



ENGINEERING SITE PLAN DESIGN STANDARDS

As authorized by the City of Royal Oak

City of Royal Oak
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Introduction

The following engineering site plan design standards are intended to provide a basis upon which all commercial, industrial and multiple family sites within the City of Royal Oak are to be designed and constructed. The requirements outlined herein reflect the requirements of the City of Royal Oak Engineering Division and of the Royal Oak Department of Public Services and conform to current engineering practices in the metropolitan Detroit area. **By no means are these standards intended as a substitute for sound professional engineering judgment.** It is suggested that the applicant obtain a copy of the City of Royal Oak Zoning Ordinance and Ordinance 90-4 to supplement these standards.

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I. Definitions

Whenever in this Document the following terms, or pronouns in place of them, are used, their intent and meaning shall be interpreted as follows:

“city”	The City of Royal Oak, Michigan, or its properly authorized agents or representatives.
“engineer”	The City of Royal Oak Engineer, or his/her duly authorized agents, assistants or representatives, limited to the specific duties assigned or entrusted to them.
“city clerk” “city treasurer” “city attorney”	The Clerk, Treasurer or Attorney of the City of Royal Oak, Michigan, their duly authorized agents, assistants or representatives.
“developer/ contractor/ owner”	The developer of the property under consideration for improvements, either an individual, incorporated company or limited liability corporation. A construction company hired to perform work for the developer or any part of it, his successor, assigns, or his duly authorized agents or legal representatives.
“Standards”	City of Royal Oak Standard Specifications for Construction. Including all additional definitions listed there in; also “city standards.”

II. Applicable Laws, Ordinances and Standards

All listed ordinances are available at the City Clerk’s office for a nominal fee or online free at <https://ecode360.com/RO2029>. The original ordinance numbers are below; however, they are not used in the codified on-line version.

1.	City Code 39	Ordinance 92-17, 2002-2 “An Ordinance to Amend Ordinance 81-6, As Amended ‘Uniform Traffic Code for Cities, Townships and Villages’”
2.	City Code 278	Ordinance 69-23 “An Ordinance Prohibiting Conduct Constituting Offenses Against Public Order and Decency” (As Amended)
3.	City Code 600	Ordinance 90-4 “An Ordinance to Provide for the Regulation of Private and Public Sewage Disposal Systems; Sewer Connections; Waste Pre-Treatment Facilities; Discharge limitations; Pollutant Limitations; Data Collecting, Monitoring and Sampling; and Providing for Penalties for the Violation thereof” (As Amended) Ordinance 99-10 “An Ordinance to Amend Ordinance 90-4...Disconnection of Downspouts and Eaves Troughs from City Sewer and County Combined Drains”
4.	City Code 644	Prev. Ordinance 2004-20 “An Ordinance To Amend Ordinance 91-8, Entitled ‘An Ordinance To Regulate And Control Storm Water Runoff; To Provide Construction And Maintenance Standards For Storm Water Retention Facilities; To Provide For

		Easements For Storm Water Retention Facilities; To Provide For Appeal By Persons Affected; To Provide For Administration And Enforcement; And To Provide For The Assessment Of All Costs Incurred By The City In Rectifying A Violation Hereof” (copy included in this Standard)
5.	City Code 650	Ordinance 2020-04 “An Ordinance to Regulate the Construction and Repair of Sidewalks”
6.	City Code 710	Ordinance 60-2 “An Ordinance to Amend the Title of Ordinance No. 320, Entitled ‘An Ordinance to Provide for and Regulate the Planting and Preservation of all Shade and Ornamental Trees in the Public Highways or Public Places in the City of Royal Oak and to Amend Section 9 of Said Ordinance” (As Amended)
7.	City Code 720	Ordinance 90-12 “An Ordinance to Amend the Uniform Traffic Code for Cities, Townships and Villages as Adopted by the City of Royal Oak in Ordinance 81-6” (As Amended)
8.	City Code 740	Ordinance 2004-5 “An Ordinance To Establish A Waste Water Collection District, To Establish A Mechanism To Set Fees For Privilege Of Using Existing Wastewater Collection System Within The District And To Establish An Enforcement And Appeal Mechanism”
9.	City Code 770	Zoning Ordinance
10.	Public Act No. 53	Miss Dig Act
11.	Public Act No. 347	Soil Erosion and Sedimentation Control Act
12.	Public Act No. 451	Natural Resources and Environmental Protection Act as amended “Roof Downspout Disconnection Law”
13.	Public Act No. 524	Construction Contracts with Public Agencies Act
14.	BOCA National Fire Prevention Code)	

Applicable Reference Standards available upon request

- A. City of Royal Oak Standard Specifications for Construction
- B. City of Royal Oak Standard Streetscape Plans, Details and Specifications
- C. Recommended Standards for Waste Water Facilities (Ten States Standards)
- D. Recommended Standards for Water Works (Ten States Standards)
- E. Michigan Manual of Uniform Traffic Control Devices
- F. Michigan Department of Transportation Standard Specifications for Construction
- G. Michigan Department of Transportation – Uniform Criteria for Major Streets
- H. The Oakland County Erosion Control Manual

III. General Requirements and Procedures

In general, an engineered SITE PLAN is required for any and all work that requires:

- Traffic control installation required by the city or state for blocking public right-of-way, sidewalk, and roadway;
- Excavation of any kind for any purpose including exploratory excavations in the public right-of-way;
- Any new utility in the public right-of-way;
- Removal and installation of any sidewalk, driveway approach or roadway pavement in the public right-of-way;
- Any building construction or building addition on the private property of any non-single-family home;
- Any sewer construction or stormwater management system construction or modification on the private property of any non-single-family home;
- Any paving work on the private property of any non-single-family home;

A. General Submittal Procedures:

1. Prior to the issuance of any building permit, partial building permit, foundation permit or plumbing permit, the plans must first receive an engineering site plan **approval** from the engineering division and the developer shall obtain all engineering division issued permits.
2. Plans shall be submitted through the city's online BS&A portal. Access to the portal is available on the city's engineering website (www.romi.gov/Engineering).
3. An Engineer, Architect or Land Surveyor registered to practice in the State of Michigan must seal plans. **An engineer registered to practice in the State of Michigan must seal all storm water detention plans and calculations per City Code 644.**
4. Upon completion of the engineering site plan review, the city will provide comments through the online portal.
5. Partial approvals will not be given except for plans where the planning commission requires streetscape construction. All revisions on all phases must be made prior to Engineering approval.
6. All site plan reviews will result in an Engineer Permit. The permit shall not be issued until all fees and bonds are paid.
7. If field changes must be made to proposed public utilities or storm water detention systems due to unforeseen existing conditions, the city field engineer shall be notified immediately. The redesign (change of grade, elevation, horizontal location, size, material, etc.) of any proposed public utilities or storm water detention systems shall be approved by the city engineer prior to making any permanent improvement.

8. In case of any conflict arising due to the interpretation of applicable laws, rules, ordinances, standards, policies and agreements as they apply to each development, or in case the meanings of one or all documents should be obscure or uncertain or in dispute, the City Engineer shall decide as to the true intent, and his decisions shall be binding and final. The city engineer reserves the right to resolve discrepancies in plans, the extent of work required, unknown conditions, field changes and any other conflict or irregularity.

B. General Plan Requirements:

1. Plans shall be submitted to 1" = 20' scale. **For sites requiring streetscape construction, 1" = 10' SCALE IS REQUIRED.**
2. When the size of the site prohibits the entire construction site from being shown on a single plan, a 1" = 100' or greater general project site orientation plan must be provided. This general plan should show the streets and their names, right-of-way widths, pavement types, all units, utilities and site dimensions.
3. The Engineering Site Plan or, if in the case of number 2 above, the general plan shall also include lot or parcel dimensions and abutting rights-of-way. A location map shall be indicated with each Engineering Site Plan showing the approximate location of the site relative to major thoroughfares.
4. For any sites that will require a utility easement, sidewalk easement, stormwater detention lien, or other legal document, a legal description of the property must be provided, including the parcel Tax Identification (Sidwell) Number. The Lot numbers and subdivision name must appear on the plans, as applicable.
5. The applicable "City of Royal Oak Standard Notes" specified in these design standards shall appear on the plan when work is planned in the public right-of-way.
6. The sanitary sewer and water main shall be shown on the same plan view. Profiles are required for all public sanitary sewers, storm sewers, and water mains.
7. All profiles shall have a vertical scale of 1" = 1' up to 1"= 5'. The profile shall have the same horizontal scale as the plan view and be shown below the plan view where possible.
8. When many plans are in the set, each plan shall include in its title block, a summary of that particular sheet. In general, plans shall follow the following format.
 - Topographical Survey/Existing Condition Plan (including utilities);
 - Removal/Demolition Plan;
 - Dimensional Site Plan (including property dimension and setbacks);
 - Paving and Grading Plan (including list of quantities);

- Utility Plan and Profiles (including list of quantities);
- Storm Water Management Plan (including calculations);
- Soil Erosion and Sedimentation Control Plan (as may be required)
- Landscaping Plan/Exterior Lighting Plan (as may be required);
- Notes and Miscellaneous Detail Sheet(s)

For small developments, combination of sheets is allowed, provided all information is clear and legible.

9. Include benchmark information on grading plans where appropriate.

For all sites proposing public sanitary, storm or combined sewers, and public water main, an as-built drawing sealed by a Professional Engineer will be required prior to final approval of the permit.

10. All setbacks and building separations must be indicated in accordance with the Zoning ordinance or Plan Commission requirements. Property lines along the public Right-of-way shall be clearly shown with dimensions from the Right-of-way line to the face of proposed building corners whether existing or proposed. Property irons shall be shown on the plans for the development as well as properties adjacent and opposite the development to clearly identify the development boundary and adjacent right-of-way. If property irons are not present, they must be established, installed and demonstrated sufficiently on the submitted plans. Any existing or proposed encroachment including buildings, overhangs, walls, signs and pavements shall be clearly noted.
11. All designated fire lanes, turnarounds including dimensions, fire department connections and any required fire hydrant installation shall be clearly indicated on the appropriate sheets.
12. If the City of Royal Oak Zoning Ordinance or City of Royal Oak Plan Commission requires a retaining or screen wall or berm, it must be shown on the plan with a detail indicating the cross-section.
13. The proposed building use or uses must be indicated on the plan. The gross square footages of all building and each associated use or uses must be indicated on the plan.
14. Required plantings in accordance with the City of Royal Oak Zoning Ordinance or Plan Commission Requirements must be shown on the plan.
15. Submitted plans shall include any additional details, specifications, Engineering Site Plan Checklist and required permits.

C. Field Requirements:

1. **Permits:** The City of Royal Oak Engineering Division will provide inspection on all public utilities and improvements in the City right-of-way as covered by the required Engineering Permit obtained prior to commencing such work as required by city code. Wherever possible, inspection will be full-time on water

mains, sanitary sewers, storm drains and road/alley paving. Part-time inspection may be provided at the discretion of the Engineering division for sidewalks, approaches, roadway patches, curbing, taps to public storm drains. Construction of private storm and sanitary sewer, private water services and fire protection services requires a Plumbing Permit, which shall be obtained at the City of Royal Oak Building Department.

2. Prior to starting any construction, the Contractor must obtain all required permits.
3. All public improvements must be field staked under the supervision of the Engineer, Architect, or Land Surveyor that prepared the plans. Staking must be in accordance with the approved plans.
4. All construction must conform to the current MIOSHA safety standards.
5. At the time of final inspection for all public improvements, the developer or his contractor shall provide all necessary labor, equipment and materials to allow City inspection of the work.

D. Permit Requirements:

1. Engineering Site Plan:

The approved Engineering Site Plan does not constitute all permits required from the City or Engineering division for the construction of the site improvements. Additional permits from the Engineering division may be required and will be addressed in the plan review. Note, however, that other Departments of the City and other agencies may require additional permits.

The other agencies; such as Michigan Department of Transportation (MDOT), Michigan Department of Environment, Great Lakes and Energy (EGLE), South Oakland County Water Authority (SOCWA), Oakland County Department of Public Works (OCDPW), Oakland County Water Resources Commissioner (WRC), Road Commission for Oakland County (RCOC), requiring permits may be listed on the approved plan.

2. Soil Erosion and Sedimentation Control Permit as required by Public Act No. 347 A copy of the Soil Erosion and Sedimentation Control Permit must be submitted to the Engineering division prior to issuance of the Engineering Permit.
3. Michigan Department of Environment, Great Lakes and Energy (EGLE) Water Main Permit (Part 399):

All public water mains require a construction permit from EGLE. The City will directly request approval from the South Oakland County Water Authority (SOCWA) and will apply for the EGLE permit on behalf of the applicant. All plans must comply with EGLE's requirements and shall be sealed by a

Professional Engineer. The applicant shall provide the responses to the EGLE permit application.

4. Michigan Department of Environment, Great Lakes and Energy (EGLE) Sanitary Sewer Permit (Part 41):

All sanitary or combined sewer requires a construction permit from EGLE. The city will apply for the EGLE permit on behalf of the applicant. All plans must comply with EGLE's requirements and shall be sealed by a Professional Engineer. The applicant shall provide the responses to the EGLE permit application.

5. Oakland County Water Resources Commissioner:

All work within the influence of a county drain under the jurisdiction of the Oakland County Water Resources Commissioner (WRC) requires a permit or letter of waiver from the WRC.

6. Road Commission for Oakland County / Michigan Department of Transportation

All work in roads under the jurisdiction of the Road Commission of Oakland County (RCOC) or Michigan Department of Transportation (MDOT) requires a permit from the RCOC or MDOT.

7. Other Permits:

Other agencies that require a permit may be designated on the approved plan. The City is not responsible to alert the Applicant what specific permit(s) is(are) required when other adjacent municipalities or agencies, listed below, may have jurisdiction over the proposed construction.

City of Berkley
City of Birmingham
City of Huntington Woods
City of Madison Heights
City of Southfield
Detroit Zoological Society

Road Commission of Oakland County
Oakland Co. Water Resources Comm.
Michigan Department of Transportation
Michigan Water Resources Commission
Oakland County Health Department
U.S. Army Corps of Engineers
CN Railroad

IV. Survey and As-Built Survey

A. General:

1. A topographical survey is required for all sites proposing new paving and building or site grading. Existing off site topographic elevations must be given at a minimum of 25' abutting the entire perimeter of the site. Grades shall be indicated at all property corners and along all property lines. On site, intermittent elevations or defined contours are required to establish the existing site drainage.

2. All existing conditions shall be indicated, **clearly shown and correctly labeled**. Locations and elevations must be given on the following:
 - benchmarks
 - existing drainage courses
 - upstream and downstream culverts
 - All above and below grade utilities and structures, including sanitary and combined sewer **and sewer leads**; water main and **water service leads**; gas lines and **gas service leads**; telephone and fiber optic lines and ducts; lighting and electrical lines and ducts, etc.; castings finish grades, pipe sizes and sewer inverts and water main top of pipe elevation **are required**.
 - sidewalks
 - trees, base elevation, type and size
 - finished grades and door sill elevations and locations of all adjacent buildings
 - all existing easements
 - all property and right-of-way lines within the scope of the plans
3. Road topography (topographic elevations) shall extend across the entire site frontage with grades shown on both sides of the street (if required by Engineering), no greater than 50 feet apart for:
 - Property line,
 - Ditch center line;
 - Top of bank;
 - Edge of shoulder;
 - Edge of pavement or top and base of curb;
 - Crown or center line (when applicable);
 - At each roadway lane division;
 - Along the back edge of public sidewalk
 - On the public sidewalk in front of building doorways
 - At any change in slope on contiguous pavements listed above.
4. Property lines must be indicated with distances and bearings where applicable (Refer to Section III, B, 10.
5. Existing rights-of-way of adjacent roads must be indicated.
6. Within the public right-of-way, existing curb type and pavement types and separation lines, thickness of road pavement, sidewalk, and approach within the influence of the work must be indicated. Joints in existing pavement, curb, sidewalk and approaches shall also be shown in the vicinity of pavement removal. The pavement type and approximate road thickness information are available from the Engineering Division.

