

ITEM 11
MANAGER'S REPORT NO. 15
COUNCIL MEETING 87/03/02

RE: ROYAL OAK AVENUE ALIGNMENT
(Report from the Director Engineering)

MUNICIPAL MANAGER'S RECOMMENDATION:

1. THAT the recommendation of the Director Engineering be adopted.

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TO: MUNICIPAL MANAGER 1987 FEBRUARY 25

FROM: DIRECTOR ENGINEERING

SUBJECT: ROYAL OAK AVENUE - ALIGNMENT

RECOMMENDATION:

THAT Council adopt Option C as further detailed in this report as the design concept for the realignment of Royal Oak Avenue.

S U M M A R Y

Burnaby's Comprehensive Transportation Plan has designated Royal Oak Avenue as a secondary arterial route to augment the primary arterial system and to provide access to major activity centres within the Municipality. Due to the hazards and limitations associated with the very steep grade on a portion of Royal Oak Avenue, this route has to date been unable to function as a secondary arterial which would include the carrying of heavy commercial traffic and buses.

This report outlines a number of alternatives which would effectively upgrade the road to the desired secondary arterial status. Each of the alternatives have been evaluated against a set of criteria and a specific alignment is being recommended which is considered to be the most acceptable one in terms of impacting the surrounding land use while still addressing the major traffic and safety criteria for a secondary arterial route.

Council designation of the future realignment of Royal Oak Avenue is required at this time as an input to the Community Plan presently under preparation for the Oakalla Prison lands intended for residential redevelopment.

R E P O R T

Burnaby's Comprehensive Transportation Plan has adopted a fundamental goal which states:

"That Council strive to facilitate the movement of people and goods within and through the Municipality in a manner that is most cost effective and efficient, while at the same time endeavoring to maintain and improve the integrity and environment of residential neighborhoods."

In addressing this fundamental policy, the adopted plan highlights four major components necessary to structure the appropriate transportation Plan; these are the road system, truck routes, public transit and residential neighborhoods.

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With regard to the road system itself, the Plan recognizes the necessity to establish a hierarchical classification for roads which would include primary arterial, secondary arterial, major and minor collector, local industrial/commercial and local residential. Within this hierarchy, the secondary arterial routes are intended to augment the primary arterial system and play a large role in providing access to major activity centres within the Municipality. The Conceptual Transportation Plan identifies Royal Oak Avenue between Imperial and Canada Way as a secondary arterial which would provide improved access to Metrotown from north and central Burnaby; it would also provide improved access to the proposed Deer Lake Town Park and now, the proposed Oakalla redevelopment area. The Transportation Plan further calls for a secondary arterial to be capable of accommodating four moving lanes and, in conjunction with the primary arterials, would constitute the recommended truck route system for the Municipality.

Due to the severe grades on a portion of Royal Oak Avenue, it has not been possible for the Municipality to consider it as a fully suitable secondary arterial until certain improvements are made to lessen the grade. Recognizing the complexity of establishing the various alternatives given such criteria as protecting the residential neighborhood, minimizing encroachment into the park, accommodating the long-sought redevelopment of Oakalla lands, and the need to utilize good engineering design criteria, it was necessary to retain the services of an engineering consulting firm.

The Consultant's Terms of Reference were to study all feasible alternative alignments and the various attendant types and/or methods of construction, listing their respective advantages and disadvantages. The terms also advised that it was of particular importance to recognize that the Royal Oak alignment will of necessity traverse an area designated as a major park and that it was necessary to recognize the interrelationship between the two major facilities. The Terms of Reference also included reference to the Transportation Plan and the aspect of preserving the adjacent residential neighborhood.

