The Township of Bloomfield Ordains:

ARTICLE I—
TITLE AND PURPOSE
SECTION 100. TITLE:
This ordinance shall be known and may be cited as the Township of Bloomfield Engineering Design Standards.

SECTION 101. PURPOSE:
The purpose is to provide a reasonable and proper basis for the design and construction of subdivision and other sewer site improvements including sanitary sewer, storm sewer, water main and site grading.

ARTICLE II—
GENERAL
SECTION 200. GENERAL REQUIREMENTS:
A. Plans submitted shall be on 23 x 36" or 22 x 36" white prints having blue or black lines, and shall be neatly and accurately prepared. Judgment should be exercised in the design, layout, and presentation of proposed improvements.

B. For projects or subdivisions having more than one sheet of plans, a general plan having a scale of 1" = 100 feet shall be provided showing the overall project or subdivision and indicating the location of all improvements shown in the detailed plans. Street names, lot lines and lot numbers shall be shown in all plans. Easements shall have a minimum width of 12 feet. Sewers in easements shall be kept at least 2 feet away from side or rear lot lines. Superimposed on this general plan shall be 2 foot contours of the area including the area at least 100 feet outside of the subdivision.

C. All sewers shall be shown in plan and profile. Profiles of sewers shall indicate the size, invert and slope of the sewer and shall indicate the existing ground along the route of the sewer and the proposed or existing top of the curb or edge of pavement grade.

D. Elevations shall be on U. S. G. S. datum. Bench marks for the work shall be indicated on the plan.

E. Finished grades of structures shall be indicated on the plan or profile for all structures.

F. A copy of the computed plat shall be submitted.

G. All plans submitted shall bear the seal of the Registered Professional Engineer responsible for the design.

H. One mylar copy of As-Built plan of water, sanitary sewer, roads and storm sewer system and certification from a registered professional Engineer that all surface grades, roads and structures are in conformance with the approved plan shall be provided prior to acceptance of the subdivision improvements by the Township.

I. Complete subdivision improvement plans shall be submitted prior to review and approval of any portion thereof.

ARTICLE III—
SANITARY SEWERS
SECTION 300. SUBMITAL PROCEDURE:
For Township approval of sanitary sewer systems, the applicant shall furnish to the Township of Bloomfield, a detailed estimate of cost and three sets of the sanitary sewer plans and specifications, including the general plan, for the system on which he desires approval. The Township Engineers shall review the estimate and the plans for conformity to the standards set forth herein, and certify that they are consistent with the overall utility plans of the Township, after which they will return one of the three sets with appropriate comments. The applicant, after making any changes requested on the set of plans returned to him, shall then submit eight sets of the revised plans to the Township for final approval. The Township Engineer shall then review these revised plans for conformity to the comments mentioned heretofore, and if they have been properly made, will transmit six copies to the Oakland County Department of Public Works for their review of the connection details (to the Evergreen Sanitary System). The Department of Public Works will then transmit the plans to the Michigan State Health Department for a construction permit. An approved copy will be returned to the applicant via the Michigan State Health Department.

SECTION 301. DESIGN STANDARDS:
1. The following notes pertaining to the sanitary sewers shall appear on the plans:

a. At all connections to the Evergreen Sanitary Sewer Intercept System shall be inserted the following note: “Obtain Oakland County Department of Public Works construction permit prior to starting construction. $50.00 fee required for each connection.

b. Downspouts, weep tile, footing drains, or any conduit that carries storm or ground water shall not be allowed to discharge into this sewer.

c. No sewer installation or portion thereof shall have an infiltration exceeding 600 gallons per inch diameter per mile of pipe per 24 hour period.

d. Concrete pipe wye openings shall contain factory installed Premium Joint Material of a type suitable and approved for use with house lead joint specified.
e. Township of Bloomfield Standard Details and specifications, hereafter adopted, are incorporated as part of these standards.

f. Wherever existing manholes or sewer pipe are to be tapped, drill holes at 4" center to center around the periphery of opening, to create a plane of weakness joint, before breaking section out.

g. For the purpose of testing infiltration, a contemporary 12" deep sump shall be provided in the first manhole above the connection which will be filled in, after successful completion of the infiltration test, up to the standard fillet provided for the flow channel. At all connections to the Evergreen System or extensions thereto, provide a watertight bulkhead with a 1" diameter pipe through the bulkhead for measuring infiltration immediately upstream.

h. For any new manholes constructed over an existing Evergreen Interceptor, or trunk extension, use the Oakland County Department of Public Works wet ground manhole detail with Standard Oakland County Department of Public Works Catchers. Obtain details from the Oakland County Department of Public Works for these items.

