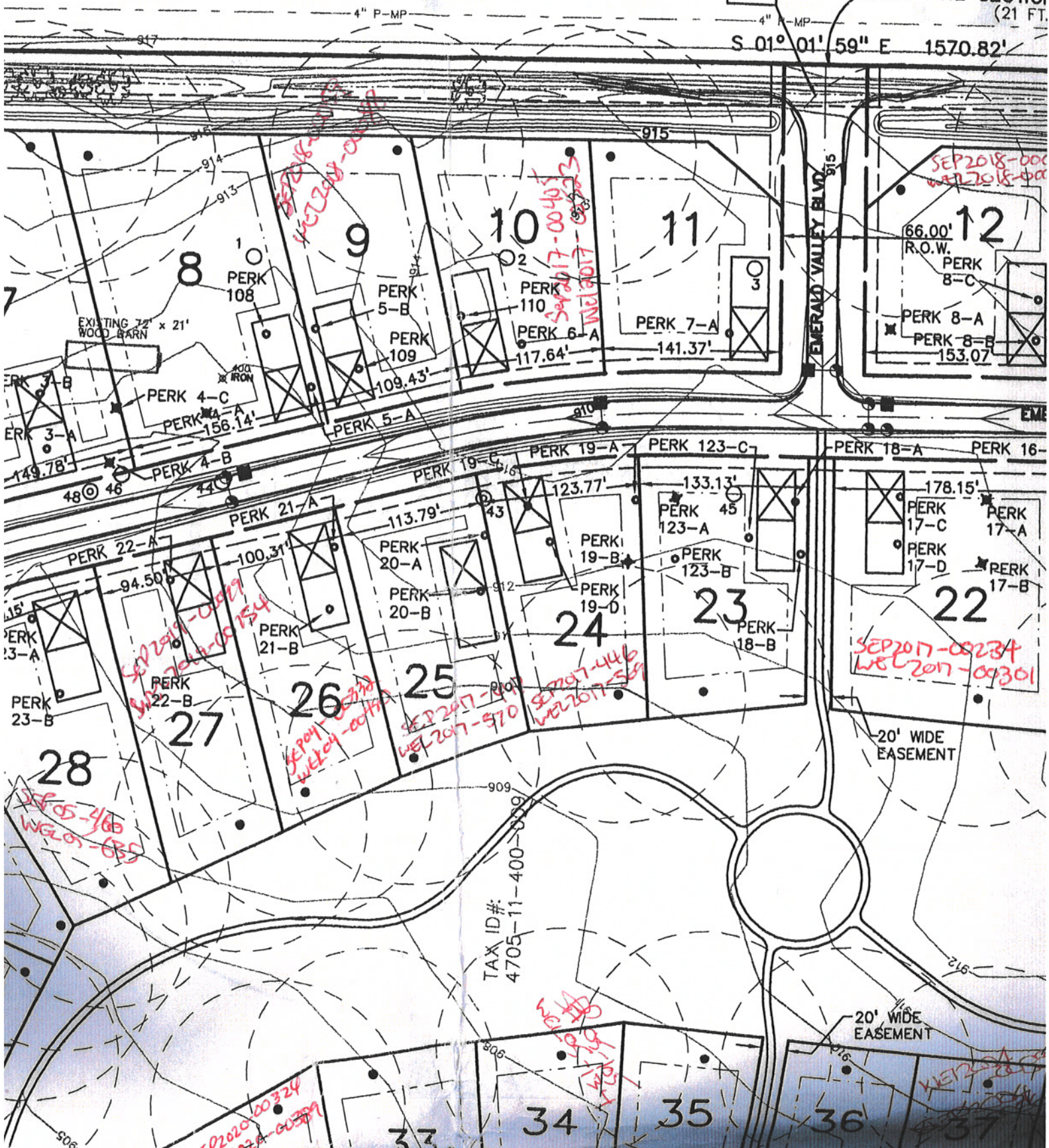


CEMETERY ROAD

PROPOSED ENTRANCE INTO EMERALD ESTATES

EAST LINE SECTION (21 FT.)

