GLACIAL IN INDUSTRIALIZED EAST-WEST BAND FROM NEW HYDE PARK TO BETHPAGE, ALONG THE SUFFOLK BORDER FROM FARMINGDALE TO MASSAPEQUA AND IN GLEN COVE AND ROSLYN HARBOR.

(b) LEVELS >50 ug/l DETECTED IN THE MAGOTHY IN THE UNSEWERED INDUSTRIALIZED AREA FROM NEW CASSEL TO FARMINGDALE.

b. TRICHLOROETHYLENE

(1) LEVELS DETECTED

| AQUIFER | WELLS TESTED | NOT DETECTED | DETECTED | | MAXIMUM LEVEL (ug/l) |
|---------|--------------|--------------|----------|----------|----------------------|
| | | | <50 ug/l | ≥50 ug/l | |
| GLACIAL | 208 | 152(73%) | 45(22%) | 11(5%) | 3,119 |
| MAGOTHY | 429 | 367(86%) | 44(10%) | 18(4%) | 2,382 |
| LLOYD | 45 | 44(98%) | 1(2%) | 0(0%) | 12 |

(2) GEOGRAPHICAL DISTRIBUTION (SEE FIGURES 10,11, AND 12)

(a) LEVELS >50 ug/l DETECTED IN THE GLACIAL INDUSTRIAL AREA FROM LAKE SUCCESS EAST TO HICKSVILLE, AND IN VALLEY STREAM, MASSAPEQUA, PORT WASHINGTON, AND GLEN COVE.

(b) LEVELS >50 ug/l DETECTED IN THE MAGOTHY IN INDUSTRIAL AREA FROM LAKE SUCCESS EAST TO BETHPAGE, AND IN GLEN COVE.

c. 1,1,1 TRICHLOROETHANE

(1) LEVELS DETECTED

| AQUIFER | WELLS TESTED | NOT DETECTED | DETECTED | | MAXIMUM LEVEL (ug/l) |
|---------|--------------|--------------|----------|----------|----------------------|
| | | | <50 ug/l | ≥50 ug/l | |
| GLACIAL | 208 | 138(66%) | 60(29%) | 10(5%) | 1,528 |
| MAGOTHY | 429 | 372(87%) | 52(12%) | 5(1%) | 310 |
| LLOYD | 45 | 44(98%) | 1(2%) | 0(0%) | 2 |

(2) GEOGRAPHIC DISTRIBUTION (SEE FIGURES 13,14, AND 15)

(a) LEVELS >50 ug/l DETECTED IN THE GLACIAL IN SYOSSET, HICKSVILLE, NORTH WANTAGH, EAST MEADOW, AND HEMPSTEAD VILLAGE.

(b) LEVELS >50 ug/l DETECTED IN THE MAGOTHY IN THE HICKSVILLE-BETHPAGE AREA.

d. OTHER VOLATILE HALOGENATED ORGANIC CHEMICALS

| CONSTITUENT | WELLS TESTED | DETECTED | | MAXIMUM LEVEL (ug/l) |
|-------------------------------|--------------|----------|----------|----------------------|
| | | <50 ug/l | ≥50 ug/l | |
| CARBON TETRACHLORIDE | 664 | 11 (2%) | 1 (<1%) | 135 |
| BROMODICHLOROMETHANE | 675 | 2 (<1%) | 0 (0%) | 4 |
| METHYLENE CHLORIDE | 155 | 3 (2%) | 0 (0%) | 47 |
| 1,1,2 TRICHLOROETHANE | 353 | 2 (<1%) | 0 (0%) | 20 |
| BROMOFORM | 130 | 0 (0%) | 0 (0%) | - |
| TRIFLUOROTRI- CHLOROETHANE | 639 | 12 (12%) | 0 (0%) | 19 |
| 1,2 DICHLOROETHYLENE | 35 | 7 (20%) | 0 (0%) | 7 |
| VINYL CHLORIDE | 67 | 3 (4%) | 0 (0%) | DETECTED |

e. TOTAL VOLATILE HALOGENATED ORGANIC CHEMICALS

(1) LEVELS DETECTED

| AQUIFER | WELLS TESTED | NOT DETECTED | DETECTED (ug/l)* | | |
|---------|--------------|--------------|------------------|------------|----------|
| | | | <10 | ≥10 TO <50 | ≥50 |
| GLACIAL | 207 | 95 (46%) | 51 (25%) | 34 (16%) | 27 (13%) |
| MAGOTHY | 431 | 270 (63%) | 100 (23%) | 36 (8%) | 25 (6%) |
| LLOYD | 46 | 41 (89%) | 4 (9%) | 1 (2%) | 0 (0%) |

*LEVEL IS THE MAXIMUM LEVEL FOR INDIVIDUAL ORGANIC CHEMICALS DETECTED IN THE LAST SAMPLE AT EACH WELL.