2. Prior to starting any sanitary sewer design the applicant may make use of maps and information available at the Township offices. It shall be the responsibility of the applicant to verify utility locations provided by the Township.

3. The following table of minimum slopes for sanitary sewers shall be adhered to:

<table>
<thead>
<tr>
<th>Size and Minimum Slope</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot; @ .28</td>
<td>12&quot; @ .22</td>
</tr>
<tr>
<td>15&quot; @ .15</td>
<td>18&quot; @ .12</td>
</tr>
<tr>
<td>21&quot; @ .10</td>
<td>24&quot; @ .08</td>
</tr>
</tbody>
</table>

NOTE: In the Township of Bloomfield, the minimum allowable size of a sanitary lateral is 10" diameter.

4. A note or detail shall show the type of bedding upon which the sewer pipe shall be installed.

5. The house lead from the lateral sewer to serve the building shall be a minimum of 6" in diameter within the street R.O.W, and shall be extended a minimum of ten (10) feet past the property line.

6. Sanitary sewer manholes shall be spaced with the following recommended maximums:

<table>
<thead>
<tr>
<th>Size</th>
<th>Minimum Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot;</td>
<td>300 feet</td>
</tr>
<tr>
<td>12&quot; to 21&quot;</td>
<td>350 feet</td>
</tr>
<tr>
<td>24&quot; and larger</td>
<td>400 feet</td>
</tr>
</tbody>
</table>

Manholes shall be placed in the street right-of-ways. In general, sanitary sewers will not be approved in the rear lot easement. Sanitary sewer manholes shall be of present construction with modified grooved tongue with rubber gasket.

7. The sewer profile shall indicate the length of run between each manhole, the size and slope of sewer between each manhole, and the class of bedding in the event that concrete bedding is required. Top elevations of all manholes shall be indicated.

8. A minimum depth from top of curb (or road centerline) to the top of any sanitary sewer of 3½ feet at local control points, or a minimum of 9 feet at locations where the sewer grade is parallel to the road grade shall be provided. In all cases the sewer shall be deep enough to serve, by gravity, a standard depth basement.

9. Each wye or end of house connection shall have a plug with the same type of joint as the main sewer.

10. Allowable types of sewer pipe and joints shall be current Bloomfield Township Standards and shall be covered on the plans by note or on the profile where applicable.

ARTICLE IV — STORM SEWERS

SECTION 400. SUBMITTAL PROCEDURE:

For Township approval of storm sewer systems, the applicant shall furnish to the Township of Bloomfield, a detailed estimate of cost and three sets of storm sewer plans and specifications. Detailed storm sewer design computations and the drainage area map indicating the various areas going into the points of inlet shall be provided. The Township Engineer shall review the estimate and the plans for conformity to standards set forth herein, and certify that they are consistent with the overall utility plans of the Township, after which they will return one of the three sets with appropriate comments. The applicant, after making any changes requested on the set of plans returned to him shall then submit four sets of revised plans to the Township for final approval. The Township Engineer shall then review these revised plans for conformity to the comments mentioned heretofore, and if they have been properly made, will retain three copies for the Township's records, and return one approved copy to the applicant. The applicant shall obtain approval of the Oakland County Road Commission and the Oakland County Drain Commissioner where applicable.

SECTION 401. DESIGN STANDARDS:

1. Storm drainage systems shall be designed for a ten year storm. The rational method for arriving at storm water runoff shall be used. The formula for rainfall intensity shall be equivalent to

\[
I = \frac{T+25}{175}
\]

in which \( T \) is the time of concentration. The consulting engineer shall use judgment in arriving at proper impervious factors. The consulting engineer shall submit a map outlining the various areas, including offsite upstream
areas, which drain to the points of inlet used for design together with the storm sewer design computations.

In general, sufficient capacity shall be provided in the storm sewer system to take fully developed (fully paved and sewered) upstream drainage into the system.

2. Where the hydraulic gradient is above the top of the sewer pipe, the design elevation of the hydraulic gradient shall be indicated.

3. Manhole spacing for storm sewers shall be as follows:

<table>
<thead>
<tr>
<th>Diameter of Absolute Maximum</th>
<th>Sewer</th>
<th>Manhole Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot; - 15&quot;</td>
<td>330'</td>
<td></td>
</tr>
<tr>
<td>18&quot; - 30&quot;</td>
<td>350'</td>
<td></td>
</tr>
<tr>
<td>38&quot; &amp; 42&quot;</td>
<td>400'</td>
<td></td>
</tr>
<tr>
<td>48&quot;</td>
<td>450'</td>
<td></td>
</tr>
<tr>
<td>54&quot; &amp; 60&quot;</td>
<td>500'</td>
<td></td>
</tr>
<tr>
<td>66&quot; and larger</td>
<td>600'</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Height of Lo-Hed pipe shall be used as the criteria for manhole spacing. Catchbasins shall not be constructed over a sewer line to replace manholes.