S 01° 01' 59" E 1570.82'



*SEP 2018-0001
WGL 2018-0001*

*SEP 2017-0040
WGL 2017-0040*

*SEP 2018-0001
WGL 2018-0001*

*SEP 2019-0099
WGL 2019-0099*

*SEP 2017-0370
WGL 2017-0370*

*SEP 2017-0101
WGL 2017-0101*

*SEP 2017-0446
WGL 2017-0446*

*SEP 2017-00234
WGL 2017-00301*

*SEP 05-465
WGL 05-635*

*SEP 2020-00324
WGL 2020-00324*

*SEP 17-19
WGL 17-19*

*SEP 2017-0001
WGL 2017-0001*

TAX ID #: 4705-11-400-009

20' WIDE EASEMENT

20' WIDE EASEMENT

EXISTING 72' x 21' WOOD BARN

PERK 3-A

PERK 3-B

PERK 4-A

PERK 4-B

PERK 4-C

PERK 21-A

PERK 22-A

PERK 23-A

PERK 23-B

PERK 22-B

PERK 21-B

PERK 20-A

PERK 20-B

PERK 19-A

PERK 19-B

PERK 19-C

PERK 123-A

PERK 123-B

PERK 18-B

PERK 17-A

PERK 17-B

PERK 17-C

PERK 17-D

PERK 16-A

PERK 18-A

PERK 8-A

PERK 8-B

PERK 8-C

PERK 5-A

PERK 5-B

PERK 6-A

PERK 7-A

PERK 108

PERK 109

PERK 110

PERK 1108

PERK 1109

PERK 1110

PERK 1111

PERK 1112

PERK 1113

PERK 1114

PERK 1115

PERK 1116

PERK 1117

PERK 1118

PERK 1119

PERK 1120

PERK 1121

PERK 1122

PERK 1123

PERK 1124

PERK 1125

PERK 1126

PERK 1127

PERK 1128

PERK 1129

PERK 1130

PERK 1131

PERK 1132

PERK 1133

PERK 1134

PERK 1135

PERK 1136

PERK 1137

PERK 1138

PERK 1139

PERK 1140

PERK 1141

PERK 1142

PERK 1143

PERK 1144

PERK 1145

PERK 1146

PERK 1147

PERK 1148

PERK 1149

PERK 1150

PERK 1151

PERK 1152

PERK 1153

PERK 1154

PERK 1155

PERK 1156

PERK 1157

PERK 1158

PERK 1159

PERK 1160

PERK 1161

PERK 1162

PERK 1163

PERK 1164

PERK 1165

PERK 1166

PERK 1167

PERK 1168

PERK 1169

PERK 1170

PERK 1171

PERK 1172

PERK 1173

PERK 1174

PERK 1175

PERK 1176

PERK 1177

PERK 1178

PERK 1179

PERK 1180

PERK 1181

PERK 1182

PERK 1183

PERK 1184

PERK 1185

PERK 1186

PERK 1187

PERK 1188

PERK 1189

PERK 1190

PERK 1191

PERK 1192

PERK 1193

PERK 1194

PERK 1195

PERK 1196

PERK 1197

PERK 1198

PERK 1199

PERK 1200

PERK 1201

PERK 1202

PERK 1203

PERK 1204

PERK 1205

PERK 1206

PERK 1207

PERK 1208

PERK 1209

PERK 1210

PERK 1211

PERK 1212

PERK 1213

PERK 1214

PERK 1215

PERK 1216

PERK 1217

PERK 1218

PERK 1219

PERK 1220

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PERK 1251

PERK 1252

PERK 1253

PERK 1254

PERK 1255

PERK 1256

PERK 1257

PERK 1258

PERK 1259

PERK 1260

PERK 1261

PERK 1262

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PERK 1325

PERK 1326

PERK 1327

PERK 1328

PERK 1329

PERK 1330

PERK 1331

PERK 1332

PERK 1333

PERK 1334

PERK 1335

PERK 1336

PERK 1337

PERK 1338

PERK 1339

Test Pit No.	Depth (feet)	Soil Description	Comments
4B	0.0 - 1.0 1.0 - 7.0 7.0 - 10.0 10.0 +	top soil clay loam/loam silt w/pockets of loamy sand silt	Unsuitable mottled @ 9'
4C	0.0 - 1.0 1.0 - 7.0 7.0 - 11.0	top soil clay loam/loam silt	Unsuitable
5A	0.0 - 1.0 1.0 - 8.0 8.0 - 11.5	top soil clay loam/loam fine sand	
5B	0.0 - 1.0 1.0 - 7.0 7.0 - 10.0	top soil loam w/pockets of loamy sand fine sand	
6A	0.0 - 1.0 1.0 - 5.0 5.0 - 9.0	top soil clay loam fine sand	
7A	0.0 - 1.0 1.0 - 5.0 5.0 - 9.0	top soil clay loam coarse sand & gravel	
8A	0.0 - 1.0 1.0 - 5.5 5.5 - 11.0	top soil clay loam silt	Unsuitable
8B	0.0 - 1.0 1.0 - 5.0 5.0 - 8.0 8.0 - 11.0	top soil clay loam loamy sand silt/silty sand	

SOILS EVALUATION
Curtis Property, 70 Acres
Handy Township, Livingston County

Date: January 11, 2002
 Landowner: Kenneth Curtis
 Engineer: EQUINOX, inc., Dan Schrauben, P.E.
 Witness: Darrell Hughes
 Excavator: Kay Dansby