2. VOLATILE NON-HALOGENATED ORGANIC CHEMICALS

a. BENZENE, TOLUENE, XYLENE, AND TOTAL ALIPHATIC HYDROCARBONS

| <u>CONSTITUENT</u> | <u>WELLS TESTED</u> | <u>WELLS DETECTED</u> | <u>RANGE DETECTED (ug/l)</u> |
|--------------------|---------------------|-----------------------|------------------------------|
| BENZENE | 307 | 26 (8%) | 1 TO 168 |
| TOLUENE | 306 | 18 (6%) | 1 TO 79 |
| XYLENE | 306 | 9 (3%) | 1 TO 100 |
| TOTAL ALIPHATICS | 244 | 107 (44%) | 4 TO 2510 |

3. PESTICIDES AND HERBICIDES

a. LEVELS DETECTED

| <u>CONSTITUENT</u> | <u>WELLS TESTED</u> | <u>WELLS DETECTED</u> | <u>MAXIMUM LEVEL (ug/l)</u> | <u>DRINKING WATER STANDARD (ug/l)</u> |
|--------------------|---------------------|-----------------------|-----------------------------|---------------------------------------|
| ALDRIN | 330 | 5 (2%) | 0.03 | * |
| CHLORDANE | 330 | 9 (3%) | 2.00 | * |
| DDT | 330 | 17 (5%) | 0.13 | * |
| DIELDRIN | 330 | 28 (8%) | 0.33 | * |
| ENDRIN | 330 | 0 (0%) | - | 0.2 |
| LINDANE | 330 | 5 (2%) | 0.07 | 4.0 |
| METHOXYCHLOR | 330 | 0 (0%) | - | 100.0 |
| TOXAPHENE | 330 | 0 (0%) | - | 5.0 |
| HEPTACHLOR EPOXIDE | 319 | 1 (<1%) | 0.01 | * |
| HEPTACHLOR | 316 | 7 (2%) | 0.30 | * |
| 2, 4D | 322 | 18 (6%) | 13.0 | 100.0 |
| 2, 4, 5TP | 322 | 15 (5%) | 2.1 | 10.0 |

*NO DRINKING WATER STANDARD

IV. CURRENT PROBLEMS

A. SOURCES OF CONTAMINATION

1. CESSPOOLS

- a. 31 PERCENT OF NASSAU'S POPULATION OR 453,000 PEOPLE USING CESSPOOLS (1979)
- b. AVERAGE OF 36 MGD RECHARGED FROM CESSPOOLS
- c. NITRATES, CHLORIDES, DETERGENTS, AND VOLATILE ORGANIC CHEMICALS CONTRIBUTED TO GROUNDWATER BY CESSPOOL LEACHATE.

2. INDUSTRIAL AND COMMERCIAL DISCHARGES

- a. 300 INDUSTRIAL-COMMERCIAL DISCHARGERS OF INDUSTRIAL ORGANIC CHEMICALS HAVE BEEN IDENTIFIED FROM A SURVEY OF OVER 3000 ESTABLISHMENTS STARTING IN 1976.
- b. DISCHARGES HAVE BEEN BOTH TO THE LAND SURFACE AND TO UNDERGROUND DISPOSAL SYSTEMS.
- c. ESTABLISHMENTS UNDER PERMIT AS OF OCTOBER 31, 1979.
 - (1) 41 WASTEWATER DISCHARGE PERMITS (SPDES)
 - (a) INORGANIC CHEMICALS - 3.5 MGD
 - (b) ORGANIC CHEMICALS - 10.4 MGD (10 MGD FROM GRUMMAN CORP.)
 - (2) 164 STORE AND REMOVAL PERMITS (SPDES)
 - (a) 456,000 GALLONS PER YEAR (ESTIMATED 1979)
 - (3) 35 PETROLEUM TERMINAL DISCHARGE PERMITS (SPDES)
- d. SINCE 1977, OVER 128 ANALYSES MADE OF INDUSTRIAL EFFLUENT SOURCES.
- e. IDENTIFYING SOURCE(S) FOR INDIVIDUAL CONTAMINANT PLUMES IN THE GROUNDWATER IS DIFFICULT DUE TO:
 - (1) TIME DELAY BETWEEN DISCHARGE AND EVENTUAL DETECTION AT WELLS AND EXPENSE OF REQUIRED TEST WELLS.
 - (2) USE OF INDUSTRIAL CHEMICALS BY MANY DIFFERENT TYPES OF INDUSTRIAL AND COMMERCIAL ESTABLISHMENTS.

3. GASOLINE TANK LEAKS

- a. INCREASING NUMBER OF LEAKS WITH INCREASING AGE OF STEEL STORAGE TANKS
- b. 46 CONFIRMED LEAKS SINCE 1976

| <u>YEAR</u> | <u>NO. OF LEAKS CONFIRMED</u> |
|-------------|-------------------------------|
| 1976 | 2 |
| 1977 | 12 |
| 1978 | 14 |
| 1979 | 18 |

- c. CONTAMINATION OF GROUNDWATER BY AROMATIC HYDROCARBONS IN GASOLINE: BENZENE, TOLUENE, AND XYLENE.