B. As-Built Survey

As built information required for developments and installation of public utilities shall include the following information:

1. For projects that include public **Water Main [SECTION VI]**:

- The location of all structures, valves, bends and water services noted and dimensioned from an adjacent right-of-way line,
- The depth of the main from the new ground surface to the top of the main at the above listed critical locations, annotated "**AB**".

2. For Projects that include **Public Sewer**:

- The location of all structures, and sewer services noted and dimensioned from an adjacent Right-of-way line,
- The elevation of all sewer inverts and rims at the above listed critical locations, annotated "**AB**".
- The slope and direction of flow of all new pipes, annotated "**AB**".

3. For Projects that include Private Property Paving:

- Proposed pavement, structure rim elevations, gutter and top-of-curb grades with strike through and new as built elevation grade adjacent in bold and annotated "**AB**".

EXAMPLE: x ~~732.60~~ [--- *proposed* grade
STRUCKOUT **732.54 AB** [--- As-Built grade]

- The As-built grades of the public sidewalk and approaches proposed or adjacent to proposed pavements and new buildings, annotated "**AB**".

4. For Projects that include full-width paving of roadway or alley pavement in the public right-of-way:

- Proposed pavement, structure rim elevations, gutter and top-of-curb grades with strike through and new as built elevation grade adjacent in bold and annotated "**AB**".

5. For Projects that include Storm Water Detention:

- Proposed pavement, structure rim elevations, gutter and top-of-curb grades with strike through and new as built elevation grade adjacent in bold and annotated.
- All as-built information required for public sewers above.

- **Calculations** that verify the required Detention volume has been provided which includes contours and AS-BUILT HWL shown on the plans.

6. As-built plans shall be transmitted to the City prior to permit closeout.

V. Soil Erosion and Sedimentation Control

A. Sites requiring permits:

All sites having a **construction area of one (1) or more acres** require a Soil Erosion and Sedimentation Control Permit from the Oakland County Water Resource Commissioner's office. Some sites less than 1 acre may also require a Soil Erosion and Sedimentation Control Permit. The Property owner, Developer or his Permittee shall contact the Oakland County Water Resource Commissioner's office to ascertain the necessary erosion control requirements and file with the city Engineer a copy of the Soil Erosion and Sedimentation Control Permit or waiver documentation.

B. Intent of permit:

The intent of this requirement is to ensure that no silt or sediment enters the public sewers, storm drains, streams or watercourses. This is accomplished through means of siltation basins, filters, diversions, etc.

C. Plan required:

A soil erosion and sedimentation control plan is required for all sites that require a permit from the Oakland County Water Resources Commissioner's office. This shall be made a part of the site construction plans. Itemized on this plan shall be step-by-step requirements for controlling siltation. No work (including site clearing) will be allowed until approved siltation control measures are in effect.

Accelerated erosion and sedimentation must be prevented during all phases of construction, including:

- initial site clearing
- material stockpiling
- utility construction
- building construction
- site and right-of-way paving
- site and right-of-way landscaping

D. Inspection:

Inspections are made periodically throughout construction on the maintenance and effectiveness of soil erosion and sediment control methods by the Oakland County Water Resources Commissioner's office. Prior to final approval, the contractor may be required to provide all necessary labor and equipment to allow the City to inspect the site and any City sewer or storm drain for any adverse impact due to improper site soil erosion and sedimentation control measures not installed or maintained

properly. The contractor will be responsible to mitigate and restore all systems to proper working conditions.

VI. Water Main

A. Applicable ordinances:

Refer to International Fire Code, 2015 Edition

B. Notes:

1. When applicable, the City of Royal Oak Standard Water Main notes must appear on the plan.
2. Profiles shall be provided for all proposed water main as required by EGLE.
3. A quantity list itemizing all proposed public water main construction must appear on the plan.
4. All construction shall conform to the current City of Royal Oak Standards and Specifications for Construction.

C. Sizes and distribution:

1. The minimum size water main in the City of Royal Oak shall be eight inches. Six-inch mains may be used only for single fire hydrant leads having a maximum length of 75 feet. No service leads are allowed from a six-inch main.
2. Twelve-inch water main may be considered as minimum for internal transmission on industrial and multiple sites.
3. Looping of mains will be required. These water main improvements shall be done at the expense of the developer.
4. No private services will be allowed from a water main greater than 16 inches in diameter.
5. Water main extensions or replacements will be required to meet the domestic and fire flow demands of a development, which shall be done at the expense of the Developer.
6. All water main installations must be in accordance with the City of Royal Oak Public Water System Hydraulic Network Analysis Plans.
7. The City reserves the right to dictate the ultimate size and location for all public water mains. The City may require a public water main be installed by private developers to accommodate future improvements within the water service district of the proposed improvements and provide extensions and easements for the extensions.

D. Valves:

Gate valve spacing will be as follows:

In the event of a breakage:

- no more than 24 single family units will lose service;
- no more than 30 multiple units will lose service;
- no more than two hydrants will be out of service;
- no more than four valves shall have to be closed to isolate a water main break. Where possible, three valves should isolate the break.

In line valve spacing shall be a maximum of 600 feet

E. Automatic fire sprinkler service connections:

1. The City will allow installation of an unmetered fire service connection provided adequate provision is made to prevent the use of water from such fire service for purposes other than fire extinguishing. Unmetered fire service connections or fire suppression lines shall be connected to a public water main. The locations of fire service connections shall conform to the 2015 International Fire Code, Section 507.5.1.1. Buildings equipped with a standpipe system installed in accordance with Section 905 shall have a fire hydrant within 100 feet of the fire department connections.
2. In no case should hydrants be placed downstream of any check valve used for automatic sprinkler protection. Where hydrants are necessary, separate mains shall be installed for fire sprinkler service and hydrant protection.
3. Sprinkler systems are not a substitute for standard requirements for hydrants.
4. Shut-off locations for fire service leads shall be between the property line and back of curb. Shut-offs shall meet the requirements for public water main valves.
5. As-built plans are required for unmetered fire service connection meeting the specifications herein

F. Hydrants:

1. Single family residential spacing shall be a maximum of 500 feet.
2. Commercial, industrial and multiple spacing shall generally be a maximum of 400 feet in line, but may vary to meet the following requirements: The 2015 International Fire Code, Section 507.5.1 states where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet from an access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official. The developer will install the hydrant, and any water main extension necessary to serve the hydrant, at his own expense. All hydrants shall be

connected to a public water main. The developer shall provide public easements when required.

3. Any hydrant located in a parking lot shall be protected by a minimum of six-inch curb or standard hydrant guard posts. In all cases, the visibility of the hydrant is required. No parking will be allowed within fifteen feet of the hydrant.
4. Additional hydrants may be required depending on the specific use of the property or at the discretion of the Fire Marshall.

G. Materials:

1. All materials shall be in conformance with the City of Royal Oak current standards and specifications.
2. Ductile Iron Water Main, Class 54, is required for all public water mains.

H. Construction:

No building permits for wood frame construction will be issued above the foundation to the active service of the required mains and hydrants and adequate access for fire fighting equipment. No occupancy shall be allowed in any instance without the required mains, hydrants and sprinklers being in active service.

I. Easements:

All public water mains, including hydrants, must be located in an easement or public right-of-way. Easement descriptions shall be forwarded to the City Engineering division upon Engineering Plan Approval. The easement size will vary individually as required for maintenance and access. The minimum water main easement width shall be 12 feet. The dedication of the easement will be required prior to construction of the system.

J. Water service leads:

1. Water service leads for commercial properties shall be a minimum of 2 inches in diameter unless otherwise approved by the City. All water service leads require a plumbing or building permit from the City of Royal Oak Building Department.
2. Private water service leads of excessive length, although not a public water supply, may require inspection and testing. Each site will be considered individually by the Engineering and Building Departments.
3. The City performs water main taps of 2-inch services or smaller. The City will perform the 1-inch or 1½-inch domestic water service tap or commercial service tap and will install a curb stop valve and box on this service in the public right-of-way line. The contractor should contact the City of Royal Oak

Treasurer, for water tap fee, scheduling the tap, and metering/shutoff requirements.

4. Private water service leads shall be connected to a public water main and in no instance be connected to a private fire suppression line.
5. All existing and proposed water service leads shall be clearly shown on the plans.

VII. Sanitary Sewer

A. Applicable ordinances:

Refer to Section II
State law, MCL 324.3112(b)
Royal Oak Ordinance, 90-4
Royal Oak Wastewater Collection System Fee Ordinance 2004-05

B. General:

1. Public sanitary sewers (or combined sewers) are required when two or more separate buildings connect to the same sewer. A single building may have more than one building lead connected to a common header pipe before connecting to a public sewer.
2. The extension of the sanitary sewers will generally be required across the entire frontage of the site and shall be done at the expense of the Developer.
3. All construction shall conform to the current City of Royal Oak Standards and Specifications for Construction.
4. The City reserves the right to dictate the ultimate size and location for all public sewers. The City may require public sewers installed by private developers to accommodate future improvements within the drainage district of the proposed improvements and provide extensions and easements for the extensions.

C. Notes:

1. Where required, the City of Royal Oak Standard Sanitary Sewer Notes shall appear on the plans.
2. A quantity summary itemizing all proposed public sanitary sewer construction must appear on the plans.

D. Sewerage:

Downspouts, weep tile, footing drains, or any conduit that carries storm or ground water shall not be allowed to discharge directly into a separate sanitary

sewer/system. City Ordinance 90-4 requires that all downspouts discharge on grade unless connected to a restricted storm water detention system.

E. Grade:

1. The following table represents the minimum and maximum grade for public combined and sanitary sewers. Note that these are minimum and maximum requirements and should be used only when topography requires it.

<u>Size</u>	<u>Standard Grade</u>	<u>Minimum Grade</u>	<u>Maximum Grade</u>
8"	0.80%	0.40%	0.80%
10"	0.60%	0.30%	6.2%
12"	0.40%	0.22%	6.0%
15"	0.24%	0.16%	3.6%
18"	0.18%	0.12%	2.8%
21"	0.14%	0.10%	2.2%

2. All upstream dead end sewers shall have a minimum last run grade of 1.0%.

F. Manholes:

1. Sanitary Sewer Manholes shall be spaced as follows:

<u>Size</u>	<u>Standard Run</u>	<u>Max Sewer Run</u>
8"	300 ft	400 ft
10"	400 ft	450 ft
12"	450 ft	500 ft
15"	500 ft	500 ft
18"	600 ft	600 ft
21"	600 ft	600 ft

2. A manhole will be required at all changes in alignment, size or grade of pipes greater than 10-inches in diameter.
3. Required standard manhole sizes are as follows and are HIGHLY recommended for private storm systems:

<u>Pipe Size</u>	<u>Standard Manhole Size</u>
------------------	------------------------------

8" - 18"	4 ft diameter
21" - 24"	5 ft diameter
27" - 36"	6 ft diameter
36" - 60"	8 ft diameter

G. Location:

1. Sanitary and combined sewers shall be located so as to provide unrestricted access for maintenance and inspection. A minimum alignment separation of 10 ft. must be maintained between the sewer and all water mains. The water main and sanitary sewer shall be located on opposite sides of the street, wherever possible.
2. All public sewers must be located in a public right-of-way or an easement. Easement drawings and descriptions shall be forwarded to the City Engineering division upon receiving plan approval. The easement size will vary individually as required for maintenance and access. The minimum sanitary sewer easement shall be 12 feet in width. The required sewer easement will be set at twice the sewer depth. The execution of easements will be required prior to issuance of permits. For any project requiring an easement or license agreement, the City will require the Developer or property Owner to provide a boundary survey and plans prepared by a professional surveyor, licensed in the State of Michigan, for review and approval, prior to issuing any permits.

H. Leads:

1. Service leads and common header pipes for multiple and commercial properties shall be a minimum of 6 and 8 inches in diameter, respectively, with a minimum slope of 1.0%. All service leads and common header pipes require a Plumbing or Building Permit from the City of Royal Oak Building Department.
2. Private sanitary sewer leads of excessive length, although not a public sewer, may require calculations, a profile plan, inspection and testing. Each site will be considered individually by the Engineering and Building Departments.
3. Common header pipes on private property which have multiple leads from the same building shall have a 6-inch minimum diameter clean out at each bend or at intervals as determined by the plumbing code but shall not be greater than 100 feet apart.

4. All existing and proposed sewer service leads shall be clearly shown on the plans.
5. Proposed sewer service leads are regulated by the City of Royal Oak adopted plumbing code requiring a minimum of 1% slope. Proposed building sanitary sewer leads shall not be connected to existing or proposed storm drain systems or outlet pipes.

I. Profile:

1. The following information shall be indicated on the sanitary or combined sewer profile:
 - Length of run between manholes.
 - Type and class of pipe between manholes.
 - Size and grade of pipe between manholes.
 - Top of casting elevations.
 - Existing and proposed utility crossings.
 - Inverts of all pipes at manholes and utility crossings.
 - Existing and proposed ground elevation along the route of the sewer.
 - Progressive numbering system on all manholes.
 - Trench backfill materials.
 - Provisions for infiltration testing.

J. Drop connections:

1. External drop manhole connections are required where the invert of the outlet pipe is 18 inches or more below the invert of the inlet pipe. Internal drop connections will not be allowed.
2. Drop connections are not required on connections of storm drains to combined sewers.

VIII. Storm Drain

A. Applicable ordinances:

Refer to Section II
State law, MCL 324.3112(b)
Royal Oak Ordinance 90-4
Royal Oak Sewer Tap Fee Ordinance
Royal Oak Ordinance 2004-20

B. General:

1. Public storm drains are required when two or more properties are drained by one pipe located on private property.

2. The extension of the storm drains will generally be required across the entire frontage of the site and shall be done at the expense of the Developer.
3. All construction must conform to the current City of Royal Oak Standard Specifications for Construction.
4. Where required the City of Royal Oak Standard Storm Drain Notes shall appear on the plan.
5. Underground drainage facilities will generally be required. All runoff on site must be accommodated and discharged in a controlled manner. The minimum on site pipe size shall be 8 inches in diameter. All public systems shall have a minimum pipe size of 12 inches in diameter. A minimum pipe size of 12 inches shall also be required between any connection to the public system and the structure immediately upstream of the connection.
6. Sump pump discharge must be directed into the storm or combined sewer via an enclosed system. The minimum discharge pipe size shall be 4 inches in diameter.

C. Structure:

1. Catch basins at the upstream end of the system shall be a minimum of 24 inches in diameter. Catch basins with an inlet pipe shall have a minimum diameter of 36 inches in diameter and include a 24-inch deep sump. All public manholes and catch basins shall be a minimum of 48 inches in diameter, with a 24-inch deep sump on all catch basins.
2. The first structure upstream from a public system within the confines of the private development shall be a minimum 48 inches in diameter and include a 24-inch deep sump.
3. Manholes shall be located at:
 - Any change in alignment, unless approved by the City Engineer.
 - Any change in pipe size.
 - Any change in elevation.
 - Any junction of the drainage system.

D. Storm drain design:

1. Storm drains shall be designed using the Manning Equation for pipes flowing full. Runoff shall be determined using the Rational Method with an intensity formula of:

$$I = 175/(T+25)$$

The initial time of concentration T shall generally be 20 minutes maximum.