The Consultant has submitted a report which gave consideration to six alternative alignments for the reconstruction of Royal Oak between Grange Street and Moscrop Street. (A full copy of the Consultant's report is available for perusal in the Engineering Department). The Consultant evaluated the six alternative alignments on the basis of twelve criteria, which were route continuity, road safety, land acquisition, soils conditions, noise impact, visual impact, park development, Oakalla lands redevelopment, residential access, utility relocation, storm water disposal, and construction scheduling. A possible thirteenth criteria, namely construction cost, was not in and of itself considered as an independent criteria for the reason that most of the basic twelve criteria have incorporated into them all manner of cost considerations, not only construction cost but also the other important ones such as user costs, social costs, and environmental costs. In any event, your Director Engineering is of the opinion that the spread of construction cost from top to bottom of all alternatives is something in the order of 20%.

As a result of the evaluations, an alignment located close to, but slightly east of, the existing Royal Oak Avenue

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was found to be clearly preferred over the other five. The Consultant also examined in greater detail the construction standards to be adopted for the recommended alignment and the mitigation measures which might be included to minimize the various impacts of the new road.

The six alternative alignments which were assessed by the Consultant are shown schematically on the attached Figure #1. Each of these possible alignments was evaluated on the basis of the twelve criteria noted earlier and on the basis that each of the criteria had equal weight. The results of the evaluation are shown in the tabulation of Figure #2. The major advantages and disadvantages of each alternative, as reflected in the scoring on Figure #2, are as follows:

1. Alternative A

To achieve a maximum grade of ten percent would result in earthworks of increasing height to the north of Buxton and a long bridge structure. In terms of route continuity and road safety, this street alignment is the best possible. The route would provide good opportunities for park development because the long, high bridge structure will leave a large open space to provide continuity to the park area. This route has minimum impact on Oakalla property and is most preferable from a storm water disposal point of view since it offers the smallest paved area and consequently the lease amount of runoff. The major disadvantages are its impact on the residential neighborhood, the extensive earthworks required to achieve a ten percent grade would require the acquisition and demolition of several homes and leave a number of the remaining ones open to noise and visual obstruction. It would not be possible to construct a frontage road for the remaining residential properties and it would be difficult to create safe intersections and private accesses. Also because this alternate is constructed entirely on the existing road allowance, it would have serious impact on traffic during construction.

2. Alternative B

This alignment reduces the impact on the residential area by sweeping to the east in the Oakalla area and then swinging far to the west to remove it from the primary park area. This would minimize the visual impact of the road and would help accommodate future park development. It would also allow the future construction of a residential frontage road and would be easier to construct as it virtually avoids the existing right-of-way. The major disadvantages of this route are that in order to achieve the improved grade it is extremely long and has minimum radius horizontal curves on sections which are subject to maximum vertical grade; this affects its continuity and safety and increases the drainage runoff. This alternative would also require the acquisition and demolition of at least three homes and then would still have a severe noise impact on many of the remaining homes in the neighborhood.

3. Alternative C

This alignment is a variation of Alternative A. The route is deflected to the east far enough to minimize the impact on the residential neighborhood, but at the same time maintains a fairly straight alignment. Some of the many

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advantages of this alternative are that it offers a much straighter alignment than any other except Alternative A, and therefore has good continuity and road safety. It does not require land acquisition from the residential neighborhood and is sufficiently removed that noise impact is not considered to be a serious consideration. It will accommodate a frontage road and offers opportunities for park development beneath a high, long bridge structure. The major disadvantages of this alternative are that the alignment does have some impact on the Oakalla property and it may present some measure of visual impact in the park area because of the height and extent of earthworks required and the length of bridge structure necessary. It is the Consultant's opinion, however, that this impact could be significantly mitigated by aesthetic bridge design and landscaping.

4. Alternative D

This alternative is a shortened modification of Alternative B. Its principal advantages are that it permits the construction of a residential frontage road, it offers reduced visual impact because it follows more closely the existing ground contours, and it poses few construction scheduling problems as it does not use the existing right-of-way. The primary disadvantage is the impact on the residential neighborhood which would be similar to those outlined for Alternative B. A second disadvantage is that it would act like an embankment across the park and thereby disrupt park development continuity.