4. LANDFILL LEACHATE

- a. 13 ACTIVE AND 40 INACTIVE LANDFILL SITES IN NASSAU.
- b. SPARSE DATA AVAILABLE ON GROUNDWATER IMPACT.
- c. LEACHATE COULD CONTAIN HEAVY METALS, NITRATES, CHLORIDES, AND ORGANIC CHEMICALS.

5. STORMWATER RECHARGE

- a. OVER 600 STORM WATER RECHARGE BASINS IN THE COUNTY
- b. VOLUME RECHARGED ESTIMATED AT 40 MGD
- c. RECHARGE BASIN WATER CONTAINS CONTAMINANTS FROM FERTILIZERS, ANIMAL WASTES, DEICING SALTS, AND PETROLEUM DERIVATIVES.
- d. CONTAMINANTS INCLUDE NITRATES, ORGANIC CHEMICALS, CHLORIDES, AND CERTAIN HEAVY METALS.

6. SALT WATER INTRUSION

a. SOUTH SHORE

(1) 3 WEDGES OF SALT WATER EXTEND INTO THE GROUNDWATER RESERVOIR IN SOUTHWEST NASSAU

(a) TOP WEDGE - IN GLACIAL, EXTENDS UNDER SOUTH SHORE BAYS TO MAINLAND

(b) INTERMEDIATE WEDGE - IN SHALLOW MAGOTHY, EXTENDS TO A LINE APPROXIMATELY FROM INWOOD EAST TO ISLAND PARK

(c) DEEP WEDGE - IN DEEP MAGOTHY, EXTENDS TO A LINE APPROXIMATELY FROM WOODMERE EAST TO OCEANSIDE

(2) LOCATION OF SALT WATER WEDGE IN THE LLOYD ON THE SOUTH SHORE IS UNKNOWN

(3) NO SOUTH SHORE PUBLIC SUPPLY WELLS CURRENTLY AFFECTED.

b. NORTH SHORE

(1) 4 PUBLIC SUPPLY WELLS ON THE GREAT NECK PENINSULA HAVE BEEN AFFECTED BY INTRUSION

(2) HIGH CHLORIDES HAVE BEEN FOUND BENEATH THE SANDPITS IN PORT WASHINGTON

(3) PUMPAGE AT THE SANDY HOLLOW ROAD WELLFIELD IN PORT WASHINGTON HAS BEEN RESTRICTED FOR MANY YEARS TO CONTROL SALT WATER INTRUSION.

(4) THE OVERALL EXTENT OF INTRUSION ON THE NORTH SHORE IS UNKNOWN.

7. ROAD SALT STORAGE

- a. 67 MUNICIPAL ROAD SALT STORAGE SITES IN THE COUNTY - STORED AS A SAND/SALT MIXTURE
- b. OPEN STORAGE CAUSES RUNOFF OF "BRINE" CAUSING LOCALIZED CONTAMINATION OF GROUNDWATER
- c. CONTAMINANTS INCLUDE CHLORIDES, SODIUM, AND CYANIDE (FROM FERROCYANIDE USED AS ANTI-CAKING INGREDIENT).

B. CURTAILMENT OF WATER SUPPLY SOURCES

1. CURRENT STATUS

a. CONTAMINATION - TYPES

- (1) WELLS ARE CURRENTLY RESTRICTED IN THEIR USAGE DUE TO NITRATES, CHLORIDES, AND VOLATILE ORGANIC CHEMICALS.
- (2) WELLS ARE VOLUNTARILY NOT USED BY SUPPLIERS DUE TO TASTE, ODOR, AND COPPER CONTENT.

b. STANDARDS

- (1) THERE ARE CURRENTLY NO LIMITS FOR ORGANIC CHEMICAL CONTAMINANTS, OTHER THAN PESTICIDES AND HERBICIDES, IN THE DRINKING WATER STANDARDS.
- (2) STATE HEALTH DEPARTMENT INTERIM GUIDELINE OF 50 ug/1 (INDIVIDUAL) AND 100 ug/1 (TOTAL) USED SINCE JANUARY, 1977.
- (3) EFFLUENT STANDARDS OR LIMITATIONS FOR 63 ORGANIC CHEMICALS ARE SPECIFIED IN PART 703 (DISCHARGE STANDARDS) OF THE STATE ENVIRONMENTAL CONSERVATION LAW.

c. RESTRICTION OF WELLS

- (1) 21 WELLS ARE RESTRICTED DUE TO NITRATES (>10 mg/1 as N).
 - (a) ONE WELL IS TREATED, 6 ARE BLENDED, AND 14 ARE NOT USED.
- (2) ONE WELL IS RESTRICTED DUE TO CHLORIDES (>250 mg/1).
- (3) 13 WELLS ARE RESTRICTED DUE TO VOLATILE ORGANIC CHEMICALS (>50 ug/1).

(a) TRICHLOROETHYLENE - 5 WELLS

(b) TETRACHLOROETHYLENE - 4 WELLS

(c) 1,1,1 TRICHLOROETHANE - 2 WELLS

(d) TRI AND TETRACHLOROETHYLENE - 2 WELLS

2. PROJECTED STATUS

a. RESTRICTION OF WELLS

(1) ADDITIONAL RESTRICTIONS OF WELL USE EXPECTED DUE TO NITRATES, CHLORIDES, AND VOLATILE ORGANIC CHEMICALS.