2. Storm drainage design computations must be submitted for review. The velocity shall be a minimum of 2.5 fps and shall not exceed 10 fps.
3. The hydraulic gradient must be maintained within the pipe, whenever possible.
4. Runoff coefficients can be determined for each individual drainage area and calculations for each drainage area must be submitted as part of the design computations using the following coefficients:

Paved or Buildings	C=0.90
Agricultural/landscaping	C=0.15 (< 5% slope)

In addition to individual coefficient design, the following shall be used as minimum coefficients:

Multiple Family	C=0.55 minimum
Commercial	C=0.75 minimum
Industrial	C=0.75 minimum

5. A storm drainage district map must be provided showing all districts within the development. The district limits must overlay the proposed grading plan for the site.
6. All upstream drainage must be accommodated on site, except for right-of-way drainage. Allowances for upstream area must be based on ultimate improvements and runoff. **Discharge shall not be diverted onto abutting properties.** Right-of-way drainage must be maintained and controlled with improvements in the public right-of-way.
7. Calculations indicating the capacity of downstream public storm drains or combined sewers may be required.

E. Plan and profile:

1. All public storm drains must be shown in profile. For developments larger than one (1) acre, private storm drains must also be shown in profile.
2. The following must be shown in profile:
 - Length of run between drainage structures.
 - Type and class of pipe between drainage structures.
 - Size and grade of pipe between drainage structures.
 - Top of casting elevations.
 - Existing and proposed utility crossings.
 - Inverts of all pipes at drainage structures and utility crossings.
 - Existing and proposed ground elevations along the route of the storm drain.
 - Progressive numbering system on all drainage structures.
 - Trench backfill materials.

F. Taps:

Connections must be made at drainage structures. Blind taps may only be allowed with the explicit approval of the City Engineer.

G. Public storm drain:

1. All public storm drains must be located in a public right-of-way or an easement. Easement drawings and descriptions shall be forwarded to the City Engineering division upon receiving Engineering Plan Approval. The easement size will vary as required for maintenance and access. The minimum storm drain easement shall be 12 feet in width. The execution of the easement will be required prior to construction of the system. For any project requiring an easement or license agreement, the City will require the Developer or property Owner to provide a boundary survey and plans prepared by a professional surveyor, licensed in the State of Michigan, for review and approval, prior to issuing any permits.
2. Any storm drain that accepts runoff from abutting property or public right-of-way must be placed in a minimum 12-foot wide storm drain easement. The required easement will be set at twice the sewer depth, unless otherwise approved by the Engineer.
3. The City reserves the right to dictate the ultimate size and location for all public storm drains. The City may require public storm drains be installed by private Developers to accommodate future improvements within the drainage district of the proposed improvements and provide extensions and easements for the extension of public storm drains.

IX. DRAINAGE AND RUNOFF

A. Applicable Ordinances:

Refer to Section II, page 3.
City Code 644 (Royal Oak Ordinance 2004-20)
State Law, MCL 324.3112(b)
Royal Oak Ordinance 90-4
Royal Oak Wastewater Collection System Fee Ordinance
Public Act No. 451

B. Storm Water Detention:

1. CITY CODE 644 (ORDINANCE 2004-20)
AN ORDINANCE TO AMEND ORDINANCE 91-8, ENTITLED ‘AN ORDINANCE TO REGULATE AND CONTROL STORM WATER RUNOFF; TO PROVIDE CONSTRUCTION AND MAINTENANCE STANDARDS FOR STORM WATER RETENTION FACILITIES; TO PROVIDE FOR EASEMENTS FOR STORM WATER RETENTION FACILITIES; TO PROVIDE FOR APPEAL BY PERSONS

AFFECTED; TO PROVIDE FOR ADMINISTRATION AND ENFORCEMENT; AND TO PROVIDE FOR THE ASSESSMENT OF ALL COSTS INCURRED BY THE CITY IN RECTIFYING A VIOLATION HEREOF - requires that all commercial, multiple family and industrial developments provide storm water detention. Acceptable means of detention can be achieved through standing water in parking areas, oversize storm pipes, below grade tanks and a separate retention basins. Any or all of these designs may be utilized to achieve the required detention. **An Engineer, registered to practice in the State of Michigan must seal all storm water detention plans and calculations per City Code 644.**

2. The following general requirements are outlined in more detail in City Ordinance 2004-20 and this synopsis is not a substitute for obtaining and adhering to the ordinance. Any updates to the ordinance take precedence over the information presented herein.

- a. Detention must be provided to store a volume as calculated using the Oakland County method of storm water detention for a ten-year storm frequency as detailed in the ordinance.

Discharge must be limited to 0.2 cfs per acre for sites with an area of 1.5 acres or more.

Discharge must be limited to 0.3 cfs maximum when total property area requiring detention less than 1.5 acres.

- b. Calculations for the runoff coefficients, detention volume and restrictor sizing shall be clearly shown on the proposed detention/grading plan(s).
- c. The ponded water surface shall be clearly shown on the detention/grading plan(s). One foot of freeboard above the ponded water surface shall be maintained below all finished floor elevations of adjacent buildings.
- d. Outlet detail or details shall be clearly shown on the plans. Restrictor size, type and location shall be clearly indicated on utility plans. The 100-year free overflow shall be clearly labeled with the appropriate calculations and details.
- e. On sites where only partial detention is being provided, a Site Detention Development Plan shall be submitted addressing the ultimate detention requirements for the time when either the property is fully developed or falls within the guidelines of the ordinance. The plan shall outline all future detention areas and provide calculations for the ultimate detention volume and shall show restrictor size and location(s). This conceptual plan will be used, as a guide for the City and property Developer to assure that the site will provide adequate detention storage area(s) at the time of future developments.
- f. As built plans shall be provided for all detention areas. Plans shall clearly indicate sufficient site grades; water surface contours and revised calculations based on the as-built grades verifying that the required volumes

have been met. Deficiencies in detention storage volume shall be addressed with plans to provide the required detention volumes.

- g. The City of Royal Oak Engineering Department will require approval prior to construction to alter or regrade any area that provides storm water detention storage (swale, pond, pipe system, paved surface, etc.) or provides freeboard for a detention system (berms, landscaping, curbing, walls, etc.) Upon completion of the site work, an as built plan will be required to verify the restricted outlet, site grading and detention storage volumes in comparison to originally approved grades and volumes. Storm Detention and Right-of-way work shall be completed and approved prior to the City Engineering division signing off on any OCCUPANCY PERMIT or other approval.
- h. One detention volume calculation shall be made for the entire site. Previous hard surface improvements that required detention or a lien shall be included in calculation. Cumulative hard surface improvements shall be shown on the plan and labeled accordingly with the areas of improvement and dates of construction.
- i. The minimum size outlet pipe shall be 8" diameter. Manholes shall be provided at each connection to public sewers of 15" or less and at all pipe junctions 10" and larger.
- j. Restrictors shall be sized to discharge at the appropriate rate. To minimize the potential for orifice clogging, the minimum size restricted orifice is 2 ½" in diameter. All restrictors and their respective calculations shall be indicated on the plans. **The total cumulative discharge from all restrictors shall equal the site total discharge.**
- k. The restricting outlet structure (manholes and catch basins) shall be precast concrete and 48" minimum diameter with a 2' minimum sump.
- l. All runoff from newly installed developments, additions and renovations shall be directed to the detention basin.
- m. A 100-year storm overflow is required to be calculated and identified on the plans. Below grade overflows are only allowed when surface overflow cannot be achieved.
- n. The City of Royal Oak shall retain the authority to approve/deny the construction of detention basins within public utility easements based on potential impacts to public utilities.
- o. No structure shall be installed within a detention basin that may allow the circumventing of detained water storage. Detention basins shall not be installed above any utility structure, manhole, water gate well, electrical handhole, etc. or within the limits of trash enclosures or any building.

- p. Due to the potential for silting of void space, stone chambers and/or backfill shall not be used as part of the storage volume for underground detention systems.
- q. In general, the calculation for the volume of a pyramid or frustum of a pyramid shall be used to most accurately determine the proposed or as-built volume of a detention area as follows:

Surface area 1 (A_1) = upper surface area, in square feet
Surface area 2 (A_2) = lower surface area, in square feet
Storage depth (H) = vertical distance between A_1 and A_2 , in feet

$$\text{Volume} = \frac{H}{3} \times [(A_1 \times A_2)^{1/2} + A_1 + A_2]$$

The Engineer shall verify any other method of calculating volume mathematically and compare to the volume using the formula listed herein.

Retention/Detention Basins:

- r. All open retention basins must be fenced if the side slopes exceed 1 vertical to 6 horizontal. The Engineering division may waive this when the design is an integral part of the landscaping and the location and depth does not present a potential hazard. The earthen side slope shall be 1 vertical to 3 minimum horizontal. Fences shall be a minimum of 6 feet high chain link with a locking access gate, 8 feet wide as detailed in the ordinance.
- s. The basin must be constructed to drain entirely, unless designed to retain a permanent water level that conforms to the aesthetics of a landscape plan relating to the surrounding landscape. Over-size pipe and below grade tanks must be constructed to drain entirely as detailed in the ordinance.
- t. The bottom of the basin must be sodded or paved as detailed in the ordinance.
- u. A minimum of 12 inches of freeboard must be maintained with a positive, non-erodable overflow spillway for all proposed systems as detailed in the ordinance.
- v. Minimum grade on the bottom of the retention basin shall be 1.2% when sodded. For paved swales in basins, the minimum shall be 0.5%.
- w. A Permanent Easement shall be required for all retention basins and below grade tanks. Easement descriptions shall be forwarded to the City Engineering division upon Engineering Plan Approval.
- x. Rooftop detention will only be allowed when an at-grade or below grade detention solution is not feasible.

Surface Storage:

- y. A minimum of 6 inches of freeboard should be maintained with adjacent properties and a positive, non-erodable overflow spillway to the public right-of-way as detailed in the ordinance shall be provided and clearly shown on the grading/paving plan.
 - z. When multiple ponding areas have different water surface elevations, multiple restrictors will be required. To reduce the potential of clogging, restricted catch basin covers (restricted lids) shall have an appropriate sized hole or holes as follows: One hole of the appropriate size up to 5 square inches or two holes of the appropriate equal size up to 10 square inches.
 - aa. Ponding on parking lots shall be limited to **9" depth**. Ponding on parking lots may be allowed at deeper depths, provided that the system is comprised of only surface detention and the deeper areas are limited to driving lanes in the parking lot. A Hold Harmless Affidavit from the property holder is required.
- C. IN AREAS WHERE STORM WATER DETENTION IS NOT REQUIRED BY ORDINANCE: The City will not allow the discharge of runoff, downspouts, roof water directly to the public right-of-way unless the following criteria are met, in the opinion of the City Engineer:
- 1. The public right-of-way has been improved to accommodate the point discharge location of runoff, and
 - 2. The discharge location will not cause unnecessary damage, harm, nuisance or encumbrance to the public in particular pedestrian traffic, and
 - 3. The discharge location will not cause unnecessary damage or maintenance of public facilities by the City of Royal Oak or adjacent property owners,
 - 4. The discharge location is located no higher than 18" above an appropriately paved surface at the location of discharge.
- D. For drainage in the public right-of-way, refer to Section X –E
- E. When drainage constitutes installation of a public sewer, refer to Section VIII

X. PAVING AND GRADING

A. APPLICABLE ORDINANCES:

Refer to Section II
Americans with Disabilities Act of 1990

B. GENERAL:

1. All public paving shall conform to the current City of Royal Oak Standard Specifications for Construction.
2. Alterations to public right-of-way pavements shall conform to the standards herein. Alterations include additions, widening, removal and replacement due to pavement cuts for utility connections, etc.
3. Where required, the City of Royal Oak Standard Paving Notes shall appear on the plans.

C. ONSITE PAVING:

1. A cross section of all on site paving is required on the plans. Pavement shall consist of concrete or asphalt; gravel is not allowed.
2. Bumper blocks and/or curb/curb and gutter shall be required, where in the opinion of the City Engineering division, the edge elevation of a paved drive or parking lot is of sufficient height above or below adjoining grades, that it creates a hazardous condition. Bumper blocks shall be installed on private property unless otherwise approved by the Engineering division. Bumper blocks shall be located a minimum of 3 feet from any public walk, so that no portion of a vehicle parked with tires against the blocks overhangs public sidewalk.
3. The Design Engineer shall fully demonstrate on his plans that ADA compliant landings areas meet federal requirements with detailed plans with sufficient dimensions and grades outside designated ingress/egress locations.
4. Proposed doorways for developments should be located at least 25 feet from existing or proposed sidewalk ADA crosswalk detectors, to allow for federally required sidewalk slopes and ADA compliant landing areas.
5. Onsite parking shall comply with city zoning regulations.

D. PUBLIC RIGHT-OF-WAY PAVING:

1. A cross section of proposed paving is required. Minimum requirements are dependent on the type of existing pavement as follows:

- a. Concrete major thoroughfare and collector roads required 8 inches of concrete on subbase as outlined in the City of Royal Oak Standards and Specifications for Construction.
- b. Asphalt-capped major thoroughfare and collector roads require 3 inches minimum asphalt cap and 8 inches of Portland cement concrete on subbase as outlined in the City of Royal Oak Standards and Specifications for Construction.
- c. Concrete local roads generally require 7 inches of concrete with integral curb and gutter on subbase as outlined in the City of Royal Oak Standards and Specifications for Construction.
- d. Public alley construction shall consist of 7 inches of concrete on subbase as outlined in the City of Royal Oak Standards and Specifications for Construction. Public alley construction may include integral curb and gutter on one or both sides of the alley paving.
- e. Asphalt-capped local roads generally require 3 inches minimum asphalt cap and 6 inches of concrete base with integral curb and gutter on subbase as outlined in the City of Royal Oak Standards and Specifications for Construction. When asphalt pavement is allowed, the minimum thickness shall be 4 inches with a minimum of 6 inches of compacted aggregate base shall be installed below as outlined in the City of Royal Oak Standards and Specifications for Construction.
- f. The City Engineering division will consider requirements for existing unimproved roads (asphalt without curb and gutter), gravel roads and non-curbed roads adjacent to proposed developments on an individual basis.
- g. Grades for proposed road paving shall always be noted to match existing adjacent grades at match locations. Along unimproved roadways, the City will establish the grades of pavement and curb and gutter based on MDOT and AASHTO Road Design standards.
- h. Removal of existing pavement shall be to the nearest joint of an existing, acceptable pavement slab or curb and gutter in the opinion of the Engineer. The City reserves the right to dictate the limits of pavement removal or restoration when pavement alterations are proposed or required as part of a development. The alteration limits shall be set to achieve a proper, durable restoration that will integrate with existing and future similar improvements and be in the best interest of the City. Deficient pavement, in the opinion of the Engineer, includes sunken, cracked, broken, and scaled - road and alley pavement, pavement not meeting the standard dimensions, slope or thickness or causing the ponding of water will be determined by the City for replacement at the time of plan review. All existing pavement or portions thereof, along the frontage of a development that is substandard or deficient will be

reviewed for replacement when a proposed cut is made into the pavement. Alterations of road and alley pavement on public right-of-way shall be installed to current standards, widths, cross sections and slopes as dictated by the Engineer.