Test Pit No.	Depth (feet)	Soil Description	Comments
1	0.0-1.0 1.0-6.0 6.0-9.0	topsoil coarse sand fine sand	
2	0.0-1.0 1.0-5.0 5.0-8.0 8.0-10.0	topsoil clay loam coarse sand fine sand	silt
3	0.0-1.0 1.0-3.0 3.0-6.0 6.0-9.0	topsoil clay loam sandy loam fine sand	
4	0.0-1.0 1.0-6.0 6.0-9.0	topsoil loamy sand medium sand	
5	0.0-1.0 1.0-4.0 4.0-8.0	topsoil sandy loam medium sand	
6	0.0-1.0 1.0-5.0 5.0-9.0	topsoil clay loam coarse sand	
7	0.0-1.0 1.0-5.0 5.0-9.0	topsoil sandy clay loam medium sand	clay streaks
8	0.0-1.0 1.0-6.0 6.0-8.0 8.0-10.0	topsoil clay loam fine sand medium sand	
9	0.0-1.0 1.0-4.0 4.0-10.0	topsoil sandy clay loam medium sand	



LIVINGSTON COUNTY DEPARTMENT OF PUBLIC HEALTH

2300 East Grand River Avenue, Suite 102, Howell, Michigan 48843-7578

www.lchd.org

ADMINISTRATION
517-546-9850
Fax: 517-546-8995

PERSONAL HEALTH
517-546-9850
Fax: 517-546-8995

ENVIRONMENTAL HEALTH
517-546-9858
Fax: 517-546-9853

April 16, 2003

Attn: Mike Campbell
Professional Engineering Associates
2900 E. Grand River Avenue
Howell, MI 48843

RE: Preliminary Approval for "Emerald Estates" Site Condominium Community located in Section 11, Handy Township.

Dear Mr. Campbell,

In accordance with Section 71A of Act 59, P.A. 1978 as amended, the Environmental Health Division of the Livingston County Department of Public Health has reviewed the information submitted for onsite sewage disposal and onsite water supply for the above mentioned site condominium community and is granting preliminary Health Department approval in accordance with the restrictions included in this letter.

The proposed "Emerald Estates" Site Condominium Community consists of 52 single family units with a minimum unit area of 21,295 sq. ft. There is no availability to public water or sanitary waste disposal at this time and none in the foreseeable future. Therefore, each unit will be entirely dependent upon onsite water and sewage treatment and disposal for long term use.

The site report and soil data has been submitted, reviewed, and soil conditions confirmed on site. The soil conditions encountered were predominantly sandy loam to loamy sand conditions which are acceptable for the disposal of onsite wastewater.

The water supply information has been provided to us by Insight Environmental Services with an assessment of the aquifer proposed to serve the individual wells. As indicated in their report, 4 test wells were drilled on proposed Unit(s) 4, 16, 43, and 50.

Based on information obtained on the test well records along with neighboring well logs, the wells will most likely be completed to an approximate depth of 70 ft. in a strata identified as drift material. The wells shall be drilled to a depth that will penetrate a minimum of 10 ft. thick impervious layer or shall maintain a minimum of 50 ft. from the static water level to the bottom of the casing or top of the screen. Due to the fact that the soil overlying the unconsolidated aquifer at "Emerald Estates" does not consistently meet the MDEQ 10 foot thick criteria, all drinking water wells shall be located a minimum of 100 feet from all onsite sewage treatment and disposal systems.

Due to apparent unsuitability of the bedrock, a complete metals analysis for private wells will be required for all drinking water wells completed in bedrock. It is recommended that all drinking water wells at "Emerald Estates" be completed in the granular soils which overly the bedrock.

In addition, water samples have been received from the test wells indicating no coliform bacteria present and nitrates were well below the acceptable State limits. Although the water analysis revealed objectionable high iron and hardness results. Due to objectionable high iron and hardness results, serious consideration should be given to installing filtering and/or water softener systems.