(2) CURRENT TRENDS

(a) WELLS ARE PROJECTED TO EXCEED THE NITRATE STANDARD AT A RATE OF ONE WELL PER YEAR.

(b) TWO WELLS IN KINGS POINT AND GREAT NECK ARE PROJECTED TO EXCEED THE CHLORIDE STANDARD IN THE NEXT FIVE YEARS.

(3) STRICTER STANDARDS FOR ORGANIC CHEMICALS.

(a) ADOPTION OF STANDARDS EQUIVALENT TO ONE IN A MILLION RISK WOULD RESULT IN THE RESTRICTION OF 26 ADDITIONAL PUBLIC SUPPLY WELLS.

3. WATER SUPPLY ALTERNATIVES

a. USE OF INTERCONNECTIONS

(1) MOST COMMUNITY PUBLIC SUPPLIES ARE INTERCONNECTED TO ADJACENT SUPPLIES TO OBTAIN ADDITIONAL WATER IN EMERGENCY SITUATIONS - A SHORT-TERM SOLUTION.

b. REPLACE WELL

(1) DEEPEN WELL OR NEW WELL AT DIFFERENT SITE

(a) THIS ALTERNATIVE HAS BEEN USED FOR 20 YEARS TO OBTAIN ACCEPTABLE WATER FROM LOWER LEVELS OF THE GROUNDWATER RESERVOIR.

(b) DEEPENING WELLS CAN DRAW CONTAMINATION DEEPER INTO THE AQUIFERS.

c. TREATMENT AT WELL

(1) REQUIRES TREATMENT FACILITY AT EACH CONTAMINATED WELL STATION.

(2) INVOLVES GRANULAR ACTIVATED CARBON (GAC) TREATMENT AT EACH WELL STATION FOR ORGANIC CHEMICAL REMOVAL AT NEARLY ONE MILLION DOLLARS PER STATION.

V. PRESENT PROGRAM

A. MASTER WATER SUPPLY PLAN (BY H2M CORPORATION)

1. UPDATE OF 1971 GREELEY-HANSEN REPORT (CPWS-60) AND 1975 NCDH WATER BUDGET REPORT
2. REVISE PREDICTED WATER SUPPLY DEFICITS
3. RE-EVALUATE WATER SUPPLY ALTERNATIVES

B. ADVANCED WASTEWATER TREATMENT (AWT)

1. PROGRAM TO DETERMINE THE ECONOMICAL AND TECHNICAL FEASIBILITY OF RECHARGING HIGHLY TREATED WASTEWATER.
2. PROGRAM TO BEGIN IN 1980 AND RUN FOR 3 TO 5 YEARS.
3. 4 MGD WILL BE TREATED AT CEDAR CREEK WATER POLLUTION CONTROL PLANT AND RECHARGED AT THE EAST MEADOW RECHARGE SITE.
4. PROGRAM ADMINISTERED BY NCDPW WITH PARTICIPATION BY NCDH AND USGS.

C. SEWERING (SEE FIGURE 16)

1. LARGE SCALE SEWERING BEGAN IN THE 1950's
2. 69 PERCENT OF THE COUNTY POPULATION IS CURRENTLY SEWERED
3. WHEN SEWER DISTRICT 3 IS COMPLETED IN 1985, OVER 90 PERCENT OF THE COUNTY POPULATION WILL BE SEWERED.
4. STUDIES ARE UNDERWAY (201 STUDIES) TO DETERMINE WHICH ADDITIONAL AREAS REQUIRE SEWERING BASED ON POPULATION DENSITY AND GROUND-WATER QUALITY IMPAIRMENT.

D. GROUNDWATER MONITORING

1. VOLATILE ORGANIC CHEMICALS

- a. DURING 1980, ANALYSES WILL BE PERFORMED ON 30 GLACIAL WELLS TO DETERMINE THE PRESENCE OF A BROAD SPECTRUM OF ORGANIC CHEMICALS LISTED BY THE USEPA AS "PRIORITY POLLUTANTS", USED BY INDUSTRIES OR DETECTED IN LIMITED TESTING OF THE GROUNDWATER.

2. AROMATICS AND ALIPHATICS

- a. BY OCTOBER 1979, 137 PUBLIC SUPPLY AND 169 MONITORING WELLS HAD BEEN TESTED FOR THE GASOLINE CONTAMINANTS: BENZENE, TOLUENE, XYLENE, AND TOTAL HYDROCARBONS.
- b. NCDH WILL COMPLETE SAMPLING OF MONITORING WELLS DURING 1980.
- c. PUBLIC SUPPLIERS WILL BE REQUIRED TO TEST ALL WELLS DURING 1980.