2. In general, 24-inch wide concrete drop-curb and gutter is required at all approaches. Removed approaches and unimproved roads adjacent to proposed developments require six (6) inch high, twenty-four (24) inch wide concrete curb and gutter. The location for back of proposed curb shall conform to the following guidelines:
 - a. Match adjacent back of curb location or street width;
 - b. Provide for a minimum 27' wide (back of curb to back of curb) roadway on local streets to be centered within the public right-of-way or
 - c. Provide for a roadway width as outlined in the "Uniform Criteria for Major Streets" Michigan Department of Transportation, rev. 1986 to be centered within the public right-of-way, or
 - d. Locate the proposed back of curb and gutter to the location and elevation as dictated by the Engineering division.
3. Passing lanes, acceleration lanes and tapers, and deceleration lanes and tapers will be required in accordance with the requirements of the Plan Commission, the City Traffic Committee and as outlined in the City of Royal Oak Standards and Specifications for Construction, Michigan Department of Transportation (MDOT) or Road Commission for Oakland County as necessary. Curb and gutter required on the passing, acceleration, or deceleration lanes should be full-height (six inches high) 24-inch wide concrete curb and gutter.
4. The dedication of right-of-way along the frontage of the site to accommodate utilities or sidewalk will generally be determined and identified by the Plan Commission prior to Engineering Site Plan submittal.
5. Sufficient proposed grades shall be shown on the plans. Spacing of proposed grades shall be at a frequency equal to or greater than that required for the survey requirements of this policy. Grades for proposed curb and gutter shall include top of curb grades and gutter grades. Proposed grading shall meet minimum requirements listed herein. Road centerline and crown grades shall be shown when new pavement is installed at or near the road centerline or crown. Long sections of curb and gutter or road way installation shall include longitudinal slopes and profiles if determined by the Engineer.
6. When installing proposed curb and gutter adjacent to asphalt pavement or asphalt capped concrete pavement, a minimum 2' wide butt joint shall be installed to provide for a smooth transition between the existing road surface and the new edge of metal of the curb and gutter. When existing pavements do not meet the minimum 1% transverse slope towards the curb and gutter, it shall be

expected that the City will require that the existing asphalt road surface shall be milled and capped to meet this minimum requirement to within the limits as outlined in the standard **AGREEMENT FOR STREETSCAPE IMPROVEMENTS**, see Section VII as part of the development.

7. Restoration of the public right-of-way areas not intended for vehicular traffic shall be made either with concrete pavement, when approved, or in most cases with the appropriate depth of topsoil and **sod** landscaping that meets the specifications outlined in the City of Royal Oak Standards and Specifications for Construction. The request of any other material is subject to review by the City. Loose stones, rocks and asphalt paving are not allowed. Tree planting locations may be required when adequate space is available.

E. DRAINAGE IN RIGHT-OF-WAY:

1. Enclosure of drainage ditches across the frontage of the site will be required.
2. Side slopes on any open ditch drainage on private property shall be 3 minimum horizontal to 1 vertical. The ditch bottom shall be 2 feet wide.
3. All Public right-of-way shall be constructed to drain to public storm or combined sewer system located within the public right-of-way or easement. Positive drainage shall be maintained.
 - a. Where existing **unimproved** right-of-way drains onto or through the private property of a proposed development, the right-of-way drainage shall be corrected with public road, alley, curb and gutter, sidewalk and utility improvements which will provide for the drainage to discharge to a public storm drain.
 - b. Where a development proposes discharging storm water to an existing unimproved right-of-way, the Developer shall show that this public right-of-way has adequate drainage facilities and does not discharge to other private properties. The development will be required to improve right-of-way drainage with public road, alley, curb and gutter, sidewalk and utility improvements which will provide for the drainage to discharge to a public storm drain.
 - c. These improvements shall be shown on the various development plans.

F. CITY SIDEWALKS:

1. Sidewalks shall conform to the following criteria:
 - a. Americans with Disabilities Act
 - b. MDOT R-28 Standard Details (current version)
 - c. City of Royal Oak Standard Sidewalk Details

d. City of Royal Oak Sidewalk replacement criteria

2. Sidewalks are required along the frontage of all developments where none currently exists. They shall be located in the right-of-way, one foot from the right-of-way line unless otherwise determined by the Engineer.
3. The walk shall be a minimum of 5 feet wide, constructed of 4 inches of concrete on compacted porous subgrade. The walk must be continued through driveway sections where it shall be increased in thickness to 8 inches for commercial developments, 7 inches thick in Streetscape areas and 6 inches thick in all other instances. The walk shall not be lowered to driveway elevations and curbs must be tapered to meet the walk. Cross slopes on the sidewalk shall be a minimum 1/4-inch per foot (1%) toward the street (transverse) with a maximum 2% and longitudinal slopes shall be a minimum of 1% (optimal) with a maximum of 8% unless otherwise approved. Grades for proposed sidewalk paving shall always be noted to match existing adjacent grades at match locations.
4. Proposed grades must be indicated along the property line and of the walk, driveways, and intermittent locations along the length of the walk. Proposed grades must provide for public sidewalk to drain to the existing or proposed storm drain or combined sewer system.
5. Any structures, hydrants, poles, etc. that are existing along the alignment of the walk, must be adjusted or relocated at the expense and coordination of the Developer.
6. All existing sidewalk or portions thereof, along the frontage of a development that is substandard or deficient shall be replaced with new sidewalk. Removal of existing sidewalk shall be to the nearest joint of an existing, acceptable sidewalk flag/square. Deficient sidewalk meeting the criteria established by City Commission shall include sunken, cracked, broken, and scaled walk, walk not meeting the above listed dimensions, slope or thickness or causing the ponding of water will be determined by the Engineer for replacement.
7. Proposed walk construction shall include handicap ramps per the City of Royal Oak Standards and Specifications for Construction (handicap ramps at intersections) at the intersection of every street and as determined by the Engineer. Proposed doorways for developments should be located at least 25 feet from existing or proposed sidewalk ADA crosswalk detectors, to allow for federally required sidewalk slopes and ADA compliant landing areas.
8. Installation of new sidewalk that abuts non-compliant ADA accessible ramps or that cause any existing ramp or ramp area to be non-compliant shall be removed and replaced and reconstructed to comply with ADA requirements. The Designer shall fully demonstrate that ADA compliant sidewalk areas meet federal requirements with detailed plans with sufficient grades.

9. Sidewalk jointing shall be as noted on the plans or as noted below. Saw cutting of new sidewalk jointing is not allowed and shall be cause for replacement.
 - a. Tooled joints for all control joints.
 - b. Paper expansion joints as dictated by City of Royal Oak Standard Specifications and shown in standard details.
 - c. Special decorative tooled joints as required for streetscape areas.

G. SITE PAVING AND GRADING:

1. Sufficient proposed grades must be indicated on the plan to ensure that:
 - a. Drainage is adequately discharged off site with proper detention, across a drive or paved area into the public right-of-way,
 - b. Drainage cannot discharge onto or across neighboring private property,
 - c. No upstream drainage is restricted,
 - d. Paving is in accordance with standards outlined herein,
 - e. The site in general drains without standing water,
 - f. Drainage from the Public right-of-way is controlled within the Public right-of-way,
 - g. Drainage of proposed developments is directed towards the detention areas,
 - h. Measures to control erosion along drainage courses are shown on the plans.
2. Elevations representing the brick ledge, finished grade, and the first floor grade must be indicated as well as the rims of existing utility structures requiring adjustment.
3. Building finish floors shall be established so that right-of-way grading and sidewalk/pavement grades shall not be significantly altered (raised or lowered). The City reserves the right to reject any plan to alter the public right-of-way to accommodate building and private property improvements. All changes in elevation between building finish floors and public sidewalk shall be made on private property with appropriate grade separation features such as stairs and ramps.
4. Proposed grading shall meet abutting property line elevations. Differentials in grade must incorporate a minimum 4 horizontal to 1 vertical slope to the abutting property line.

5. Retaining walls along public right-of-way are highly discouraged. Any wall separating a differential grade of more than 12 inches shall be considered a retaining structure and will require a structural Engineering design and review and shall be permitted through the City of Royal Oak Building Department.
6. Asphalt curbing is strongly discouraged and not allowed for providing the required freeboard for detention systems.

XI. MISCELLANEOUS REQUIREMENTS

A. Use of the Public Right-of-way:

1. **Landscaping:** All landscaping improvement plans for the public right-of-way will be considered a construction project and will be required to follow the review procedures outlined herein. Plan submittal and review may be required. The City will require at a minimum a preliminary plan and an Engineering Permit. All trees planted in the public right-of-way shall conform to those trees approved by the City Parks and Forestry Department.
2. **Irrigation:** Property owners are allowed to irrigate the public right-of-way at their own discretion. The City reserves the use of the public right-of-way for public utilities and infrastructure.
 - a. The City will require at a minimum, a preliminary plan and Engineering Permit for installation of irrigation systems in the public right-of-way prior to construction. The City will make repairs to damaged irrigation systems installed in the public right-of-way damaged during a City construction project so long as a plan for the installation is on file with the City Engineering division.
 - b. Installation of any irrigation system in the public right-of-way shall be limited to watering the landscaping in that localized area. Spray from sprinklers shall not jet across any paved area, private drive or walkway or any public sidewalk or roadway to irrigate landscaping on the other side of the paving. Excessive spray onto any paved surface either public or private will require immediate correction and will be in violation of this standard and approved Engineering Site Plans.
 - c. The adjacent property owner responsible for the grass maintenance shall remove abandoned or unused irrigation systems from the public Right-of-way.
3. **Obstructions:** The public right-of-way shall be maintained free of obstructions per Ordinance 650 as amended.
 - a. Obstructions of public right-of-way include construction equipment and materials including portable toilets and trailers. Use of the right-of-way during construction activities is outlined in the Engineering Permit issued

for each project. Permanent right-of-way obstructions which are not allowed without a City approved license agreement include boulders, landscape timbers, railroad ties, screen/decorative walls, decorative planters, pots or statues, benches or other furniture, signs, placards, sight obstructing plantings, etc. For any project requiring an easement or license agreement, the city will require the developer or property owner to provide a boundary survey and plans prepared by a Michigan licensed surveyor for review and approval, prior to issuing any permits.

- b. Pedestrian Access shall be maintained at all times on the public sidewalk adjacent to the proposed construction unless special permission and a pedestrian detour plan is approved by the City. All pedestrian detours shall be on paved surfaces.
 - c. The City will not approve the placement construction trailers and related temporary facilities (toilets/port-a-john, storage sheds etc.) to be located in the public right-of-way unless that right-of-way is closed and entirely fenced, secured and has been designated as part of the construction operation.
4. **Traffic Control:** All traffic control shall conform to the Michigan Manual of Uniform Traffic Control Devices. Traffic control plans are required for any construction that will block any portion of the traveled roadway.

XII STREETScape AND CBD REQUIREMENTS

A. GENERAL:

When required by the Plan Commission, the Developer shall complete and submit plans for review by the Engineering division for the construction of public streetscape improvements. Public streetscape improvement plans shall include all items listed within the following **AGREEMENT FOR STREETScape IMPROVEMENTS**.

Examples of approved plans and specifications will be given to the Developer for his use in preparing plans and will include typical details and schematic layouts.

The following is the **AGREEMENT FOR STREETScape IMPROVEMENTS**, which will be required to be signed by the Developer prior to construction of approved streetscape. The agreement outlines the responsibilities and requirements of the City and the Developer.

AGREEMENT FOR STREETScape IMPROVEMENTS:

THIS AGREEMENT is made and entered into on this the _____ day of _____, 20____, by and between the CITY OF ROYAL OAK, a Michigan Municipal Corporation, whose address is 203 S. Troy Street, Royal Oak, Michigan 48067 (hereinafter CITY), and

_____, a Michigan Corporation, whose address is

_____, Michigan _____,
(hereinafter BUSINESS).

RECITALS

WHEREAS, the CITY desires to maintain consistent public streetscape throughout the downtown area and;

WHEREAS, BUSINESS, desires to improve, install and develop a public streetscape in accordance with all ordinances, rules, and regulations of the City of Royal Oak and;

WHEREAS the CITY and BUSINESS desire to construct the public streetscape improvement under the terms and conditions set forth below.

THEREFORE, in consideration of and reliance upon the recitals, terms, promises, covenants and conditions contained in this Agreement and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the CITY and BUSINESS agree as follows:

AGREEMENT

1. Definitions:

- A. Development".** All of the streetscape improvements on the BUSINESS' property or on the public property immediately adjacent to the BUSINESS' property that have been approved by the City of Royal Oak Planning Commission.
- B. "Public Streetscape Improvement".** Generally defined as the removal of existing concrete sidewalks, curb and gutter, lighting, and other related existing infrastructure in the public right-of-way; the installation of new concrete sidewalks complete with concrete block pavers, street lighting, irrigation, trees, tree gates, curb and gutter, street paving, related drainage and landscape furnishings, and all related work. The work shall also include developing CITY approved engineering plans and specifications for the improvements in accordance with CITY Engineering division standards, rules, regulations, and policies.

2. The BUSINESS shall develop, produce, finance, pay-for and/or install the following:

- A. Develop generic public streetscape design plans** for work adjacent to the proposed development site with the limits of the plan extending to the nearest street intersection in each direction.

The generic design plans shall include the brick pattern layout; curb and gutter alignment and grade; street lighting type, location, spacing, wiring, conduit, and final controller and meter location including any required easements; irrigation system layout, piping, and final controller location; tree type, size and location, related drain system improvements, paving and landscape furnishings.

- B. If previously designed and/or installed, pay the cost of the generic public streetscape design and improvements for the area within the project limits, and the costs of any existing design and improvements adjacent to the development that are attributable and proportionate to the development as determined by the City Engineer.
- C. Develop detailed public streetscape construction plans and specifications for the streetscape improvement to be constructed adjacent to the development site to a reasonable ending location and any improvements required outside the project limits to serve the development. The detailed plans and specifications shall be suitable for public construction and shall meet the requirements of the current edition of the City of Royal Oak Site Plan Design Standards and Standard Specifications for Construction. Any errors and or omissions in the plans shall be the responsibility of the BUSINESS to correct, complete, design and construct to provide the intended final streetscape.
- D. Submit plans, specifications and required fees for all work to the Engineering division for site plan review.
- E. Install in accordance with approved plans and specifications:
 - i. Concrete streetscape sidewalk improvements including the concrete base course complete with block pavers or stamped colored concrete as approved by the City of Royal Oak.
 - ii. Concrete curb and gutter including related drainage pipes and drainage structure improvements and other related pavement restoration and City infrastructure improvements required for the work.
 - iii. Asphalt resurfacing and/or pavement replacement of the existing roadway to match the new curb and gutter and provide transverse drainage of 1% minimum, to a distance no less than 12' as measured perpendicular to the edge of metal of the new curbing or as directed by the City.
 - iv. Trees, tree grates and related operational tree irrigation systems including all piping, sprinkler heads, foundations, conduits, electrical wiring, back flow preventer, valves, fixtures, and irrigation system controller as required.