4. The following information shall be indicated on the storm sewer profile:
   a. Length of run between manholes
   b. Size and slope of sewer between manholes
   c. Class of bedding where concrete is required
   d. Top elevation of all manholes

Where possible, the slope of the sewers shall provide a minimum velocity of 2.5' per second velocity.

5. A note or detail shall show the type of bedding upon which the sewer pipe shall be installed.

6. Where possible, provide a minimum of 3 feet of cover from the top of curb (or road centerline) to the top of any storm sewer. If the depth of cover to the top of pipe is less than one foot, C-75 - C 1.4 pipe shall be used. If the cover is between one foot and three feet from top of curb to top of pipe, use C-75 - C 1.3 pipe. All catch basin leads within a street shall be C-75 - C 1.3 pipe, including the leads to the manholes.

7. In general catch basins shall be located as follows:
   a. At the radius return of street intersections, 150 feet maximum distance along the street between a high point and a corner catch basin is allowed when drainage is required to go around the corner.
   b. At all low points in streets.
   c. At intermediate points along the street such that there is a maximum of 600 feet of drainage draining from a high point to a catch basin or from a previous intercepting catch basin to this catch basin.
   d. A maximum of 900 feet of drainage is allowed from two directions.

8. Field catch basins shall be provided at all low points in easements. Locate intercepting field catch basins such that not more than 600 feet of drainage runs into any one catch basin or than a low point of catch basin. 1200 feet of drainage is allowed to run into a low point catch basin. Locate field catch basins in rear lot easement swale when such swale changes direction by more than 45°.

9. Finished easement swales shall be indicated on the plans.

10. Improved open drains may be permitted upon special circumstances in accordance with Article XIV.

11. Headwalls and inlet structures shall be placed as required.

12. Allowable types of sewers and joints shall be current Bloomfield Township Standards and shall be covered on the plan by note or on the profile where applicable.

13. Lateral storm sewers shall be constructed to provide an outlet for the footing drain discharge only shall be a minimum of 8" diameter on a minimum 0.4% grade with manholes spaced a maximum of 300 feet.

14. Wherever sufficient grade is available, the storm sewers shall be constructed at a depth adequate to allow for gravity drainage of the building footing drains. Where grade is not available to allow for gravity drainage of the footing drains, a sump and pump shall be provided with the sump pump discharge connected to the enclosed storm sewer system.

15. A minimum 4" diameter storm sewer lead shall be constructed from the lateral storm sewer to the property line to provide an outlet for the footing drain discharge. The lead shall be constructed at a minimum depth of 3/4 ft. on a minimum of 1.0% grade. The materials and methods of construction shall be in accordance with the current Bloomfield Township Standards.

ARTICLE V - WATER MAINS

SECTION 500. SUBMITTAL PROCEDURE:

For Township approval of water main systems, the applicant shall furnish to the Township of Bloomfield, a detailed estimate and three sets of full water main plans and specifications for the system on which he desires approval. The Township Engineer shall review the estimate and the plans for conformity to the standards set forth herein, and certify that they are consistent with the overall utility plans of the Township, after which they will return one of the three sets with appropriate comments. The applicant, after making any changes requested on the set of plans returned to him, shall then submit nine (9) sets of plans to the Township for final approval. The Township Engineer then review these revised plans for conformity to the comments mentioned heretofore and, if they have
been properly made, will transmit
nine (9) copies to the City of Detroit
for approval. After the City of De-
troit approval has been obtained,
they will be forwarded to the Michi-
gan State Health Department for a
construction permit.

SECTION 501. DESIGN STAN-
ARDS:

1. Type of pipe and joint shall be
in accordance with the current
Bloomfield Township Standards.

2. All water main shall be installed
with a minimum cover of 5’ below
finished grade. Where water mains
must dip to pass under a storm
sewer or sanitary sewer, the sec-
tions which are deeper than nor-
mal shall be kept to a minimum
length by the use of vertical
11 - 45° bends properly anchored.