E. INDUSTRIAL DISCHARGE ABATEMENT (SPDES)

1. AS OF OCTOBER 31, 1979, SPDES PERMITS ISSUED FOR:
 - a. 41 INDUSTRIAL DISCHARGES OF ORGANIC AND/OR INORGANIC CHEMICALS.
 - b. 35 PETROLEUM TERMINAL OPERATIONS
2. DURING 1980 ADDITIONAL PERMITS TO BE ISSUED:
 - a. 10 INDUSTRIAL DISCHARGES AND 161 DRYCLEANING PLANTS.
 - b. 34 PETROLEUM TERMINAL OPERATIONS.
3. PROGRAM CONSISTS OF:
 - a. IDENTIFYING AND PERMITTING NEW SOURCES OF POLLUTION
 - b. SURVEILLANCE OF COMPLIANCE OF PERMITTED OPERATIONS

VI. UNMET NEEDS

A. IDENTIFY AND ELIMINATE SOURCES OF POLLUTION

1. STORMWATER RECHARGE BASINS
 - a. DETERMINE CONTAMINANT LOADING AND SOURCES
 - b. DEVELOP AND IMPLEMENT ABATEMENT PROCEDURES
 - (1) ANIMAL WASTE CLEAN-UP ORDINANCES
 - (2) MUNICIPAL STREET CLEANING PROGRAMS
2. LANDFILLS
 - a. DETERMINE IMPACT OF LANDFILLS ON GROUNDWATER QUALITY.
 - b. DEVELOP ABATEMENT PROCEDURES TO ELIMINATE FUTURE CONTAMINATION AND TO CONTROL PRESENT CONTAMINATION.
3. DRYCLEANING PLANTS
 - a. SURVEY OF DRYCLEANING PLANTS TO DETERMINE DISCHARGE VIOLATIONS AND TO CORRECT VIOLATIONS BY ISSUING SPDES STORE AND REMOVAL PERMITS TO BE COMPLETED.

4. AUTO SERVICE STATIONS
 - a. SURVEY OF SERVICE STATIONS, TRANSMISSION REPAIR SHOPS, AND AUTO-WRECKING ESTABLISHMENTS TO DETERMINE AND CORRECT DISCHARGE VIOLATIONS BY ISSUING SPDES DISCHARGE OR STORE AND REMOVAL PERMITS.

B. MANAGEMENT OF EXISTING CONTAMINATION

1. DETERMINE THE MOST EFFECTIVE OVERALL WATER MANAGEMENT STRATEGY TO HANDLE ORGANIC CHEMICAL CONTAMINATION ALREADY IN THE GROUNDWATER.
2. STUDY MECHANICS OF TRANSPORT OF ORGANIC CHEMICALS IN THE GROUNDWATER SYSTEM AND BY USING MATHEMATICAL MODELING DETERMINE THE BEST OVERALL SOLUTIONS FOR CONTAMINATED AQUIFER SEGMENTS.

C. GASOLINE CONTAMINATION OF GROUNDWATER

1. IMPROVEMENTS TO THE STATE OIL SPILL PREVENTION AND COMPENSATION FUND (ARTICLE 12, STATE NAVIGATION LAW).
 - a. SPECIFIC STANDARDS TO WHICH GROUNDWATER QUALITY MUST BE RESTORED ARE REQUIRED.
 - b. MECHANISM IS REQUIRED TO FINANCE NECESSARY ENVIRONMENTAL ASSESSMENTS.
 - c. ADEQUATE MANPOWER IS REQUIRED BY RESPONSIBLE AGENCIES TO PERFORM ASSESSMENTS AND PROSECUTE OFFENDERS.

D. HANDLING AND STORAGE OF HAZARDOUS MATERIALS

1. REGULATIONS ARE REQUIRED FOR INDUSTRIAL SOLVENTS WHICH ARE EQUALLY AS HAZARDOUS AS PETROLEUM PRODUCTS.
2. CLEAN-UP REQUIRED OF SPILLS OF NON-PETROLEUM HAZARDOUS CHEMICALS.

E. CONSUMER PRODUCT REGULATION

1. PASSAGE OF SENATE BILL S.2382 NEEDED TO REGULATE THE USE OF SEWAGE SYSTEM CLEANERS AND ADDITIVES. (THE ASSEMBLY BILL A.3111 WAS PASSED DURING THE 1979 SESSION).
2. DEVELOPMENT OF REGULATIONS FOR OTHER CONSUMER PRODUCTS AS APPROPRIATE.

F. DRINKING WATER STANDARDS FOR ORGANIC CHEMICALS

1. INTERIM STATE GUIDELINES FOR ORGANIC CHEMICALS HAVE BEEN USED SINCE JANUARY 1977.
2. THESE GUIDELINES TREAT ALL ORGANIC COMPOUNDS ALIKE WITH A LIMIT OF 50 ug/l.
3. MORE SPECIFIC STANDARDS FOR INDIVIDUAL ORGANIC CHEMICALS ARE REQUIRED TO CORRESPOND TO DIFFERENT HEALTH RISKS REPRESENTED BY VARIOUS ORGANIC CHEMICALS.