- v. **An operational public ornamental street lighting systems including all foundations, conduits, electrical wiring, fixtures, lighting controller and electrical meters as required. The work shall include the removal of all existing public lighting, poles, controllers and meters as required for the work.**
 - vi. **All temporary electrical feeds, conduits, connections between any locations of permanent lighting system improvements.**
 - vii. **All permits and inspections, construction signage and permanent traffic control devices.**
 - viii. **All systems shall be operational and approved by the CITY prior to acceptance and return of required performance bonds.**
- 3. **Mid-block developments: Streetscape required for mid-block developments will not be installed until an adjacent development that has been required to install public streetscape improvements that will extend to the nearest intersection, is scheduled to be constructed. The BUSINESS with a mid-block development shall pay the CITY the cost of the public streetscape improvements and all of its permanent components listed in 2E above in lieu of constructing the required streetscape. The cost of this item is \$_____ as determined by the CITY through the public bid process. This streetscape payment shall be made prior the BUSINESS obtaining a Certificate of Occupancy for the development. This provision does not relieve the BUSINESS from installing right-of-way improvements necessary to serve the BUSINESS and the Public until the time of permanent streetscape installation. These improvements may include sidewalk repairs, new drive approaches, curbing and landscape restoration in accordance with CITY and Engineering division standards, rules, regulations, and policies.**
- 4. **Engineering Permit: The BUSINESS shall obtain a CITY Engineering Permit for all streetscape improvement work.**
 - A. **Engineering division approved construction plans and specifications for the work are required before a CITY Engineering Permit can be issued.**
 - B. **All private property easements required for the work must be provided and executed before a CITY Engineering Permit can be issued.**
 - C. **A bond in the form of cash or letter of credit as outlined in the City of Royal Oak Standard Specifications for Construction - Special Instructions is a requirement for obtaining an Engineering Permit.**
 - D. **All inspections required by the City for the construction, including Engineering, Plumbing and Electrical inspections.**
- 5. **The CITY shall be responsible for financing the following:**

- A. The generic public streetscape design work outside of the project development limits. The cost of the work must be submitted to the CITY for approval prior to the commencement of any work.
 - B. The portion of the cost for the tree irrigation system controller and/or lighting system controller that will service facilities outside of the limits of the public streetscape improvement adjacent to the development project.
 - C. City public infrastructure improvements not required for the developer's streetscape work but mandated because of a pre-existing condition in the public infrastructure.
 - D. Roadway resurfacing and/or pavement replacement, at the request of the city, wider than one 12-foot traffic lane measured from the concrete curb and gutter edge of metal or wider than the necessary 1% minimum transverse slope pavement width.
 - E. Additional permanent streetscape not required for the developer's streetscape work but mandated by the City of Royal Oak to end the streetscape at a logical ending point.
 - F. Contract unit prices for work to be paid for by the CITY must be submitted to the CITY for approval prior to beginning any work.
6. Time. BUSINESS agrees to complete all work under this Agreement by _____, 20_____.
7. Delay and Extension. The parties agree that should BUSINESS be obstructed or delayed in the prosecution or completion of work by disastrous storms, acts of Providence, general strikes, Court Injunction, or by any neglect or delay on the part of the CITY, the BUSINESS shall have no claim for damages for such causes or delay, but shall in such case be entitled to such extension of time limit specified herein for the completion of the work as the CITY Engineer shall adjudge to be just and reasonable, provided however, that any claim for such extension be made in writing by the BUSINESS within a week after the time when such alleged cause or delay shall have occurred. A revised schedule of completion for all work covered by this Agreement is required as part off any formal claim for extension. Claims for extension shall be in writing and shall be received by the City of Royal Oak Engineer 10 business days prior to the completion date listed above.
8. Approval of Changes. Changes in the plans and specifications shall not be made except with the prior written approval of the CITY Engineer. Such approval shall not be unreasonably withheld. Change requests shall be stated in a written request and shall specify a detailed description of the change and the cost or credit of the change.
9. Plans and Specifications Cooperative. The Plans and Specifications are intended to be cooperative. They shall be construed as supplementary and explanatory each to the other, and any work called for on the Plans and not particularly shown on the Plans is to be as included under this

Agreement the same as is set forth in the Specifications and exhibited on the Plans.

10. **Conflict.** In case of any conflict between the Specifications and the Plans, or in case the meaning of either or both should be obscure or uncertain or in dispute, the CITY Engineer shall decide as to the intent, and his decisions shall be binding and final.
11. **Approval.** All work shall be subject to the approval of the CITY Engineer.
12. **Compliance with Laws and Ordinances.** The BUSINESS shall obey and abide by all the laws of the State of Michigan relating to the employment of labor and all ordinances and requirements of the City of Royal Oak regulating or applying to the improvement.
13. **Defects.** The BUSINESS shall forthwith remedy any defects in work that appear and of which the BUSINESS is notified in writing by the CITY within 12 months from the completion of the improvement.
14. **Access.** During construction of the improvements, the BUSINESS shall permit the CITY and all other public authorities to inspect the work and materials used for the improvement.
15. **Incorporation of documents.** The marked-up plans (Attachment A) and the changes on the plan as shown on the drawing attached as exhibit B, are specifically incorporated by reference in this Agreement.
16. **Bond.** The BUSINESS shall provide to and for the benefit of the CITY a performance bond, subject to the provisions thereof as contained in the City's Zoning Ordinance and pursuant to the Engineering Division's policy and guidelines.
17. **Insurance Requirements.** The BUSINESS shall not commence work under this Agreement until it has obtained the insurance required under this paragraph. All coverages shall be with insurance carriers, licensed and in good standing with the State of Michigan and acceptable to the CITY.
 - A. **Comprehensive General Liability Insurance:** The BUSINESS shall procure, and maintain in effect during the life of this Agreement, Comprehensive General Liability Insurance in an amount not less than \$1,000,000 combined single limit of liability.

The above requirement does not limit the liability of the BUSINESS under this Agreement.

18. **Additional Insured.** All Certificates of Insurance forwarded to the CITY by BUSINESS must name the City of Royal Oak as an additional named insured. All certificates forwarded to the CITY by the BUSINESS shall include an endorsement stating the following shall be "Additional Insured: The City of Royal Oak, all elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and board members, including employees and volunteers thereof." All certificates will give thirty (30) days notice of intent to cancel or of non-renewal to the CITY. Insurance coverage must be written through an

insurance company that is licensed as an admitted carrier to do business in the State of Michigan by the State of Michigan Department of Insurance.

19. **Indemnification.** BUSINESS agrees to indemnify and hold harmless the CITY and its officers, employees, and agents from any and all liability, loss or damage as a result of claims, actions, suits, causes of action, proceedings, costs, expenses, judgments, and liabilities of any kinds whatsoever arising out of the BUSINESS'S or BUSINESS'S contractors, agents, servants, or employees performance of the work described herein. It is further agreed that the BUSINESS, the BUSINESS'S agents, servants, or employees, shall be liable to the CITY for any damage suffered by the CITY as a result of the failure of performance, provided such damages are caused by the BUSINESS'S error, omission or negligent act, or the error, omission or negligent act of its officers, contractor's, agents or employees.
20. **Service of Notice.** Any notices required by this Agreement shall be served personally or by registered mail, certified receipt requested, to the party to whom it is requested, to the party for whom it is intended at the address listed at the beginning of the Agreement.
21. **Default.** When, in the opinion of the City Engineer, the work or any part of the work to be done under this Agreement has been abandoned, is unnecessarily delayed, cannot be completed at the rate of progress or within the time specified, or the BUSINESS or BUSINESS'S agents, servants or employees are willfully violating any of the covenants, carrying it out in bad faith, or have been adjudged as bankrupt, or if he should make a general assignment for the benefit of this creditors, the City Engineer shall so certify in writing to the CITY, and the CITY, in writing may declare the BUSINESS in default and so notify him to discontinue the work. The CITY may then complete the work or may complete it by other means. The CITY may take over and use materials and equipment at the site of the work and other materials and equipment used elsewhere for the work at the time of default, and may procure other materials, equipment, and all else necessary for the completion of the work. The CITY may recover the cost of completing the work from the BUSINESS or from the Surety.
22. **Ownership of documents.** Original documents, drawings, design and notes submitted to the CITY become the property of the CITY.
23. **Extra work.** It is agreed by the parties that any extra work not specifically mentioned in this Agreement but which is obviously necessary to the complete performance of the Agreement and which may be fairly implied as included, will be considered included and be performed by BUSINESS without extra charge or liability to the CITY.
24. **Time is of the essence in the performance of this Agreement.**
25. **This Agreement contains the entire agreement of the parties concerning the design, construction, and installation of the public streetscape improvement. All prior and simultaneous negotiations are merged in this Agreement. This Agreement may be modified only by a written document signed by the parties.**

- 26. Nonassignability:** This Agreement may not be assigned, in whole or in part, by either party without the prior written consent from the other, which consent shall not be unreasonably withheld.

B. PLANS AND SPECIFICATIONS

1. Plans for PUBLIC STREETSCAPE IMPROVEMENTS shall follow the format as developed by the Engineering division.
 - Cover Sheet
 - Construction Signing and Traffic Control Plans
 - Horizontal & Vertical Topography Plans (Scale 1"=10')
 - Removal & Lighting/Utility Improvement Plans (Scale 1"=10')
 - Notes & Details for Lighting/Utility Improvement
 - Paving & Grading Plans (Scale 1"=10')
 - Notes & Details for Pavement/Sidewalk Improvements
 - Pavement Resurfacing/Markings & Landscaping Plans (Scale 1"=10')

An example set of drawings can be provided to the developer to emulate for submittal to the Engineering division.

2. Plan **Horizontal and Vertical Topography** shall be from block to block with the frequency of elevation shots similar to those in the sample plans supplied by the City to the developer and shall include intersection information for the entire block that the development lies within. This is required to satisfy the generic streetscape design plans required for each block. If the Plan Horizontal and Vertical Topography has already been completed it will be given to the developer for his use.
3. As-built plans shall be supplied to the Engineering division within 30 days of the completion of permanent paving work and shall indicate all as-constructed features, including grading, that are different from the approved plans.
4. Specifications for **PUBLIC STREETSCAPE IMPROVEMENTS** shall follow the Standard City of Royal Oak format as given above and shall include the applicable City Standard Specifications:
 - a. Water Main Items of Work
 - b. Irrigation Items of Work
 - c. Electrical Items of Work
6. **REPAIR OF DAMAGED OR REMOVED STREETSCAPE:** In locations where streetscape has been constructed previously, repairs to streetscape in areas proposed to be removed as part of the development or damaged during construction shall be constructed as follows:

- a. Using the most current standards and material specifications for streetscape construction for the specific area proposed.
- b. Broken pavers shall not be used. Stamped colored concrete shall be used per city standards.

C. STREETSCAPE DESIGN GUIDELINES:

- a. **Layout and Alignment:** The City shall develop the conceptual layout and alignment of proposed curbing, lighting, trees and concrete block paver areas for the block in which the streetscape improvement lies. Based on the development's drive locations, trees and lighting locations will be adjusted to accommodate site entrances. Trees may be eliminated to accommodate drives while in most cases lights will not be eliminated. For developments in areas where streetscape currently exists, the development shall correct the spacing of lights and trees to the standard City spacing and layout of that block, due to the addition or removal of drives. Layout corrections may require the addition or relocation of existing trees and lights. Correction of layout and alignment will be at the developer's expense as required in the Streetscape Agreement.
- b. **Grading:** The first developer in each block where streetscape has been designated for construction is required to perform a topographic survey and design the grading of that block. The grading shall include location and elevation of drainage structures, top and gutter of curbing and sidewalk grades at the edge of proposed walk near the Right-of-way line. The survey shall conform to the requirements of the City Site Plan Design Standards as required in the Streetscape Agreement.

Grading Requirements:

- i. Significant grade changes to the public right-of-way required by a developer to meet barrier free and building code requirements shall be performed at the cost of the developer.
 - ii. Desirable transverse slopes on public streetscape are 1%-3%. Maximum slopes on public streetscapes shall be 5% and 8% at drive approaches.
 - iii. Desirable transverse slopes on public streets are 1.2%-3%. Maximum slopes on public streetscapes shall be 5%.
 - iv. The height of curbing in the public right-of-way shall be 6-inches maximum.
- c. **Street Lighting:** Developers shall install permanent street lighting conduit in the permanent location in the area being improved with streetscape adjacent to their development as required in the Streetscape Agreement. Developer shall install a connection to the existing or proposed street lighting controller location with an electrical feed in conduit in the location shown on the approved plans. The permanent location of all electrical shall be shown on the plans as well as the

location of any temporary connection proposed by the developer. This electrical feed and connection shall be installed at the cost of the developer. All connections between any permanent electrical service and temporary electrical service shall be made in an approved electrical handhole.

Public Lighting Requirements:

- i. All public lighting shall be owned and operated by the City or other public utility.
 - ii. All lighting controllers shall be owned and operated by the City or other public utility.
 - iii. All public lighting systems and lighting controllers including DTE power supply shall be installed on public property or within a previously approved public easement.
 - iv. The City will not assume ownership of any transformer required to power any lighting system, or allow a public system be powered by/through private transformers or meters. All transformers shall be pole mounted or on private property in a previously approved public easement.
 - v. All City-owned and operated public lighting systems are metered per DTE requirements.
- d. **Road paving:** Temporary improvements including paving, required transitioning proposed streetscape improvements to existing remaining roadway or sidewalk shall be the responsibility of the developer to design and install. This 'transition zone' shall be designed to meet the City of Royal Oak grading and drainage requirements and may be reviewed for pedestrian and vehicular safety. Any permanent street paving and curb work outside the streetscape limits, if required by the City, to complete curb alignment or drainage will be funded by the City and charged to the future streetscape developers of this area as required in the Streetscape Agreement. Any permanent street paving and curb work outside the streetscape limits, if required by the City, to correct an existing condition or improve the finished roadway to a reasonable finishing point will be at the City's expense.

D. CENTRAL BUSINESS DISTRICT REQUIREMENTS:

- 1. **FENCING** - Within the Central Business District, the City has established a common decorative fencing requirement for all property that abuts the Grand Trunk/Canadian National Railway Right-of-way. All developments that abut or propose improvements along the Canadian National Railway Right-of-way shall install decorative - wrought iron look -fencing that matches the style and dimensions of fencing located on the east side of the Canadian National Railway Right-of-way between Washington Avenue and Fifth Streets. Installation of decorative fencing may require the removal of existing fencing that does not conform to the above listed standard. Fencing shall be shown on Engineering

Site Plans as required. This fencing improvement shall be installed at the cost of the developer.

2. ROOF DRAINS AND DOWNSPOUTS – City Code 644 allows exemption for developments in the Central Business District from providing storm water detention. Also controlling development drainage is Public Act No.4 of 1998 amending Public act 451 of 1994, which prohibits all roof drain connections directly to City sewers and requires all roof drains to spill on grade. The City has determined that roof drains, which discharge onto public right-of-way and in particular, public sidewalk, can create hazards during certain weather conditions. The City therefore requires one of the following:

- a. Roof drains in the central business district shall discharge at grade on the property of the development. The discharge locations shall not cause hazards in adjacent public right-of-way, which shall be demonstrated by the developer to include the volume of flow for a 10 year storm flow at each point of roof discharge and flow path of roof discharge to nearest public drain or catch basin.
- b. A direct connection may be made between a proposed roof drain and a public sewer such that the development provides a small amount of storm water detention and the outflow is restricted to that of agricultural runoff. The detention volume required is based on a time of concentration equal to the flow of water off site from the furthest point of a roof to the center of the roof with an agricultural overland flow rate and through a pipe to a point outside the building.

$$\begin{aligned} T_c &= [(A_r/2)^{1/2} / 120 \text{ ft/min}] + [(A_r/2)^{1/2} / 6 \text{ ft/min}] \\ &= (\text{pipe outlet flow time} + \text{roof flow time}) \end{aligned}$$

$$Q_a = C \times I \times A_r = 0.90 \times (175/(T_c + 25)) \times (A_r / 43,560)$$

$$V_t = [0.217 \times A_r \times T_c] / (T_c + 25) - 40 \times Q_a \times T_c$$

Where: A_r = roof area, square feet
 Q_a = allowable outflow from site, cubic feet per second
 T_c = time of concentration, minutes
 V_t = volume of detention required, cubic feet

City of Royal Oak
Site Plan Design Standards
2024

*The following notes shall be placed on **ALL** construction plans. They may be modified when appropriate.*

CITY OF ROYAL OAK STANDARD NOTES

1. NOTIFY THE CITY OF ROYAL OAK ENGINEERING DIVISION AT (248)246-3260 A MINIMUM OF 24 HOURS PRIOR TO THE START OF CONSTRUCTION AND PRIOR TO INSPECTIONS.
2. ALL CONSTRUCTION MUST CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS ADOPTED BY THE CITY OF ROYAL OAK.
3. CALL MISS DIG (800)482-7171 OR 811 A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
4. ALL SOIL EROSION AND SEDIMENT MUST BE CONTROLLED AND CONTAINED ON SITE. ALL PUBLIC DRAINAGE STRUCTURES REQUIRING CLEANING SHALL BE COMPLETED PRIOR TO FINAL INSPECTION BY THE CITY.
5. ALL EXCAVATION UNDER OR WITHIN 3 FEET OF PUBLIC PAVEMENT, EXISTING OR PROPOSED, SHALL BE BACKFILLED AND COMPACTED WITH MDOT CLASS II SAND PER THE CITY OF ROYAL OAK REQUIREMENTS.
6. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO PUBLIC UTILITIES, PAVEMENT, CURB, CURB AND GUTTER AND SIDEWALK IN THE PUBLIC RIGHT-OF-WAY.
7. PRIOR TO THE ISSUANCE OF AN OCCUPANCY PERMIT, ALL RIGHT-OF-WAY AND STORM DETENTION WORK SHALL BE COMPLETED AND APPROVED AND ALL REQUIRED AS-BUILT PLANS SHALL BE APPROVED.
8. FOR ANY PROJECT REQUIRING AN **EASEMENT** OR **LICENSE AGREEMENT**, THE CITY WILL REQUIRE THE DEVELOPER OR PROPERTY OWNER TO PROVIDE A BOUNDARY SURVEY AND PLAN EXHIBITS PREPARED BY A PROFESSIONAL SURVEYOR, LICENSED IN THE STATE OF MICHIGAN, FOR REVIEW AND APPROVAL PRIOR TO ISSUING ANY PERMITS.