5. Alternative E

The prime advantage of this alternative is that it is the only one with a maximum grade of less than ten percent. However, it requires a long detour to the east through the Oakalla complex but it has considerably less earthworks than any of the other alternatives. The major disadvantage is that route continuity is poor and the tight radius curves are undesirable from a road safety aspect. It also could have a serious impact on the redevelopment potential of the Oakalla lands as it tends to divide the land parcel. It is a somewhat longer route and therefore would have increased storm water runoff to handle.

6. Alternative F

This alternative represents a combination of Alternatives A and D by remaining on the existing road alignment past the residential neighborhood and Oakalla and then deflecting to the west through the lowland area. It offers good route continuity and has minimal potential impact on the development of the Oakalla lands. Its major disadvantage is that it combines all the worst features of Alternatives A, B and D with respect to impact on the residential neighborhood. It requires the greatest amount of demolition of existing homes and has a serious visual and noise impact on many of the remaining homes. It does not allow for a frontage road and access to the neighborhood would be difficult and dangerous. Because part of this route is on existing road it would impact seriously on the construction scheduling. It would also act as a barrier to the park continuity.

(Cont'd.)

The summary of the Consultant's evaluation of the six alternatives is shown in the tabulation in Figure #2 which clearly indicates that Alternative C scores considerably higher than the other five. The Consultant's approach was to now determine a number of ways whereby the impact of the recommended route could be mitigated to an acceptable level.

In discussing such mitigation measures, the Consultant identified four major factors: (1) Alignment design, (2) Cross section design, (3) Bridge design, and (4) Landscaping.

Alternative C basically follows the existing alignment of Royal Oak Avenue but has a realigned section which would be designed to ensure that the toe of the embankment slopes is clear of the existing roadway; this would then allow the construction of a frontage road with cul-de-sac on a portion of the existing alignment. It is also suggested that the horizontal curves be designed to maintain good visibility and avoid severe superelevation of the roadway. The attached Figure #3 from the Consultant's report shows a proposed new access at Oakglen which may also form the basis for a possible future access to the Oakalla redevelopment area.

The vertical alignment design is not as easy to improve but the Consultant recommends that the vertical curve coincide with the horizontal curve at the north end of the bridge structure. This is a recognized method of improving road aesthetics.

When considering the appropriate cross section for this secondary arterial street, the Consultant has recommended that Burnaby's standard cross-section be used except in the realigned section. In this section he proposed that a no-post guard rail be installed behind both curbs. This will not only act as a safety feature, but also be an effective barrier against tire noise. As there will be very limited need for pedestrian access along the realigned section of roadway it is proposed that a sidewalk be constructed on one side only; it would probably be best located on the east side where the pedestrian could take advantage of the views of the park and Deer Lake. It is also recommended that all overhead power and telephone lines be placed underground.

The bridge will be a very conspicuous feature of this realignment and every consideration must be given to an aesthetically-pleasing design. The Consultant has proposed that the northerly third of the bridge be constructed as a solid concrete box abutment founded on piles because the elevation of the proposed road above the surrounding ground is not high enough to warrant a traditional bridge structure. The southerly two-thirds of the structure is proposed to be constructed as a bridge with a concrete deck on twin box girders. This type of design diminishes the structural depth of the bridge while increasing the span lengths, giving the net effect of a slimmer bridge with fewer supporting piers.

The fourth factor to be considered is landscaping where the intent would be to contour the embankment slopes so that they fit more naturally into the park landscape and to plant these slopes to screen views of the road and traffic from residents and park users. However, at the same time, it is desirable to maintain park use for as many residents as possible and also to allow opportunities for viewing the park for road users driving through the area. A landscape concept is shown on the attached Figure #4.

The Consultant's cost estimate for the recommended alignment is \$6.4 million for the portion of Royal Oak Avenue between Grange and Moscrop; this estimate does not include the possibility of having to acquire land from the Oakalla Prison complex in view of its proposed dedication as a requirement of future rezoning. The estimate also does not include landscaping costs, as these will be done in conjunction with the park development. Lastly, the estimate does not include any provision for storm water treatment as this will be handled by the overall treatment of the creek which is ultimately used as the drainage outfall. The estimated cost of constructing the balance of Royal Oak Avenue between Moscrop and Canada Way is \$800,000, which is also exclusive of any land acquisition costs. These estimates are very preliminary in nature because they have been made without benefit of any detailed design investigations. Before the estimates are used even for budget purposes, they should be refined by undertaking at least a preliminary design investigation. This matter is particularly acute on this project because of the bridge structure and the sensitive ground aspects, both of which can dramatically affect an estimate of construction cost.