3. In general, 8” mains will be al-
ternated with 6” mains in streets
within a subdivision system. How-
ever, water mains which are main
feeders within a subdivision, shall
be 8”. Any 6” water mains shall
not have a run longer than 1400
feet between connections to an
8” water main. Gate valves shall
be located in the system such that
not more than four valves need
be turned off to isolate any sec-
tion of water main. Moreover,
sufficient valves shall be placed
such that not more than thirty
lots shall be serviced within such
section of water main which can
be so isolated. Where possible,
gate valves shall be located at
street intersections 5 feet from
the intersecting street right-of-
way line.

4. Hydrants shall be installed along
the water main at least every 600
feet. In no case shall a house be
more than 500 feet from a hy-
drant. In commercial or industrial
districts, additional hydrants
may be required. Hydrants shall be in-
stalled at the ends of all dead-end
water mains. When near a street
intersection, hydrants shall be
located 15 feet from the intersect-
ing street right-of-way. Hydrants
shall be Bloomfield Township
Standard.

5. The plans shall indicate the fin-
ished grades of all hydrants and
gate wells.

ARTICLE VI—
GRADING

SECTION 600. SUBMITTAL PRO-
CEEDURE:

For Township approval of the grad-
ing plan for erosion and sediment
control, the applicant shall furnish a
detailed estimate and three sets of
the subdivision and/or site grading
plans. The Township Engineer shall
review the estimate and plans for
conformity to the principles set forth
herein, after which they will return
one of the three sets with appropriate
comments. The applicant, after mak-
ing any changes requested on the
set of plans returned to him shall
then submit four sets of revised
plans to the Township for final ap-
proval. The Township Engineer shall
then review these revised plans for
conformity to the comments men-
tioned heretofore, and if they have
been properly made, will retain three
copies for the Township’s records,
and return one approved copy to the
applicant.

SECTION 601. DESIGN PRIN-
CIPLES:

1. In order to provide effective ero-
sion and sediment control, prac-
tical combinations of the following
technical principles shall be ap-
piled to the erosion control aspects
of the grading plan.

a. The smallest practical area of
land should be exposed at any
one time during development.

b. When land is exposed during
development, the exposure
should be kept to the shortest
practical period of time.

c. Temporary vegetation and/or
mulching should be used to
protect critical areas exposed
during development.

d. Sediment basins (debris basins,
or silt traps) should be in-
stalled and maintained to re-
move sediment from run-off
waters from land undergoing
development.

e. Provisions should be made to
effectively accommodate the in-
creased run-off caused by
changed soil and surface condi-
tions during and after develop-
ment.

f. The permanent final vegetation
and structures should be in-
stalled as soon as practical in
the development.

 g. The development plan should be
fitted to the topography and
soil so as to create the least
erosion potential.

h. Wherever feasible, natural ve-
getation should be retained and
protected.

ARTICLE VII—
COMPLIANCE STANDARDS

The approvals required under the
provisions of this Ordinance shall be
obtained prior to the installation of
any subdivision or project improve-
ments within the Township, in public
streets, public alleys, public rights-
of-way, and public easements, and/or
under the ultimate jurisdiction of
the Township shall comply with all
of the provisions and requirements
of this or any other related ordinance.

ARTICLE VIII—
INTERPRETATION

The provisions of these regulations
shall be held to be the minimum re-
quirements adopted for the promotion
and preservation of public health,
safety and general welfare of the
Township. These regulations are not
intended to repeal, abrogate, annul or
in any manner interfere with existing
regulations of law of the Township,
or conflict with any statues of the
State of Michigan or Oakland County
except that these regulations shall previ-
ally be used in cases where these regula-
tions impose a greater restriction
than is provided by existing statutes,
laws or regulations.

ARTICLE IX—
FEES

At time of submittal of plans.
ARTICLE XIII — REPEAL

All ordinances and amendments thereto enacted and/or adopted by the Township Board inconsistent with the provisions of this Ordinance are hereby repealed, as of the effective date of this Ordinance. The repeal of the above Ordinance and amendments does not affect or impair any act done, offense committed or right accruing, accrued or acquired or liability, penalty, forfeiture or punishment incurred, prior to the time enforced, prosecuted or inflicted.

ARTICLE XIV — VARIANCE

The Township Board may authorize a variance from these engineering design standards when it determines that undue hardship may result from strict compliance. In granting any variance, the Board shall prescribe other conditions that it deems necessary or desirable for the public interest. No variance shall be granted unless the Township Board finds:

A. There are special circumstances or conditions affecting the subdivision or project improvement such that a strict application of the provisions of this ordinance would deprive the applicant of reasonable use of his property.

B. That the variance is necessary for the preservation and enjoyment of the substantial property right of the applicant.

C. That the granting of the variance will not be detrimental to the public welfare or injurious to other property in the area in which said property is situated.