The following notes shall be placed on construction plans on the appropriate sheets if pertinent to the proposed construction. They may be modified when appropriate.

GENERAL NOTES

1. ALL WORK WITHIN THE CITY RIGHT-OF-WAY SHALL BE COMPLETED IN ACCORDANCE WITH THE CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION. CONTRACTORS MUST OBTAIN AN ENGINEERING PERMIT FROM THE CITY ENGINEERING DIVISION PRIOR TO PERFORMING THIS WORK.
2. THE CONTRACTOR IS REQUIRED TO USE THE MOST CURRENT CITY OF ROYAL OAK STANDARD SPECIFICATIONS, NOTES AND DETAILS AVAILABLE AT THE TIME OF ENGINEERING PERMIT ISSUANCE. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE CURRENT STATUS OR REVISION TO ANY CITY STANDARD DETAILS OR SPECIFICATIONS, WHICH MAY HAVE BEEN SHOWN, CALLED OUT OR IMPLIED ON THE APPROVED PLANS.
3. CONTRACTOR MUST MAINTAIN ONE (1) LANE OF TRAFFIC IN EACH DIRECTION AT ALL TIMES IN THE ROADWAY ADJACENT TO THE PROJECT UNLESS OTHER AGREEMENTS ARE REACHED WITH THE CITY FOR TEMPORARY OR PERMANENT ROAD CLOSURES. THE CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
4. ALL UTILITY TRENCHES AND EXCAVATED AREAS IN THE PUBLIC RIGHT-OF-WAY OR FOR PUBLIC UTILITIES IN EASEMENTS ON PRIVATE PROPERTY SHALL BE BACKFILLED WITH MDOT CLASS II SAND IN MAXIMUM 12 INCH LIFTS AND COMPACTED TO 95% MODIFIED PROCTOR DENSITY WITHIN PAVEMENT INFLUENCE AREAS. 90% DENSITY IS ALLOWABLE IN GREENBELT AREAS.
5. ALL LAWN AREAS DISTURBED WITHIN CITY RIGHT-OF-WAY ADJACENT TO LOCAL STREETS SHALL BE RESTORED WITH 3" OF TOPSOIL AND CLASS A SOD. CITY RIGHT-OF-WAY ADJACENT TO MAJOR STREET SHALL BE RESTORE WITH TOPSOIL, SEED AND MULCH BLANKET.
6. "AS-BUILT" DRAWINGS OF ALL PUBLIC SEWER, WATER MAIN, LIGHTING AND IRRIGATION WORK WITHIN CITY RIGHT-OF-WAY INCLUDING PRIVATE SERVICES AND STORM DETENTION FACILITIES SHALL BE PREPARED BY THE DEVELOPER OR CONTRACTOR AND FURNISHED TO THE CITY ENGINEERING DIVISION WITHIN THIRTY (30) DAYS AFTER COMPLETION OF THE WORK. DRAWINGS SHALL INCLUDE "AS-BUILT" LOCATIONS AND INVERTS OR COVER OVER ALL WYES, LEADS, STRUCTURES, AND VALVES, RESTRICTORS ETC. INSTALLED.
7. WHEN CONFLICTS ARISE BETWEEN NOTES AND DETAILS ON THE PLANS AND IN THE SPECIFICATIONS, THE CITY ENGINEER SHALL MAKE THE FINAL DECISION AS TO WHICH DETAIL OR NOTE APPLIES TO THE PROPOSED CONSTRUCTION.
8. THE CONTRACTOR SHALL COORDINATE AND COOPERATE THE WORK SO AS NOT TO DELAY OR INTERFERE UTILITY COMPANIES, AND CITY FORCES

WORKING IN THE RIGHT-OF-WAY OR EASEMENTS. THE CONTRACTOR SHALL MAKE EVERY EFFORT TO COORDINATE HIS WORK WITH THE OTHER CONTRACTORS WORKING IN THE IMMEDIATE AREA.

9. ALL EXCESS FILL AND OTHER MISCELLANEOUS DEBRIS OR OTHER MATERIAL GENERATED BY THE PROJECT SHALL BE PROPERLY AND EXPEDITIOUSLY HAULED AWAY FROM THE PROJECT AREA TO AN APPROPRIATE LANDFILL.
10. ALL INSPECTION FOR THE CONSTRUCTION OF THE PROJECT WILL BE PERFORMED AS OUTLINED IN THE RIGHT-OF-WAY PERMIT, EXCLUDING INSPECTION REQUIRED BY THE OAKLAND COUNTY DRAIN COMMISSIONER'S OFFICE, THE MICHIGAN DEPARTMENT OF TRANSPORTATION OR THE ROAD COMMISSION FOR OAKLAND COUNTY. ALL TESTING NECESSARY FOR THE CONSTRUCTION OF THE PROJECT WILL BE PROVIDED BY THE CONTRACTOR.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING ALL SURVEY STAKES AND MARKS NECESSARY FOR THE CONSTRUCTION OF ALL WORK UNLESS OTHER AGREEMENTS ARE MADE WITH THE CITY.
12. MATERIALS, TOOLS, AND EQUIPMENT SHALL NOT BE DISTRIBUTED UPON OR NEAR THE SITE OF THE WORK IN SUCH A MANNER AS TO OBSTRUCT LOCAL VEHICLE OR PEDESTRIAN TRAFFIC OR CAUSE UNNECESSARY INCONVENIENCE. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ALL MATERIALS UNTIL THEY ARE FINALLY INCORPORATED INTO THE WORK AND ACCEPTED BY THE CITY. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR AND REPAIR ANY DAMAGE DONE BY REASON OF THE STORAGE OF TOOLS, MATERIALS, AND EQUIPMENT.
13. THE CONTRACTOR SHALL SECURE PERMISSION FROM THE AUTHORITIES HAVING JURISDICTION FOR THE USE OF A PARTICULAR ROAD AS A HAUL ROUTE. LOADING RESTRICTIONS AS ESTABLISHED BY LAW OR ORDINANCE SHALL BE OBSERVED. TRUCKS HAULING EXCAVATED MATERIAL, BITUMINOUS MATERIAL, CONCRETE, SAND, STONE, OR OTHER LOOSE MATERIAL FROM OR TO THE SITE SHALL BE TIGHT SO THAT NO SPILLAGE WILL OCCUR ON ADJACENT STREETS OR HAUL ROUTES. BEFORE TRUCKS START AWAY FROM THE SITE, THEIR LOADS SHALL BE CAREFULLY TRIMMED BY HAND AND TIRES SHALL BE CLEANED IF NECESSARY.
14. THE CONTRACTOR SHALL BE REQUIRED TO CLEAN AND SWEEP ALL PAVED SURFACES THAT HE HAS PLACED OR DISTURBED, AS WELL AS THOSE OVER WHICH HE HAS HAULED OR PLACED MATERIALS. THE CONTRACTOR SHALL REMOVE SPILLAGE OF CONCRETE AND COMPACTED BITUMINOUS MATERIAL FROM PAVED SURFACES. SWEEPING SHALL BE PERFORMED WITH A SELF-PROPELLED OR TOWED STREET SWEEPER EQUIPPED WITH PICK-UP ATTACHMENTS AND CURB BRUSHES THAT DO NOT CAUSE AIR-BORNE DUST. ALL DEBRIS SHALL BE HAULED AND DISPOSED OF OFF-SITE. PAVED SURFACES SHALL BE SWEPT AS OFTEN AS NECESSARY AS DIRECTED BY THE ENGINEER.

15. THROUGHOUT THE LENGTH OF THE PROJECT, STORM DRAINS, SANITARY, AND COMBINED SEWERS ARE TO BE MAINTAINED IN A CLEAN SERVICEABLE CONDITION. PRIOR TO FINAL APPROVAL OF THIS WORK, ALL UTILITY STRUCTURES WITHIN THE CONSTRUCTION INFLUENCE AREA SHALL BE POWER VACUUMED CLEAN OF DEBRIS.
16. THE CONTRACTOR SHALL NOTIFY THE FIRE DEPARTMENT OF THE CITY OF ROYAL OAK AT (248)246-3800 WHENEVER THE CONSTRUCTION WORK SHALL IN ANY WAY INTERFERE WITH THE USE OF A STREET BY FIRE VEHICLES. IN CASE OF DOUBT, THE CITY MAY, IN THE INTERESTS OF PUBLIC SAFETY, NOTIFY THE FIRE DEPARTMENT, BUT SUCH NOTIFICATION SHALL IN NO WAY RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY.
17. THE CONTRACTOR SHALL PROVIDE A 24-HOUR EMERGENCY TELEPHONE NUMBER WITH THE CONSTRUCTION PROGRESS SCHEDULE. IN THE EVENT THE CONTRACTOR IS CONTACTED BY THE CITY OF ROYAL OAK POLICE DEPARTMENT OR THE ENGINEER TO RESPOND TO EMERGENCY SITUATIONS, THE CONTRACTOR SHALL RESPOND IMMEDIATELY, OR THE CITY OF ROYAL OAK WILL PROCEED WITH THE NECESSARY EMERGENCY RESPONSE AND TAKE ALL ACTION THE CITY DEEMS NECESSARY. THE CONTRACTOR SHALL REIMBURSE THE CITY OF ROYAL OAK FOR ALL EXPENSES INCURRED FOR THE EMERGENCY RESPONSE UPON RECEIPT OF BILLING.
18. ALL MATERIALS SUPPLIED BY THE CONTRACTOR SHALL BE CERTIFIED IN WRITING BY THE MANUFACTURER SHOWING THAT THE MATERIALS SUPPLIED MEET THE CITY OF ROYAL OAK STANDARD SPECIFICATIONS. THEIR CERTIFICATIONS SHALL INCLUDE THE SPECIFICATION OF THE MATERIAL SUPPLIED. NO WORK MAY BE DONE WITHIN THE PUBLIC RIGHT-OF-WAY OR EASEMENT WITH MATERIALS SUPPLIED BY THE CONTRACTOR WITHOUT A WRITTEN MATERIAL CERTIFICATION APPROVED BY THE ENGINEER.
19. THE CONTRACTOR IS RESPONSIBLE FOR SIGNING AREAS FOR NO PARKING 24 HOURS IN ADVANCE OF COMMENCING WORK WHEN NECESSARY. "NO PARKING TOW AWAY ZONE" SIGNS CAN BE PURCHASED FROM THE CITY, HOWEVER, SIGN STAKES OR HOLDERS ARE THE RESPONSIBILITY OF THE CONTRACTOR. TREES **CANNOT** BE USED AS SIGNPOSTS. SIGNS MUST BE POSTED 24 HOURS BEFORE THE WORK IS TO BEGIN.
20. THE CONTRACTOR SHALL OBTAIN A PERMIT FROM THE MICHIGAN DEPARTMENT OF TRANSPORTATION FOR WORK WITHIN THE RIGHT-OF-WAY OF WOODWARD AVENUE (M-1) OR I-696 SERVICE DRIVES, AS APPLICABLE.
21. THE CONTRACTOR SHALL OBTAIN A PERMIT FROM THE ROAD COMMISSION FOR OAKLAND COUNTY FOR WORK WITHIN THE I-696 SERVICE DRIVES, GREENFIELD ROAD, CROOKS ROAD (NORTH OF 14 MILE ROAD), 12 MILE ROAD OR 14 MILE ROAD (EAST OF ROCHESTER), AS APPLICABLE.

22. THE CONTRACTOR SHALL OBTAIN A PERMIT FROM THE OAKLAND COUNTY WATER RESOURCES COMMISSIONER FOR WORK WITHIN THE INFLUENCE AN OAKLAND COUNTY DRAIN.
23. THE CONTRACTOR SHALL RESTRICT HIS OPERATIONS TO RIGHTS-OF-WAY, CITY PROPERTY, OR EASEMENTS WITHIN PRIVATE PROPERTY. THE CONTRACTOR SHALL NOT TRESPASS ON PRIVATE PROPERTY AND HE SHALL NOT USE NOR REQUEST THE USE OF ANY UTILITY, INCLUDING WATER, FROM A PROPERTY OWNER. WHERE THE PLANS INDICATE WORK OUTSIDE OF AN EASEMENT ON PRIVATE PROPERTY, OR WHEN THE ENGINEER DIRECTS THE CONTRACTOR TO PERFORM WORK OUTSIDE OF AN EASEMENT, THE CITY WILL SECURE A PERMIT FROM THE PROPERTY OWNER PRIOR TO COMMENCEMENT OF WORK.
24. THE CONTRACTOR SHALL REPLACE, AT NO ADDITIONAL COST, ANY NEW PAVEMENT, BASE, DRIVEWAY OR SIDEWALK THAT IS DAMAGED DUE TO A LACK OF TRAFFIC CONTROL DEVICES. THE CONTRACTOR SHALL BEAR THE COST OF REPAIR OR REPLACEMENT OF ANY SURFACE FEATURES, STRUCTURES, SEWERS, OR SEWER LEADS DAMAGED AS A RESULT OF HIS OPERATIONS. DAMAGED STRUCTURES OR PIPES SHALL BE REPAIRED OR REPLACED TO THE CONDITION AT THE TIME OF DAMAGE. ALL REPAIRS AND REPLACEMENTS MADE BY THE CONTRACTOR SHALL BE IN CONFORMANCE WITH THE CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION. ANY DAMAGE TO PRIVATE PROPERTY CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR.
25. THE CONTRACTOR SHALL PROVIDE TRENCH BOXES, SHEETING, TIE BACKS, AND ANCHORS AS REQUIRED TO PROTECT PERSONNEL AND TO CONTAIN EXCAVATIONS WITHIN THE RIGHTS-OF-WAY, EASEMENTS, AND CONSTRUCTION LIMITS SHOWN ON THE PLANS. REFER TO THE CITY OF ROYAL OAK GENERAL SPECIFICATIONS FOR EXCAVATING AND BACKFILLING. THE DECISION TO DEWATER FOR UNDERGROUND INSTALLATION IS SOLELY THE RESPONSIBILITY AND DETERMINATION OF THE CONTRACTOR. IF WELL POINTS ARE INSTALLED AND USED IT SHALL BE AT LOCATIONS APPROVED BY THE ENGINEER.

THE CITY HAS DETERMINED THAT ALL UTILITY STRUCTURES AND PIPES UNDER ITS JURISDICTION ARE POTENTIALLY PERMIT-REQUIRED CONFINED SPACES AS DEFINED BY MICHIGAN OCCUPATIONAL SAFETY AND HEALTH ACT (MIOSHA) STANDARD 1910.146, PART 90 INCLUSIVE. THE CONTRACTOR MUST COMPLY WITH MIOSHA REQUIREMENTS FOR PRACTICES AND PROCEDURES TO PROTECT EMPLOYEES FROM THE HAZARDS OF ENTRY INTO PERMIT-REQUIRED CONFINED SPACES. PRIOR TO COMMENCING ANY UNDERGROUND WORK, THE CONTRACTOR SHALL FURNISH THE ENGINEER WRITTEN CERTIFICATION THAT THE COMPANY HAS IMPLEMENTED A PERMIT-REQUIRED CONFINED SPACE PROGRAM CONFORMING TO MIOSHA REQUIREMENTS. QUESTIONS CONCERNING MIOSHA REQUIREMENTS SHOULD BE DIRECTED TO THE MICHIGAN OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION AT (517)284-7777.