The Consultant's report has been reviewed by both the Planning and Parks Departments and both Departments concur with Engineering that, overall, alignment Alternative C is the preferred one. As this project proceeds towards implementation, all affected Departments will continue to be closely involved and kept informed so that the impact of this project is addressed in a manner which is acceptable to all parties concerned.

The Parks & Recreation Commission at its meeting of 1987 February 18 indicated that it has no objection to the use of Deer Lake parklands for the accommodation of the recommended alignment "C" and has submitted a companion report to Council in that regard.

With respect to the question of encroachment into the provincially-owned Oakalla property, Council will recall that on 1987 January 05, staff was authorized to initiate preparation of a community plan for the Oakalla Prison lands. The recommended alignment "C" has been provided to the consultants engaged by the Province as a potential influence on the redevelopment of the site. Further, the 1979 Crown Grant document conveying certain Oakalla property to Burnaby for Deer Lake Park purposes makes provision for the Crown to "resume", under controlled conditions, a portion of said property for the purpose of "...making roads, canals, bridges, or other public works...". Further discussions with the Province will determine the specific process(es) which are necessary to effect this provision in order to accommodate the realignment of Royal Oak Avenue.

The proposed phase out of the Oakalla Prison and commencement of its redevelopment is expected to take some 4 to 5 years. If the Royal Oak realignment were to occur only after this period, (say 1991), then development of the roadway would pose no operational difficulty. Presently, the Royal Oak realignment is in the Capital Improvement Program as 1988 and 1989 projects related to the ongoing improvement of road accessibility to and from Metrotown. This timing presents some operational problems for the Corrections Branch who require retention of an outbuilding affected by the realignment for as long as the Prison remains functional. The actual timing of the Royal Oak realignment will therefore need to be defined in relation to both Metrotown needs and