D. Application for any such variance shall be submitted in writing by the proprietor at the time the preliminary plan is submitted, stating fully and clearly all facts relied upon by the proprietor and shall be supplemented with maps, plans, or other additional data which may aid in the analysis of the proposed project. The plans for such development shall include such covenants, restrictions or other legal provisions necessary to guarantee the full achievement of the plan.

ARTICLE XV — EFFECTIVE DATE

This ordinance shall become effective immediately upon its publication.

Made and passed by the Township Board of the Township of Bloomfield, this 19th day of January, A.D. 1968.

DELORES V. LITTLE
TOWNSHIP CLERK
BLOOMFIELD TOWNSHIP
ORDINANCE NO. 242

AN ORDINANCE TO AMEND ORDINANCE NO. 167 KNOWN AS TOWNSHIP
OF BLOOMFIELD ENGINEERING DESIGN STANDARDS FOR BLOOMFIELD TOWNSHIP

The Township of Bloomfield Ordains:

"SECTION 101. That Ordinance No. 167 be and the same hereby
is amended by the addition of a new Article thereto reading as
follows:

ARTICLE XVI
STREETS, ROADS AND RIGHTS-OF-WAYS, PUBLIC OR PRIVATE

SECTION 1500. GENERAL REQUIREMENTS

A. All streets, roads and rights-of-way, public or private,
   including those in Cooperative, Condominium, Cluster and
   Multiple Developments shall conform to Part II of the current
   "Procedures for Plat Development and Standards and Specifications"
   of the Oakland County Road Commission, as set forth therein,
   except as they pertain to Rights-of-Way in the Cooperative,
   Condominium, Cluster and Multiple Developments.

B. Article IX of Ordinance No. 167 shall apply to all those
   streets, roads and rights-of-way that are not under the
   jurisdiction of the Oakland County Road Commission.

SECTION 1501. SUBMITTAL PROCEDURE

A. For Township approval of the paving plans, the applicant
   shall furnish a detailed estimate and three sets of the
   paving plans. The Township Engineer shall review the estimate
   and plans for conformity to the principles set forth herein,
   after which they will return one of the three sets with
   appropriate comments. The applicant, after making any changes
   requested on the set of plans returned to him shall then submit
   four sets of revised plans to the Township for final approval.
   The Township Engineer shall then review these revised plans
   for conformity to the comments mentioned heretofore, and if
   they have been properly made, will retain three copies for
   the Township's records, and return one approved copy to the
   applicant.

SECTION 1502. DESIGN STANDARDS

A. All storm sewers, draining pavement areas, shall be designed
   in accordance with Article IV of this Ordinance.

B. All pavements shall be designed according to the current
   standards and requirements of the Oakland County Road Commiss-
   sion as set forth in Section VIII of said publication.
   Profiles shall indicate existing ground and the proposed
   top of curb and/or crown of road grades.
SECTION 1502. DESIGN STANDARDS (continued)

C. Pavement widths shall be determined as follows:

1. A collector road is defined as a road carrying traffic from minor roads to major thoroughfares and shall be 33.00 feet wide as measured from back-to-back of curb.

2. A minor road is defined as a road which is used primarily for access to abutting residential properties, and shall be 27.00 feet wide as measured from back-to-back of curb.

D. All subdivisions and building complexes, private or public, having an entrance from a major thoroughfare shall be of the Boulevard type according to the current standards and requirements of the Oakland County Road Commission, Figures 7 and 8.

E. All roads and streets shall be paved according to current Oakland County Road Commission Standards and Requirements, Figures 11, 11A, 12 and 13.

F. All pavement shall have concrete curb and gutter according to the current standards and requirements of the Oakland County Road Commission, Figure 14.

G. All driveways, banners, and/or parades upon or over such roads as described in Section 1500 of this Ordinance shall conform to the current standards and requirements of the Oakland County Road Commission.

SECTION 2.01. That Article VII - Compliance Standards of Ordinance No. 167 be and the same hereby is amended to read as follows:

ARTICLE VII
COMPLIANCE STANDARDS

The approvals required under the provisions of this Ordinance and any amendment thereto shall be obtained prior to the commencement of installation or construction of improvements in any subdivision plat, condominium project or development, cluster housing project or development, or multiple family project or development within Township of Bloomfield.

SECTION 3.01. This Ordinance shall take effect immediately upon its publication.

Made and passed by the Township Board of the Township of Bloomfield this 9th day of October A. D., 1972.

DELOREIS V. LITTLE
Township Clerk