26. WORKMANSHIP AND MATERIALS FURNISHED FOR THIS PROJECT SHALL PRODUCE CONCRETE PAVEMENT, DRIVEWAY, AND SIDEWALK WHOSE OVERALL

FINISHED QUALITY MUST EQUAL OR EXCEED THAT OF NEW CONCRETE IN ADJACENT AREAS OF THE CITY OF ROYAL OAK. IT IS THE INTENT OF THE PLANS AND SPECIFICATIONS TO PRODUCE A FINISHED PROJECT THAT EQUAL OR EXCEEDS THE FINISH, DURABILITY, AND APPEARANCE OF NEW PAVEMENT AND CURB AND GUTTER PREVIOUSLY CONSTRUCTED WITHIN THE GENERAL AREA.

27. WORKMANSHIP AND MATERIALS FURNISHED UNDER FOR THIS PROJECT SHALL PRODUCE BITUMINOUS SURFACES AND CONCRETE CURB AND GUTTER, WHOSE OVERALL FINISHED QUALITY MUST EQUAL OR EXCEED THAT OF NEW BITUMINOUS PAVEMENT AND CONCRETE CURB AND GUTTER IN ADJACENT AREAS OF THE CITY OF ROYAL OAK. IT IS THE INTENT OF THE PLANS AND SPECIFICATIONS TO PRODUCE A FINISHED PROJECT THAT EQUAL OR EXCEEDS THE FINISH, DURABILITY, AND APPEARANCE OF NEW PAVEMENT AND CURB AND GUTTER PREVIOUSLY CONSTRUCTED WITHIN THE GENERAL AREA.
28. FOR STREETSCAPE PROJECTS, WORKMANSHIP AND MATERIALS FURNISHED SHALL PRODUCE CONCRETE AND CONCRETE BLOCK PAVER SIDEWALK, TREE AND TREE GRATE, LIGHTING AND IRRIGATION SYSTEM INSTALLATION WHOSE OVERALL FINISHED QUALITY MUST EQUAL OR EXCEED THAT OF NEW MATERIALS PLACED IN ADJACENT AREAS OF THE CITY OF ROYAL OAK. IT IS THE INTENT OF THE PLANS AND SPECIFICATIONS TO PRODUCE A FINISHED PRODUCT THAT EQUAL OR EXCEEDS THE FINISH, DURABILITY, AND APPEARANCE OF NEW SIDEWALK AND STREETSCAPE FEATURES PREVIOUSLY CONSTRUCTED WITHIN THE GENERAL AREA.
29. FOR ANY PROJECT PERFORMING RIGHT-OF-WAY OR STREETSCAPE CONSTRUCTION; OR REQUIRING AN EASEMENT OR LICENSE AGREEMENT, THE CITY WILL REQUIRE THE DEVELOPER OR PROPERTY OWNER TO PROVIDE A BOUNDARY SURVEY AND PLANS PREPARED BY A PROFESSIONAL SURVEYOR, LICENSED IN THE STATE OF MICHIGAN, FOR REVIEW AND APPROVAL, PRIOR TO ISSUING ANY PERMITS.

SANITARY SEWER LEAD NOTES

(To be placed on plans when new sanitary sewer leads are proposed)

1. ALL SANITARY SEWER LEAD WORK SHALL CONFORM TO THE CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION FOR MATERIALS AND METHODS OF CONSTRUCTION.
2. ALL SANITARY 4-INCH AND 6-INCH SANITARY LEADS SHALL BE PVC SDR 23.5 PIPE INSTALLED AT A SLOPE OF NO LESS THAN 1.04%. LEADS SHALL EXIT THE PROPERTY AT APPROXIMATELY 90 DEGREES FROM PROPERTY LINE TO THE PUBLIC SEWER CONNECTION/TAP UNLESS OTHERWISE APPROVED BY THE CITY. LEADS SHALL NOT BE CONNECTED TO PUBLIC OR PRIVATE STORM DRAINS. THE PVC PIPE USED FOR THE LEADS SHALL CONFORM TO ASTM D 3034 (SDR 23.5). JOINTS SHALL BE BELL-AND-SPIGOT TYPE RUBBER GASKETED JOINTS CONFORMING TO ASTM F 477.
3. EACH SANITARY LEAD SHALL CONNECT TO CITY'S SANITARY OR COMBINED SEWER AT A WYE CONNECTION OR BLIND TAP, AS REQUIRED BY THE CITY ENGINEER:

FOR **VITRIFIED CLAY PIPE**:

IF A WYE CONNECTION FOR THE LEAD DOES NOT EXIST, THE CONTRACTOR SHALL CUT AND REMOVE A SECTION OF SEWER AND SHALL INSTALL AN APPROPRIATELY SIZED ER 4-67 EXTRA STRENGTH VITRIFIED CLAY WYE TO BE CONNECTED TO THE EXISTING SEWER USING FLEXIBLE RUBBER COUPLINGS EQUAL TO FERNCO SERIES 1001.

FOR **CONCRETE PIPE**:

IF A WYE CONNECTION FOR THE LEAD DOES NOT EXIST, THE CONTRACTOR SHALL CONSTRUCT A BLIND TAP CONNECTION FOR THE PROPOSED SEWER LEAD TO EXISTING CITY SEWER SHALL BE MADE USING A CORING MACHINE, WHICH WILL CREATE A CLEAN AND CIRCULAR OPENING WITHOUT DAMAGING THE EXISTING PIPE. THE CENTERLINE OF THE CORE SHALL BE ALIGNED WITH THE CENTERLINE OF THE SEWER BEING TAPPED. A RUBBER BOOT ASSEMBLY EQUAL TO A KOR-N-TEE ASSEMBLY WITH A STAINLESS STEEL KORBAND SHALL BE FURNISHED AND INSERTED IN THE CORE. THE CORE DIAMETER SHALL BE AS RECOMMENDED BY MANUFACTURER OF THE RUBBER BOOT. A SAWED END OF THE NEW SEWER SHALL BE INSERTED IN THE BOOT AND THE EXTERNAL STAINLESS STEEL BAND ON THE BOOT SHALL BE TIGHTENED TO MANUFACTURERS' RECOMMENDATIONS. THE NEW SEWER AT THE BLIND TAP SHALL BE ENCASED IN A MINIMUM 2500 PSI CONCRETE, 6-INCH THICK, POURED AGAINST UNDISTURBED GROUND UP TO THE SPRINGLINE OF THE NEW SEWER.

WATER SERVICE NOTES

(To be placed on plans when new water services are proposed)

1. ALL WATER SERVICE WORK SHALL CONFORM TO THE CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION FOR MATERIALS AND METHODS OF CONSTRUCTION.
2. WATER SERVICE WORK UP TO 2 INCHES IN DIAMETER WITHIN THE PUBLIC RIGHT-OF-WAY OR EASEMENT, INCLUDING INSTALLATION OF VALVES AND BOXES, SHALL BE PERFORMED BY CITY FORCES. CONTACT THE CITY TREASURER AT (248)246-3140 FOR WATER TAP FEES AND SCHEDULING OF TAPS AND METERING REQUIREMENTS.
3. WATER SERVICE PIPE SHALL BE COPPER TUBING IN ACCORDANCE WITH ASTM SPECIFICATIONS B 88-55 "TYPE K", OR FEDERAL SPECIFICATIONS WW-T-799 "TYPE K", INSTALLED WITH NO LESS THAN 48" OF FINAL COVER. FITTINGS AND REDUCERS SHALL BE FLARED TYPE MUELLER COPPER SERVICE THREAD UNIONS AND COUPLINGS.
4. WHEN MULTI-UNIT BUILDINGS REQUIRE INDIVIDUAL METERS AND SHUT OFF VALVES, SHUT OFF VALVES SHALL BE MUELLER H-15204N AND BOXES SHALL BE MUELLER H-10314, OR CITY APPROVED EQUALS. ALL 1" SHUT OFF VALVES AND BOXES TO BE INSTALLED AT 4' OFF BUILDING LINES.
5. WHEN MULTI-UNIT BUILDINGS REQUIRE A SINGLE WATER SERVICE, A METER ROOM THAT INCLUDES INDIVIDUAL UNIT SHUTOFFS WILL BE REQUIRED WITH KEYS ISSUED TO THE CITY WATER DEPARTMENT ALONG WITH AN ACCESS EASEMENT.
6. WATER SERVICE REPLACEMENTS SHALL COMPLY WITH THE MCINGIAN LEAD AND COPPER RULE.

WATER MAIN NOTES

(To be placed on plans when new water main is proposed)

1. ALL WATER MAIN WORK SHALL CONFORM TO THE CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION.
2. PROPOSED WATER MAIN TAPS SHALL BE MADE WITH AN APPROPRIATELY SIZED CUT IN TEE OR TAPPING SLEEVE WITH VALVE AND WELL OR ROAD BOX. TAPPING SLEEVES SHALL BE EAST JORDAN (EJI MJ TAPPING SLEEVES. GATE VALVES SHALL BE **EJ RESILIENT WEDGE GATE VALVE** W/NON-RISING STEM AND DESIGNED FOR RIGHT-HAND (CLOCKWISE) OPENING. ROAD BOXES WITH ADAPTORS SHALL BE INSTALLED FOR ALL VALVES UNLESS OTHERWISE DIRECTED BY THE CITY.
3. PROPOSED WATER MAIN SHALL BE INSTALLED WITH NO LESS THAN 5.5 FEET OF FINAL COVER.
4. WATER MAIN SHALL BE DUCTILE IRON PIPE CONFORMING TO USA S-A21.51 AND SHALL HAVE DOUBLE THICKNESS CEMENT MORTAR LINING CONFORMING TO USA S-A21.4. THE DUCTILE IRON PIPE SHALL BE "SUPER BELL-TITE" PUSH-ON JOINT TYPE.
5. WATER MAIN FITTINGS SHALL BE TYLER PIPE LINE OF MECHANICAL JOINT FITTINGS CONFORMING TO ANSI/AWWA C153/A21.53-84 STANDARD FOR DUCTILE IRON FITTINGS AND ANSI/AWWA C111/A21.11-85 STANDARD FOR GRAY IRON FITTINGS. WORKING PRESSURE RATING SHALL BE 350 PSI. ALL BOLTS AND NUTS SHALL BE COR-TEN WITH XYLAN COATING OR APPROVED EQUAL.
6. PROPOSED WATER MAIN SHALL BE SUCCESSFULLY CHLORINATED AND PRESSURE TESTED PRIOR TO ACTIVATING THE LINE. PRESSURE TESTING AND CHLORINATION SHALL CONFORM TO CITY STANDARD SPECIFICATIONS FOR CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING CHLORINATION TESTING ARRANGEMENTS BY CONTACTING THE SOUTHEASTERN OAKLAND COUNTY WATER AUTHORITY (SOCWA) AT (248) 288-5150.
7. NEW HYDRANT ASSEMBLIES AND LEADS SHALL BE CONSTRUCTED PER THE CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION. ANY REQUIRED TAPS FOR THE PROPOSED HYDRANTS SHALL BE MADE WITH EJ TAPPING SLEEVES OR TEES AS NOTED ON THE PLANS.
8. CITY OF ROYAL OAK STANDARD WATER MAIN AND HYDRANT DETAILS SHALL BE USED FOR ALL HYDRANT INSTALLATION. THE HYDRANTS SHALL BE EJ 5BR-250 MODEL WITH TWO (2) 3.75" PUMPER NOZZLES OR APPROVED EQUAL ONE OF WHICH SHALL BE FITTED WITH A 5" HARRINGTON INTEGRAL HYDRANT STORZ D DOME ADAPTOR, AND DRAINS TAPPED AND PLUGGED. HYDRANT SHALL BE PAINTED WITH RUSOLEUM INDUSTRIAL 5A271 FEDERAL SAFETY RED.

9. PROPOSED PUBLIC WATER MAIN WILL REQUIRE APPROVAL OF THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY AND THE SOUTHEAST OAKLAND COUNTY WATER AUTHORITY (SOWCA).

STORM DRAINAGE NOTES

(To be placed on plans when new storm drain work is proposed)

1. ALL STORM DRAINAGE WORK SHALL CONFORM TO CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR.
2. PVC STORM SEWER PIPE SHALL BE PVC SDR26 PIPE CONFORMING TO ASTM D 3034 FOR PIPES 15-INCH DIAMETER AND SMALLER. USE REINFORCED CONCRETE PIPE (ASTM C76) OR PS 115 PVC PIPE FOR PIPES 18-INCH DIAMETER AND LARGER. JOINTS SHALL BE BELL-AND-SPIGOT TYPE RUBBER GASKETED JOINTS CONFORMING TO ASTM F 477.
3. CONTRACTOR SHALL LOWER EXISTING WATER MAINS, IF NECESSARY, TO AVOID CONFLICTS WITH PROPOSED STORM DRAIN ELEVATION.
4. PROPOSED MANHOLES, INLETS AND CATCH BASINS SHALL CONFORM TO CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION.

STORM WATER DETENTION NOTES

(The following items shall be clearly and visibly represented or noted on the plans)

1. PROPOSED ON-SITE STORM DRAINAGE SYSTEMS SHALL CONNECTED TO AN EXISTING ON-SITE STORM DRAIN, PUBLIC STORM DRAIN OR COMBINED SEWER AND SHALL BE SHOWN ON THE PLANS. AN UNRESTRICTED OVERFLOW FOR THE STORM WATER DETENTION SYSTEM SHALL BE CLEARLY SHOWN AND LABELED ON THE PLANS.
2. THE CONTRACTOR OR ENGINEER SHALL VERIFY THAT EXISTING STORM MANHOLES ARE TRAPPED UPSTREAM OF CONNECTIONS TO COMBINED SEWERS, AS DETAILED IN THE CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION. IF NO TRAP EXISTS, A TRAP SHALL BE INSTALLED IN THE OUTLET PIPE OF THE FURTHEST DOWNSTREAM MANHOLE OR CATCH BASIN.
3. ROOF DRAINS OR DOWN SPOUTS SHALL BE DISCONNECTED FROM ANY EXISTING OR PROPOSED SANITARY OR STORM SYSTEM ACCORDING TO CITY ORDINANCE 90-3 AND MICHIGAN LAW. ROOF DRAINS SHALL DISCHARGE ONTO PRIVATE PROPERTY GROUND AND SHALL BE DETAINED IN A STORM WATER DETENTION SYSTEM.
4. TIERED DETENTION SYSTEMS (PONDED WATER LEVELS AT DIFFERENT ELEVATIONS) REQUIRE A SERIES OF RESTRICTORS/RESTRICTED LIDS TO POND (HEAD) WATER TO THE PROPER STORAGE ELEVATIONS. THESE RESTRICTORS SHALL BE SIZED ACCORDING TO THE FINAL DISCHARGE RATE (S) AND INTERMEDIATE FLOW RATES OUT OF EACH BASIN AREA. A LIST OF RESTRICTORS AND THEIR LOCATIONS SHALL BE SHOWN ON THE PLANS.