Therefore, pursuant to Section 71A of Act 59 of P.A. 1978, as amended, the proposed "Emerald Estates" Site Condominium Community located in Section 11, Handy Township is granted preliminary approval by this Department contingent upon the following restrictions:

* **Represents all issues that shall be submitted prior to final master deed approval.**

- 1) No unit shall be used for other than a single family dwelling.
- 2) There shall be no future subdividing of any building unit which would utilize individual onsite sewage disposal and/or water supply systems.
- 3) "Emerald Estates" Site Condominium Project has been approved for 52 individual described in Professional Engineering Associates site plan Job #2014 dated 3/1/03 revision 4/02/03. The wells and septic shall be located in the exact area as indicated on preliminary site plan.
- 4) All wells shall be drilled by a Michigan licensed well driller and be drilled to will penetrate a minimum of a 10 ft. impervious clay layer and/or shall maintain a minimum of 50 ft. from the static water level to the bottom of the casing or top of the screen.
- 5) Due to the fact that the soil overlying the unconsolidated aquifer at "Emerald Estates" does not consistently meet the MDEQ 10 foot thick criteria, all drinking water wells shall be located a minimum of 100 feet from all onsite sewage treatment and disposal systems.

not consistently meet the MDEQ 10 foot thick criteria, all drinking water wells shall be located a minimum of 100 feet from all onsite sewage treatment and disposal systems. Due to apparent unsuitability of the bedrock, a complete metals analysis for private wells will be required for all drinking water wells completed in bedrock. It is recommended that all drinking water wells at "Emerald Estates" be completed in the granular soils which overly the bedrock.

- 6) The test well(s) used to determine onsite water supply adequacy have been drilled on Unit(s) 4, 16, 43, and 50. If this/these wells are not intended for the use as a potable water supply, then they must be properly abandoned according to Part 127, Act 368 of the Groundwater Quality Control Act.
- 7) OK*
11/10/03
BR The test wells throughout the project which are not functionable must be abandoned according to Part 127, Act 368, P.A. 1976 of the Groundwater Quality Control Act. Written certification as to the abandonment of these wells by a licensed well driller must be submitted **prior to final master deed approval.**
- 8) There shall be no underground utility lines located within the areas designated as active and reserve septic system areas.
- 9) The reserve septic locations as designated on the preliminary plan on file at the Livingston County Department of Public Health must be maintained vacant and accessible for future sewage disposal uses.
- 10) OK*
11/10/03
BR The final grade in the septic areas shall be prepared according to the information submitted by the engineer for Unit 51. Elevation specifications have been submitted to the Livingston County Department of Public Health for review and have been approved. Engineer certification is required **prior to final master deed approval** indicating that these units have been prepared under engineer guidelines and written certification is required along with an "as-built" drawing depicting the original grades and final constructed grades in the cut or filled areas.
- 11) The onsite sewage disposal system(s) for Unit(s) 1, 3-6, 28-31, 34, 35, 39, 43-45, and ~~52~~ will require the excavation of slow permeable soils to a more permeable ranging between 5.5 feet to 8 feet in depth. Due to the fact that unsuitable soils excavated in the area and replaced with a clean sharp sand, the cost of the system is higher than a conventional sewage disposal system.

- 12) Units 1, 4, 28, 29, and 48 will require an enlarged system due to the heavy soil structure witnessed on these units. Please refer to the soil conditions on file at LCDPH.
- *
OK
11/10/03
BR
13) The engineer must give written certification that any additional grades, filling and/or land balancing that has taken place as part of the construction of the development has not affect the placement for either the active or reserve sewage disposal systems. This certification must be given stating that there has been no changes on any units affected **prior to final master deed approval.**
- *
OK
11/10/03
BR
14) **Prior to final master deed approval,** written engineer certification must be given which indicates that all storm drains which are within 50 ft. (greater than 25 ft.) to the proposed active or reserve septic systems have been sealed with a watertight premium joint material. All septic systems shall maintain no less than 50 ft. from any detention/retention pond unless approved by Livingston County Department of Public Health.
- 15) A 1200 sq. ft. area has been designated on each unit for the active and reserve sewage disposal systems to accommodate a typical 3 bedroom single family home. Proposed homes exceeding 3 bedrooms must show that sufficient area exists for both active and reserve sewage systems which meet all acceptable isolation distances.
- 16) There shall be no activity within the regulated wetlands unless permits have been obtained from the Michigan Department of Environmental Quality.
- 17) All restrictions placed on "Emerald Estates" Site Condominium Community by the Livingston County Department of Public Health are not severable and shall not exp' under any circumstances unless otherwise amended or approved by the Livingston County Department of Public Health.

All deed restrictions along with a copy of the final master deed shall to be submitted to the Livingston County Department of Public Health for review and approval prior to being s to the Livingston County Register of Deeds.

All restrictions established by the Livingston County Department of Public Health must be incorporated into the Deeds for recording. **Any changes within the development from what has been reviewed by the Livingston County Department of Public Health will make this approval null and void.**

If you have any further questions, please do not hesitate to contact me at (517) 546-9858.

Sincerely,



Brian Reynolds
Environmental Sanitarian



David Lucik, R.S.
Supervising Sanitarian

1-0302pm N:\DATA\BrianR\EmeraldEstates.wpd

cc: Mr. Dan Sandahl, MDEQ
Township
Township Engineer
Developer