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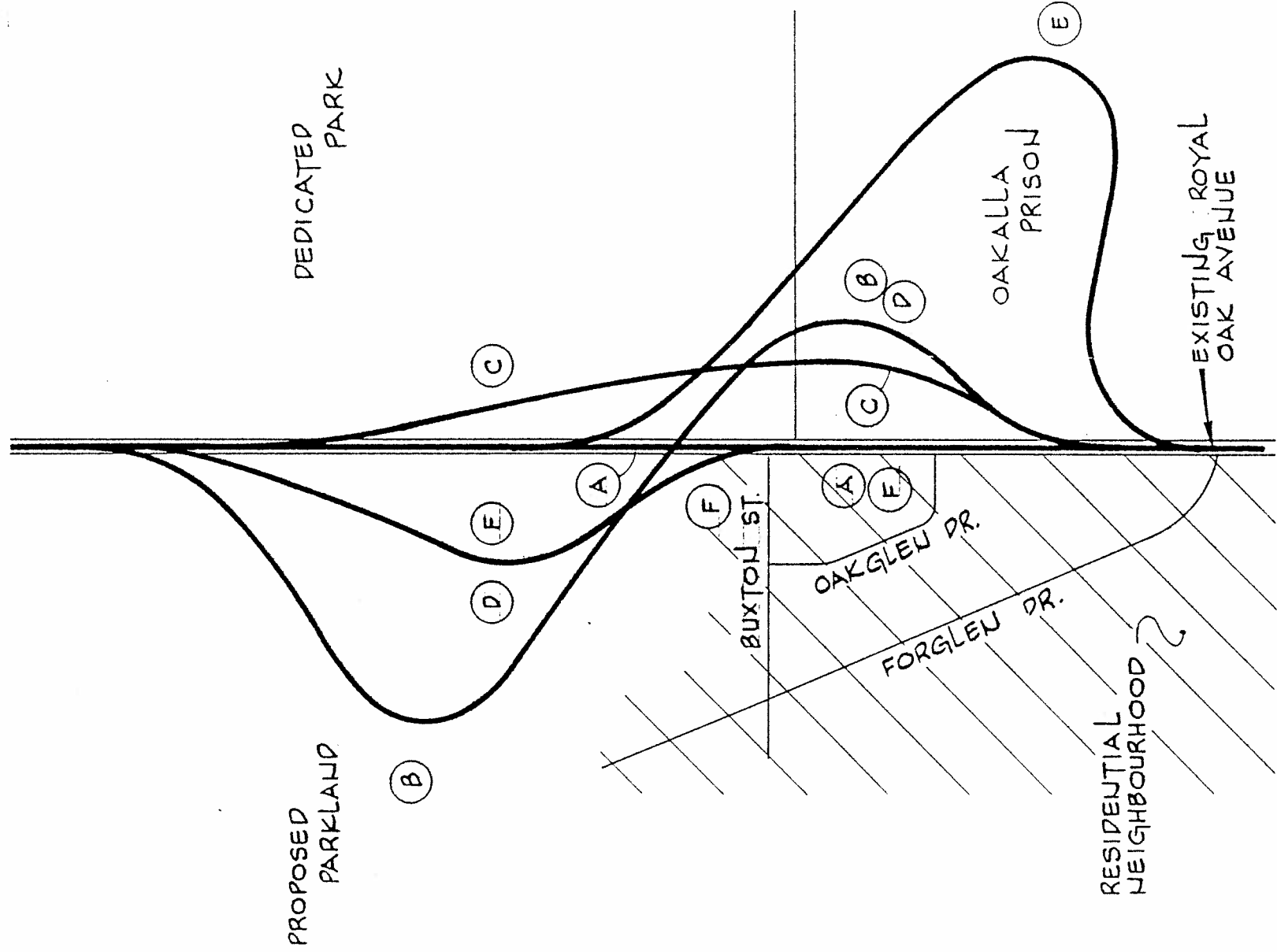
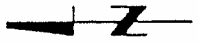
availability of the required right-of-way from the prison point of view.

The timing of the Oakalla Prison relocation has been unknown until recently. With staff discussions now underway with Provincial officials on the whole subject of the Oakalla redevelopment, it is timely that this report be presented to Council so that the Royal Oak realignment ramifications can be incorporated within the community plan preparation process and the phase out planning of the Oakalla facility.


DIRECTOR ENGINEERING

EEO/VNW:dp

cc: Director Planning & Building Inspection
Director Finance
Director Recreation & Cultural Services