PAVING NOTES

(To be placed on plans when paving within the public Right-of-way is proposed)

1. ALL PAVING WORK SHALL CONFORM TO CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION FOR MATERIALS AND METHODS OF CONSTRUCTION.
2. EXISTING PAVEMENT SHALL BE SAW CUT, FULL DEPTH, PRIOR TO REMOVAL. PAVEMENT SHALL BE SAWCUT 2 FEET OFF THE BACK-OF-CURB WHERE CONCRETE CURB AND GUTTER IS TO BE INSTALLED WITHIN CONCRETE ROADWAYS AND 2½ FEET OFF THE BACK-OF-CURB WHERE CONCRETE CURB AND GUTTER IS TO BE INSTALLED WITHIN ASPHALT CAPPED CONCRETE ROADWAYS.
3. WHERE PORTIONS OF PAVEMENTS CONSISTING OF A CONCRETE BASE COURSE WITH AN ASPHALT OVERLAY ARE REMOVED FOR PROPOSED UTILITY WORK, A NEW CONCRETE BASE COURSE AND ASPHALT OVERLAY SHALL BE PLACED TO MATCH THE THICKNESSES OF THE EXISTING MATERIALS. ASPHALT MATERIALS SHALL MEET THE REQUIREMENTS OF MDOT MIXTURE 5EML FOR WEARING COURSE AND MDOT MIXTURE 4EML FOR BASE AND LEVELING COURSES. UNLESS OTHERWISE DIRECTED OR APPROVED.
4. CONCRETE CURB AND GUTTER INSTALLED IN PUBLIC RIGHT-OF-WAY SHALL CONFORM TO DETAILS PROVIDED IN THE ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION. ⅛ INCH WIDE X 2½ INCH DEEP CONTRACTION JOINTS SHALL BE PROVIDED IN THE CURB AND GUTTER AT CONSISTANT INTERVALS NOT EXCEEDING 10 FEET IN LENGTH. THE EXISTING ASPHALT SURFACE SHALL BE MILLED TO A STRAIGHT EDGE AND REPLACED, MATCHING THE NEW CURB AND GUTTER, AS NECESSARY.
5. PRIOR TO PLACING CONCRETE BASE COURSE OR CONCRETE CURB AND GUTTER, ⅝ INCH STANDARD EXPANSION ANCHORED HOOK BOLTS OR LANE TIES, SHALL BE INSTALLED ALONG PAVEMENT SAW CUTS AND SPACED AT 36 INCHES, ON CENTER OR AS DIRECTED BY THE ENGINEER.
6. DRIVEWAY OPENINGS TO BE INSTALLED SHALL CONFORM TO THE CITY OF ROYAL OAK STANDARD DETAIL FOR DRIVEWAYS, EXCEPT WITHIN THE INFLUENCE OF STREETSCAPE OR UNLESS OTHERWISE APPROVED.
7. DRIVE APPROACHES AND PUBLIC SIDEWALK WITHIN THE INFLUENCE OF A DRIVEWAY SHALL BE 6-INCH THICK CONCRETE WITH 2½ INCH DEEP TOOLED CONTRACTION JOINTS. WITHIN THE INFLUENCE OF COMMERCIAL DRIVEWAYS, SIDEWALK AND APPROACH CONCRETE SHALL BE 8-INCH THICK AND WITHIN THE INFLUENCE OF STREETSCAPE CONCRETE SHALL BE 7 INCHES THICK.
8. SIDEWALK TO BE INSTALLED OUTSIDE THE INFLUENCE OF THE DRIVE APPROACH SHALL BE A MINIMUM 5 FOOT WIDE, 4 INCH THICK CONCRETE WITH 2 INCH DEEP TOOLED CONTRACTION JOINTS AT ±5 FOOT INTERVALS. A ½ INCH

WIDE FULL DEPTH FIBER EXPANSION JOINT SHALL BE INSTALLED 50-FOOT INTERVALS, OR AS DIRECTED BY THE ENGINEER

9. ALL SIDEWALKS SHALL HAVE A MINIMUM 1.0% TRANSVERSE SLOPE TOWARDS THE RIGHT-OF-WAY CENTERLINE AND A MAXIMUM OF 2.0%.
10. ALL PAVEMENT INCLUDING CONCRETE BASE COURSE, CURB, CURB AND GUTTER AND DRIVE APPROACH SHALL BE PLACED ON A MINIMUM 6 INCH THICK AGGREGATE BASE MATERIAL COMPACTED TO 95% OF ITS MAXIMUM UNIT WEIGHT. ALL SIDEWALK SHALL BE PLACED ON A MINIMUM 4 INCH THICK GRANULAR BASE MATERIAL COMPACTED TO 95% OF ITS MAXIMUM UNIT WEIGHT, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
11. THE CONCRETE MIX SHALL CONFORM TO THE MIX REQUIREMENTS PROVIDED IN THE ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION.
12. ANY PORTION OF A TRENCH, HOLE, OR PIT THAT IS OUTSIDE A 1 ON 1 INFLUENCE LINE OF AN EDGE OF SIDEWALK, DRIVEWAY, PAVEMENT, OR BACK OF CURB THAT IS EITHER PROPOSED OR TO REMAIN IN PLACE, SHALL BE BACKFILLED WITH SUITABLE EXCAVATED MATERIAL (EXCLUDING WET CLAY), PLACED IN LAYERS NOT EXCEEDING 12 INCHES, AND COMPACTED TO 90% OF ITS MAXIMUM UNIT WEIGHT.

UTILITY NOTES

(To be placed on plans when utility construction within the public Right-of-way is proposed)

1. ALL UTILITY CONSTRUCTION SHALL CONFORM TO CITY OF ROYAL OAK STANDARD SPECIFICATIONS FOR CONSTRUCTION FOR MATERIALS AND METHODS OF CONSTRUCTION.
2. PREVIOUSLY ABANDONED PIPES OR STRUCTURES AND PROPOSED STORM DRAIN OR SEWER PIPES OR STRUCTURES TO BE ABANDONED SHALL BE CUT & REMOVED AS NECESSARY TO FACILITATE CONSTRUCTION OF THE PROPOSED UTILITY IMPROVEMENTS INDICATED ON THE PLANS. OPEN ENDS OF ABANDONED PIPES OR STRUCTURES TO BE ABANDONED SHALL BE BULKHEADED WITH A 12 INCH THICK WATERTIGHT MASONRY BULKHEAD.
3. PLUGS OR CAPS SHALL BE INSTALLED AT ALL OPEN ENDS OF WATER MAIN TO BE ABANDONED.
4. EXISTING HYDRANTS TO BE REMOVED SHALL NOT BE REMOVED UNTIL AFTER THE ADJACENT NEW HYDRANT IS IN SERVICE. THE CONTRACTOR SHALL PUT A TEMPORARY COVERING OVER ANY NEW HYDRANT INSTALLED THAT IS NOT IN SERVICE.
5. THE CONTRACTOR SHALL DELIVER ANY HYDRANTS, GATE VALVES OR UTILITY CASTINGS THAT ARE REMOVED AS A PART OF THE PROJECT TO THE CITY OF ROYAL OAK DPS YARD AT 1600 N. CAMPBELL ROAD.
6. WHEN CONNECTING A NEW WATER MAIN TO THE EXISTING MAIN, THE DIMENSIONS OF THE EXISTING MAIN MAY NOT ALLOW THE USE OF STANDARD MECHANICAL JOINT FITTINGS SINCE THESE MAINS MAY BE PIT-CAST OR IN CLASSES OTHER THAN THE STANDARD. IN SUCH CASES, SPECIAL OVERSIZE SOLID SLEEVES SHALL BE FURNISHED AND INSTALLED. DRESSER STYLE COUPLINGS SHALL NOT BE USED.
7. WHEN CONNECTING A NEW WATER MAIN TO THE EXISTING MAIN, THE FITTINGS SHALL BE INSTALLED WITH RETAINER GLANDS OR OTHER APPROVED JOINT RESTRAINT SYSTEMS.
8. IN ORDER TO ELIMINATE CONFLICT WITH OTHER UNDERGROUND UTILITIES, ROAD BOXES MAY BE INSTALLED WHERE GATE WELL INSTALLATION IS INDICATED ON THE PLANS, WHEN DIRECTED BY THE ENGINEER.
9. EXISTING ROAD BOXES AND CURB STOP BOXES SHALL BE REMOVED, REPLACED OR ADJUSTED, AS DIRECTED BY THE ENGINEER.
10. WHEN CURB STOP BOXES FOR 1-INCH WATER SERVICES FALL WITHIN PROPOSED SIDEWALK, DRIVEWAY, OR PAVEMENT, THE CONTRACTOR SHALL FURNISH AND INSTALL A CURB STOP BOX SLEEVE EQUAL TO MUELLER H-10342 AS.

11. ALL TRENCHES, HOLES, AND PITS RESULTING FROM THE LIGHTING/UTILITY IMPROVEMENTS (I.E. REMOVAL OF HYDRANT ASSEMBLIES, WATER MAIN, FOUNDATIONS, AND STRUCTURES; ABANDONING OR RECONSTRUCTING STRUCTURES; INSTALLING CONDUIT, WATER SERVICES, WATER MAIN, OR SEWER; AND CONSTRUCTING FOUNDATIONS, HANDHOLES, GATE WELLS, OR DRAINAGE STRUCTURES) SHALL BE BACKFILLED AS FOLLOWS:

ANY PORTION OF A TRENCH, HOLE, OR PIT THAT IS WITHIN A 1 ON 1 INFLUENCE LINE OF AN EDGE OF SIDEWALK, DRIVEWAY, PAVEMENT, OR BACK OF CURB THAT IS EITHER PROPOSED OR TO REMAIN IN PLACE, SHALL BE BACKFILLED WITH MDOT CLASS II GRANULAR MATERIAL, PLACED IN LAYERS NOT EXCEEDING 12 INCHES, AND COMPACTED TO 95% OF ITS MAXIMUM UNIT WEIGHT.

ANY PORTION OF A TRENCH, HOLE, OR PIT THAT IS OUTSIDE A 1 ON 1 INFLUENCE LINE OF AN EDGE OF SIDEWALK, DRIVEWAY, PAVEMENT, OR BACK OF CURB THAT IS EITHER PROPOSED OR TO REMAIN IN PLACE, SHALL BE BACKFILLED WITH SUITABLE EXCAVATED MATERIAL (EXCLUDING WET CLAY), PLACED IN LAYERS NOT EXCEEDING 12 INCHES, AND COMPACTED TO 90% OF ITS MAXIMUM UNIT WEIGHT.

12. ALL CONNECTIONS BETWEEN NEW SEWER AND EXISTING SEWER UP TO 15 INCHES IN DIAMETER SHALL BE MADE USING FLEXIBLE RUBBER COUPLINGS WITH STAINLESS STEEL CLAMPS. COUPLINGS FOR THIS WORK SHALL BE FERNCO STRONG BACK RC SERIES (1002,1006,5000,6000) OR LOGAN LCP COUPLINGS. THE MAXIMUM DISPLACEMENT BETWEEN SEWER PIPE AT ALL CONNECTION POINTS SHALL NOT EXCEED $\frac{3}{4}$ INCH VERTICAL OR 1 INCH LONGITUDINAL.
13. ALL PUBLIC STORM DRAIN, SANITARY AND COMBINED SEWER RUNS CONTAINING SECTIONS OF PIPE TO BE REMOVED AND REPLACED SHALL BE CLEANED & TELEVIEWED AFTER THE PIPE IS REPLACED AND PRIOR TO REPLACING THE PAVEMENT ABOVE THE REPAIR. ONE (1) COPY OF THE VIDEO RECORDING OF THE TELEVIEWING SHALL BE FURNISHED TO THE ENGINEER SO THAT THE STRUCTURAL INTEGRITY OF THE REPAIR CAN BE APPROVED BY THE ENGINEER PRIOR TO THE CONTRACTOR REPLACING PAVEMENT ABOVE THE REPAIR.
14. 10-INCH AND 12-INCH SEWER TRAPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE MDOT STANDARD PLAN R-19. 10-INCH SEWER TRAP DIMENSIONS SHALL BE PROPORTIONAL, MORE OR LESS, TO THE DIMENSIONS SPECIFIED FOR THE 12-INCH SEWER TRAP.
15. THE CONTRACTOR SHALL RECONSTRUCT DRAINAGE STRUCTURES OR GATE WELLS IN AREAS OF PAVEMENT REPLACEMENT OR IF THE STRUCTURE IS TO BE TAPPED, AS DIRECTED BY THE ENGINEER. THE DEPTH OF THE RECONSTRUCTION OF ANY STRUCTURE WILL BE DETERMINED BY THE ENGINEER.

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16. IF REQUIRED TO CENTER CASTINGS AT THE LOCATIONS INDICATED ON THE PLANS, THE CONTRACTOR SHALL FURNISH AND INSTALL A PRECAST FLAT TOP COVER AT EXISTING DRAINAGE STRUCTURES AND GATE WELLS, AS DIRECTED BY THE ENGINEER.
17. FLOW CHANNELS SHALL BE INSTALLED AT ALL PROPOSED MANHOLES AS INDICATED IN THE CURRENT VERSION OF MDOT STANDARD PLAN R-1.
18. WHEN PAVING ASPHALT SURFACES, THE FINAL ADJUSTMENT OF ALL CASTINGS OR ROAD BOXES TO FINISHED GRADE SHALL BE MADE IMMEDIATELY PRIOR TO PLACING THE WEARING COURSE.

Site Plan Review Checklist Engineering Division (For information only)			
	NA	INCLUDED	
		YES	NO
a1. Site Plans with a Horizontal Scale of 1" = 20'			
2. Engineer's Opinion of Probable Cost for work in the right-of-way			
3. Engineer's Opinion of Probable Cost for paving work on private property			
4. General Plan (Large Sites Only) with a Horizontal Scale of 1"=100'			
5. Streetscape Plans at a Horizontal Scale of 1" = 10'			
6. Roadway and Utility Profiles at Vertical Scale between 1"=1' to 1"= 5'			
7. Seal of Licensed Professional Engineer or Architect from Michigan			
8. Legal Description and Tax Identification Number			
9. North Arrow			
10. Index of Sheets			
11. Topographic Survey/Existing Condition Plan (Including Underground Utilities)			
12. Benchmarks (for projects with grading and/or utility plans)			
13. Removal/Demolition Plan			
14. Dimensional Site Plan (Including Property Dimensions and Setbacks)			
15. Paving and Grading Plan			
16. Utility Plan and Profiles			
17. Storm Water Management Plan (Including Detention Calculations)			
18. Soil Erosion and Sedimentation Control Plan (per OCWRC Requirements)			
19. Legal Descriptions for easements, license agreement or detention lien (if applicable)			
20. Landscape Plan (if applicable)			
21. Exterior Lighting and Photometric Plan (if applicable)			
22. City of Royal Oak Standard Notes (as applicable)			

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Site Plan Review Checklist		NA	INCLUDED	
			YES	NO
23.	City of Royal Oak General Notes (as applicable)			
24.	City of Royal Oak Sanitary Sewer Lead Notes (as applicable)			
25.	City of Royal Oak Water Service Notes (as applicable)			
26.	City of Royal Oak Water Main Notes (as applicable)			
27.	City of Royal Oak Storm Drainage Notes (as applicable)			
28.	City of Royal Oak Storm Water Detention Notes (as applicable)			
29.	City of Royal Oak Paving Notes (as applicable)			
30.	City of Royal Oak Utility Notes (as applicable)			
31.	Dimension Fire Lanes and Turnarounds			
32.	Location of Fire Department Connection and Hydrants			
33.	Retaining or Screen Walls (Including Detailed Cross Section)			
34.	Proposed Use (Including Gross Square Footage)			
35.	Copy of WRC Permit for Soil Erosion and Sedimentation Control (as applicable)			
36.	Copy of WRC Permit for Construction within Influence of County Drain (if applicable)			
37.	Copy of RCOC Permit/Approval for Construction within RCOC Right-of-way (if applicable)			
38.	Copy of MDOT Permit/Approval for Construction within MDOT Right-of-way (if applicable)			
39.	Copy of Permit(s)/Approval(s) from Municipalities other than City of Royal Oak (if applicable)			
40.	EGLE Permit Application for Wastewater Systems (if applicable)			
	EGLE Permit Application for Water Supply Systems (if applicable)			