*AMENDED 4/13/80
SENT TO COMMITTEE
CONSERVATION & RECREATION*

VII. PROPOSED PROGRAM

A. DEC ASSESSMENT OF LANDFILLS

1. ASSESSMENT OF LANDFILLS AS A POLLUTION SOURCE IS PLANNED BY THE STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION UNDER THE FEDERAL RESOURCE CONSERVATION AND RECOVERY ACT.

B. STATE FINANCED STUDIES

1. ASSESSMENT OF GROUNDWATER CONTAMINATION BY ORGANIC CHEMICALS.
 - a. TEST OVER 300 WELLS IN NASSAU DURING 1980 FOR ADDITIONAL HALOGENATED AND NON-HALOGENATED COMPOUNDS NOT PRESENTLY TESTED FOR.
 - b. TEST APPROXIMATELY 30 GLACIAL WELLS IN NASSAU DURING 1980 FOR 104 "PRIORITY POLLUTANTS" ESTABLISHED BY THE USEPA.
 - c. DEVELOP AND IMPLEMENT DATA MANAGEMENT SYSTEM FOR ORGANIC AND INORGANIC CHEMICAL DATA.
2. HYDROLOGICAL STUDY OF GROUNDWATER CONTAMINATION IN THE ROOSEVELT FIELD WATER DISTRICT.
 - a. DEVELOP AND DEMONSTRATE METHODOLOGIES TO DEFINE THE LEVELS AND SPATIAL EXTENT OF ORGANIC CHEMICALS IN THE GROUNDWATER SYSTEM.
 - b. EVALUATE THE MECHANICS OF TRANSPORT IN A CONTAMINATED AQUIFER SEGMENT.
 - c. USE THIS INFORMATION TO IDENTIFY SPECIFIC SOURCES OF ORGANIC CHEMICAL CONTAMINATION AND TO ASSESS FUTURE CONTAMINATION AS A GUIDE TO LOCAL WATER SUPPLY DEVELOPMENT.
 - d. EVALUATE FEASIBILITY OF GENERAL APPLICATION AND FURTHER DEVELOPMENT OF TECHNIQUES TO INCLUDE GROUNDWATER MODELING APPLICATIONS.

C. IDENTIFY AND ELIMINATE SOURCES

1. DRYCLEANING PLANTS

- a. SURVEY 340 DRYCLEANING PLANTS IN NASSAU (BEGUN IN 1979).
- b. EFFLUENT ANALYSIS OF SUSPECTED VIOLATIONS.
- c. ISSUE SPDES STORE AND REMOVAL PERMITS FOR APPROXIMATELY 200 PLANTS (60 PERCENT ESTIMATED TO REQUIRE PERMITS).
- d. CONTINUE SURVEILLANCE OF PERMITTED PLANTS.

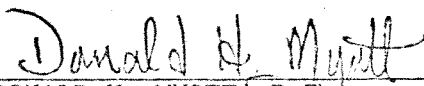
2. AUTO SERVICE STATIONS

- a. SURVEY 1000 SERVICE STATIONS, 90 TRANSMISSION REPAIR SHOPS, AND 40 AUTO WRECKING FIRMS.
- b. CONTROL BY ISSUING SPDES STORE AND REMOVAL OR DISCHARGE PERMITS WITH SUBSEQUENT SURVEILLANCE TO ENSURE COMPLIANCE.

D. RECOMMENDED LEGISLATION

1. PASSAGE OF SENATE BILL S.2382 REGULATING SEWAGE SYSTEM AND DRAIN CLEANERS AND ADDITIVE PLUS DEVELOPMENT OF REGULATIONS TO CONTROL USE OF OTHER HOUSEHOLD PRODUCTS.
2. AMENDMENT TO THE ENVIRONMENTAL CONSERVATION LAW (PART 3, ARTICLE 12, STATE NAVIGATION LAW) TO REQUIRE CLEAN-UP OF SPILLS OF ALL HAZARDOUS SUBSTANCES NOT MERELY PETROLEUM PRODUCTS, AND TO REQUIRE PROPER PROTECTION AND PREVENTION AS REQUIRED FOR PETROLEUM PRODUCTS.
3. AMENDMENT TO ARTICLE 12, STATE NAVIGATION LAW, TO SPECIFY ENVIRONMENTAL STANDARDS FOR CLEAN-UP OF PETROLEUM PRODUCT SPILLS, PARTICULARLY AS APPLIES TO SOLE SOURCE AQUIFERS, AND ALSO TO PROVIDE COMPENSATION FROM THE FUND FOR ACTUAL AND NECESSARY ENVIRONMENTAL ASSESSMENT PERFORMED BY REGULATORY AGENCIES DIRECTLY ASSOCIATED WITH THE SPILLS.
4. STATE LEGISLATIVE REVIEW OF THE ADMINISTRATION OF ARTICLE 12, STATE NAVIGATION LAW, BY THE STATE DEPARTMENT OF TRANSPORTATION AND THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION TO DETERMINE WHETHER THE INTENT OF THE LAW IS BEING PROPERLY REALIZED AND TO MOTIVATE SUCH CHANGES AS MAY BE INDICATED EITHER IN THE LAW OR IN AGENCY RESPONSIBILITY.