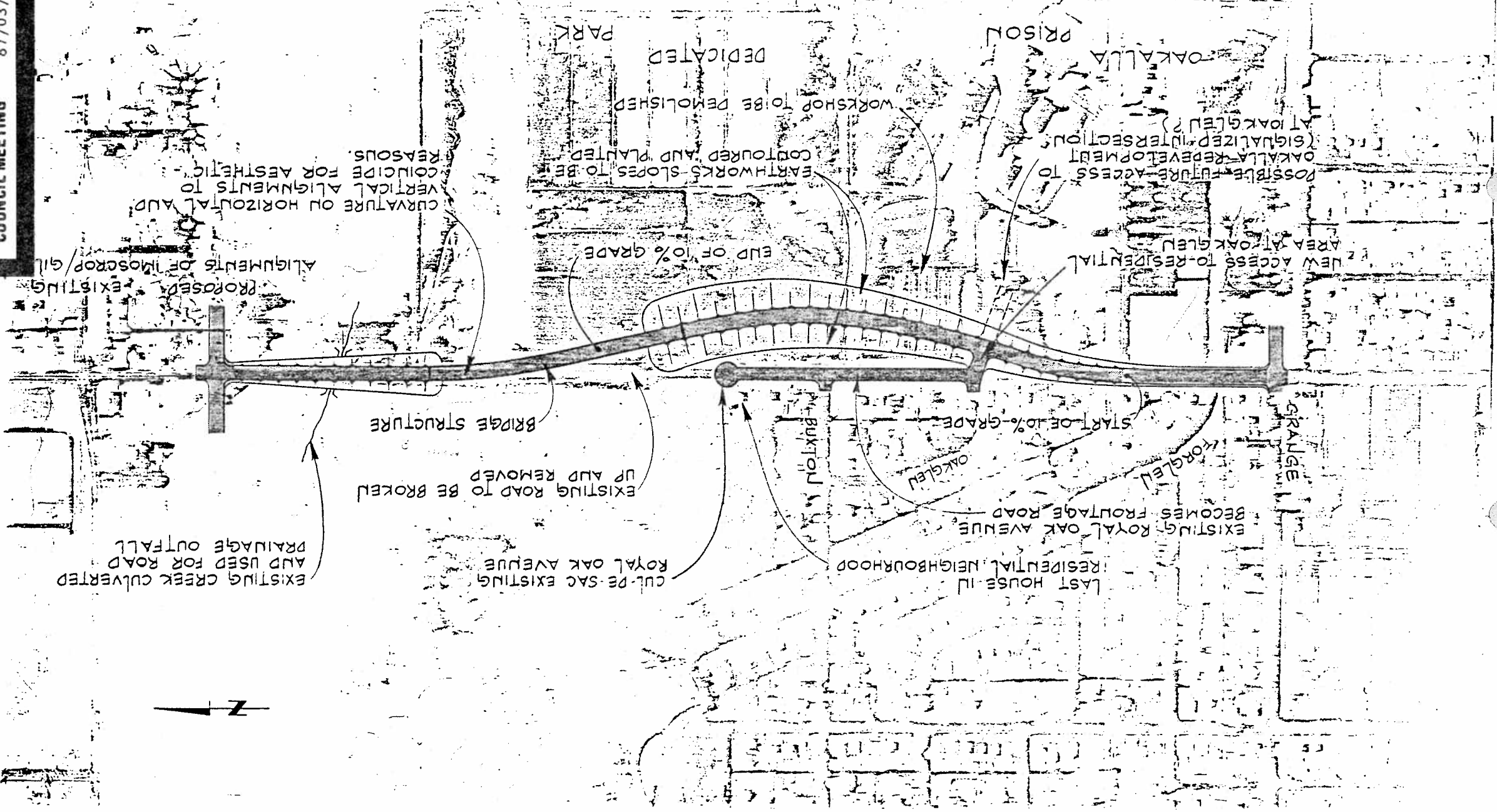
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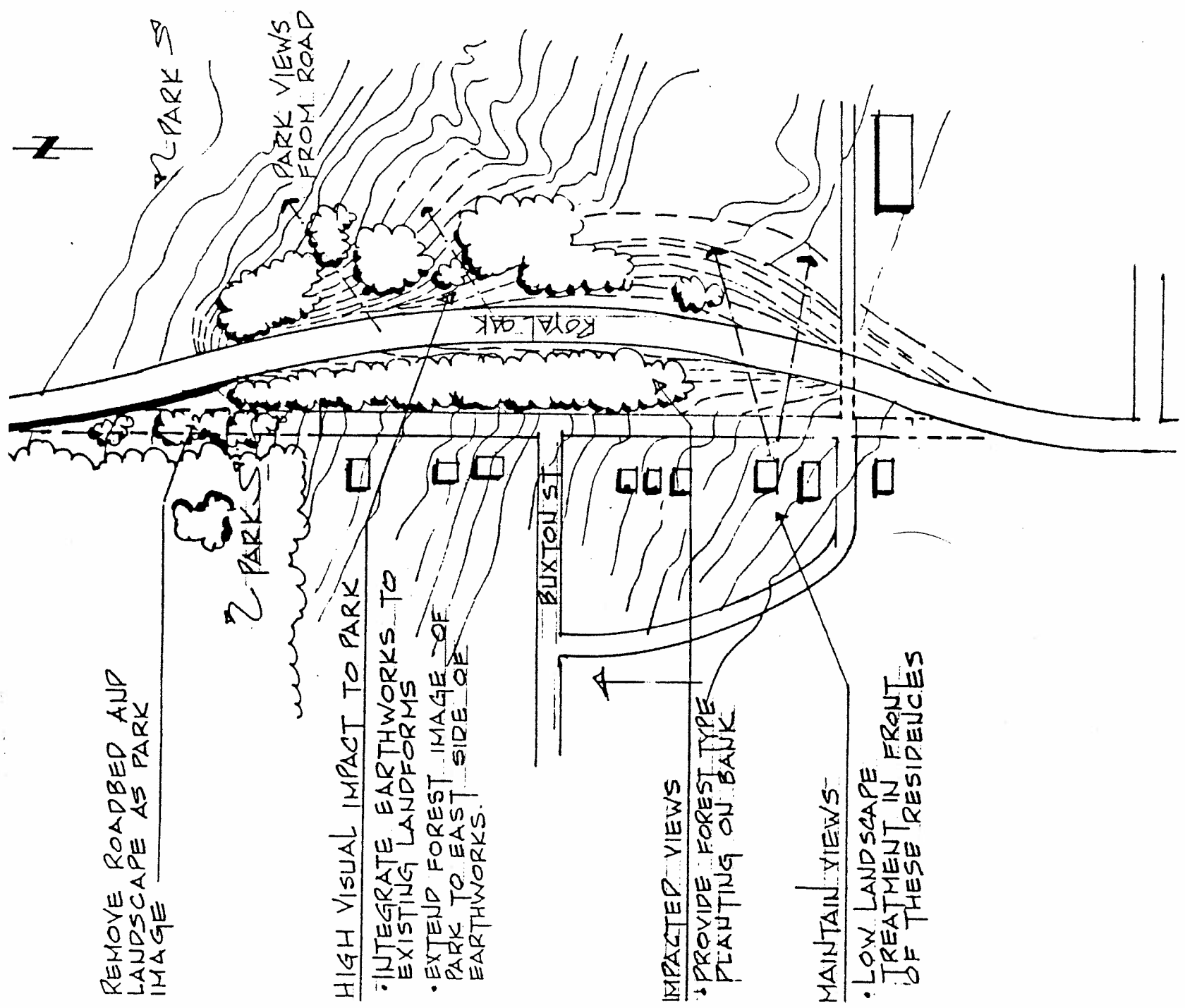
Evaluation Criteria	Alignment Alternate					
	A	B	C	D	E	F
2.1 Route Continuity	5	1	4	3	1	4
2.2 Road Safety	5	1	4	1	1	3
2.3 Land Acquisition	1	2	4	2	3	1
2.4 Soils Conditions	2	2	2	2	4	2
2.5 Noise Impact	1	2	4	2	3	1
2.6 Visual Impact	2	4	3	4	2	3
2.7 Park Development	4	4	4	2	1	2
2.8 Oakalla Redevelopment	4	3	3	3	1	4
2.9 Residential Access	1	4	4	4	4	1
2.10 Utility Relocations	1	2	4	3	3	2
2.11 Stormwater Disposal	4	1	3	2	1	3
2.12 Construction Scheduling	1	4	3	4	4	2
Score	31	30	42	32	28	28
Equivalent Percentage	52%	50%	70%	53%	47%	47%

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PROPOSED REALIGNMENT
 OF ROYAL OAK AVE. FIG. 3





REMOVE ROADBED AND LANDSCAPE AS PARK IMAGE

2 PARKS

2 PARKS

PARK VIEWS FROM ROAD

HIGH VISUAL IMPACT TO PARK

- INTEGRATE EARTHWORKS TO EXISTING LANDFORMS
- EXTEND FOREST IMAGE OF PARK TO EAST SIDE OF EARTHWORKS.

IMPACTED VIEWS

- PROVIDE FOREST-TYPE PLANTING ON BANK

MAINTAIN VIEWS

- LOW LANDSCAPE TREATMENT IN FRONT OF THESE RESIDENCES