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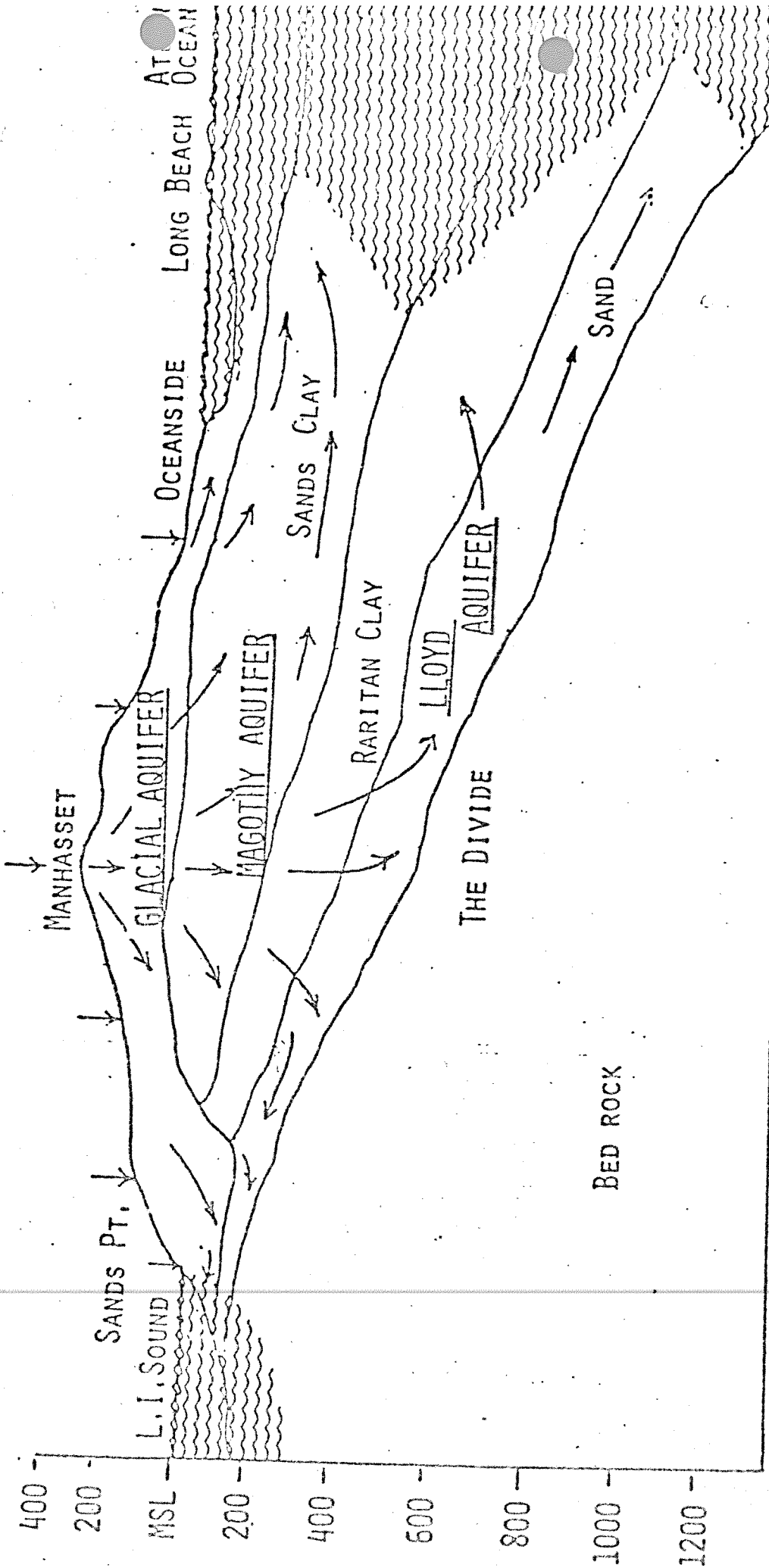


DONALD H. MYOTT, P.E.
SENIOR PUBLIC HEALTH ENGINEER
BUREAU OF PUBLIC WATER SUPPLY

FIGURE 1

SIMPLIFIED GEOLOGIC SECTION - NASSAU COUNTY, NEW YORK

ELEVATION
IN
FEET
BASED
ON
AVERAGE SEA
LEVEL (MSL)

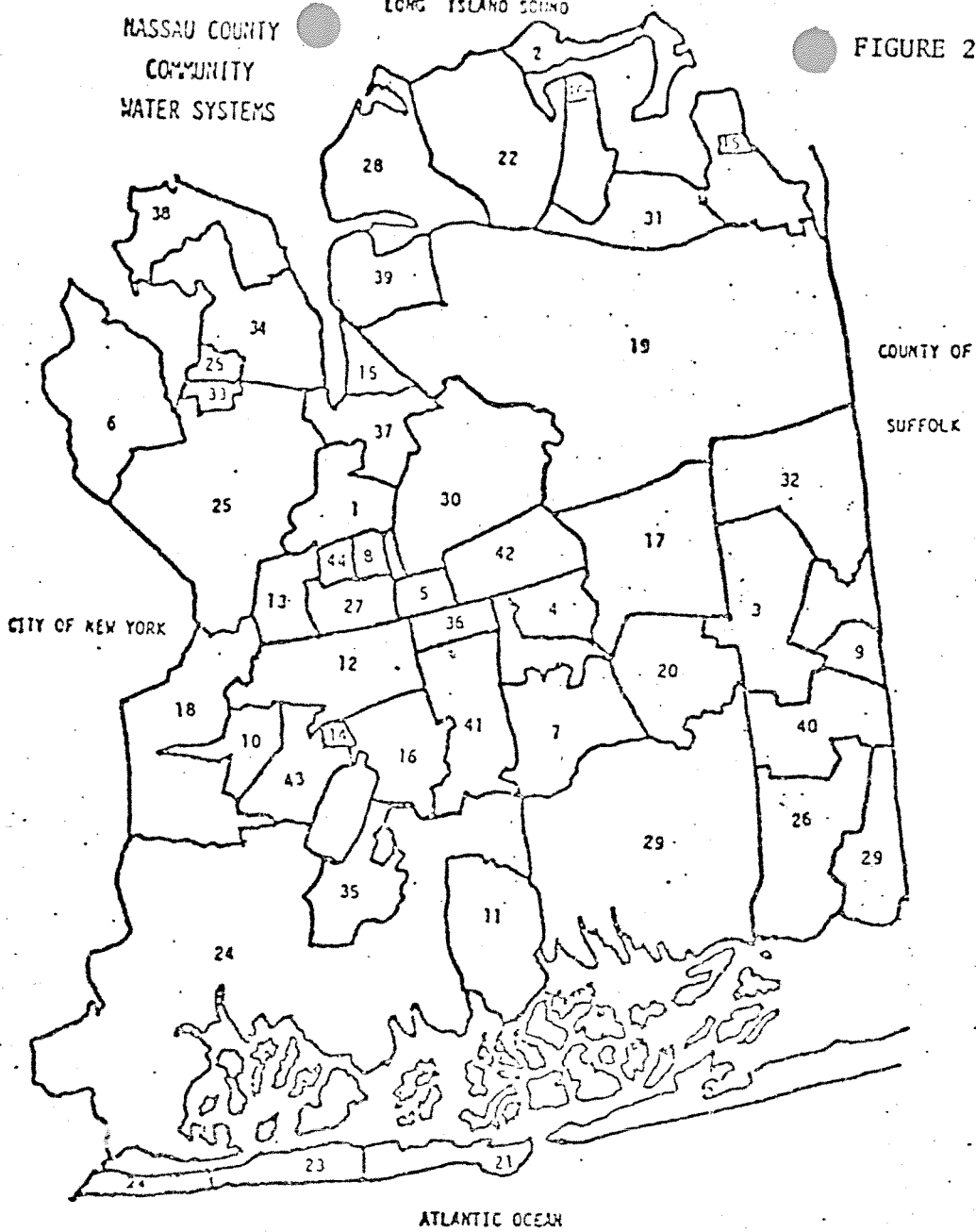


INDICATES SALT WATER
GENERAL MOVEMENT OF FRESH WATER

NASSAU COUNTY
COMMUNITY
WATER SYSTEMS

LONG ISLAND SOUND

FIGURE 2



- | | |
|---------------------------------------|---|
| 1. Albertson Water District | 24. Long Island Water Corporation |
| 2. Bayville Village | 25. Manhasset-Lakeville Water District |
| 3. Bethpage Water District | 26. Massapequa Water District |
| 4. Bowling Green Water District | 27. Mineola Village |
| 5. Carle Place Water District | 28. Glen Cove City |
| 6. Citizens Water Supply Company | 29. New York Water Service - Merrick Division |
| 7. East Meadow Water District | 30. Old Westbury Village |
| 8. East Williston Village* | 31. Oyster Bay Water District |
| 9. Farmingdale Village | 32. Plainview Water District |
| 10. Franklin Square Water District | 33. Plandome Village |
| 11. Freeport, Village | 34. Port Washington Water District |
| 12. Garden City Village | 35. Rockville Centre Village |
| 13. Garden City Park Water District | 36. Roosevelt Field Water District |
| 14. Garden City South Water District* | 37. Roslyn Water District |
| 15. Glenwood Water District* | 38. Sands Point Village |
| 16. Hempstead Village | 39. Sea Cliff Water Division |
| 17. Hicksville Water District | 40. South Farmingdale Water District |
| 18. Jamaica Water Supply Company | 41. Uniondale Water District |
| 19. Jericho Water District | 42. Westbury Water District |
| 20. Levittown Water District | 43. West Hempstead-Hempstead Gardens Water District |
| 21. Lido-Point Lookout Water District | 44. Williston Park Village |
| 22. Locust Valley Water District | 45. Sel-Bra Acres Water Supply (Cove Neck) |
| 23. Long Beach City | 46. Mill Neck Estates Water Supply |

* Supplies 8, 14, and 15 served by other supplies during 1960.
No raw water data is given for these non-source supplies.