



ADVISORY CIRCULAR

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SIERRA LEONE CIVIL AVIATION AUTHORITY

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Guidance on Airport Master Plan

A handwritten signature in blue ink, appearing to read 'M Baio', is written over a horizontal line.

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TABLE OF CONTENTS

GENERAL.....	3
1.1 PURPOSE	3
1.2 APPLICABILITY.....	3
1.3 DESCRIPTION OF CHANGE	3
1.4 REFERENCES.....	3
1.5 CANCELLED DOCUMENTS.....	3
INTRODUCTION	3
PROJECT REQUIREMENTS	4
1.6 AIRPORT MASTER PLANS AND AIRPORT LAYOUT PLANS	4
1.7 UPDATE FREQUENCY.....	5
1.8 AS-BUILT AIRPORT LAYOUT PLANS	6
INITIAL ACTIONS	6
1.9 AIRPORT REPRESENTATIVE	6
1.10 AIRPORT AND AIRSPACE REVIEW PROCESS.....	7
ALP SUBMITTAL, REVIEW AND APPROVAL PROCESSES	7
AIRPORT LAYOUT PLAN COMPONENTS AND PREPARATION	10
1.11 ALP NARRATIVE REPORT	12
1.12 COMPONENTS.....	12
AIRPORT LAYOUT PLAN (ALP) SET	14
1.13 GENERAL REQUIREMENTS	14
APPENDIX 1 – TRANSMITTAL LETTER	16
APPENDIX 2 – AIRPORT DATA SHEET	19
APPENDIX 3 - AIRPORT LAYOUT DRAWING	22
APPENDIX 4 - AIRPORT AIRSPACE DRAWING	26
APPENDIX 7 – TERMINAL OR BUILDING AREA DRAWING	38
APPENDIX 8 – LAND USE DRAWING	40
APPENDIX 9 – AIRPORT PROPERTY MAP	42
APPENDIX 10 – AIRPORT LAYOUT PLAN (ALP) CHECKLIST	44

GENERAL

Sierra Leone Civil Aviation Authority Advisory Circulars contain information about standards, practices and procedures that the Authority has found to be an Acceptable Means of Compliance (AMC) with the associated Regulations.

An AMC is not intended to be the only means of compliance with a regulation, and consideration will be given to other methods of compliance that may be presented to the Authority.

Information considered directive in nature is described in this AC in terms such as “shall” and “must”, indicating the actions are mandatory. Guidance information is described in terms such as “should” and “may” indicating the actions are desirable or permissive, but not mandatory.

1.1 Purpose

This AC provides guidance for an Airport Layout Plan (ALP) preparation, submittal, and approval for airports that range in size and function from small general aviation to large commercial service facilities. The intent of this guidance is to foster a flexible approach to ALP’s and to some extent master planning that directs attention and resources to critical issues.

It is to be used as a guide and checklist for the development and preparation of airport layout plans, and to assist the preparer in conforming to the SLCAR’s Part 14A. The scope of each layout plan must be tailored to the individual airport under evaluation.

1.2 Applicability

This AC is designed to give guidance to aerodrome operators or airport owners on the preparation and submittal of Airport Master Plan and Airport Layout Plan

1.3 Description of Change

This is the first AC to be issued on this subject.

1.4 References

- a) SLCAR’s Part 14A – Aerodrome Design and Operation
- b) SLCAR’s Part 14C – Certification of Aerodrome
- c) SLCAA-AC-AGA043-01 – Guidance Material Supplement to SLCAR Part 14A
- d) ICAO Doc 9184 – Master Planning

1.5 Cancelled Documents

Not Applicable

INTRODUCTION

- (a) The SLCAR’s Part 14A Chapter 1, Section 1.5.1 requires that an aerodrome operator proposing to construct or make changes to an airports layout, must submit an Airport Layout Plan (ALP) Report or Airport Master Plan (AMP) to the

Authority for approval. The report is based on current physical conditions at the airport and provides recommendations for future improvement projects.

- (b) An ALP is a planning document for airports. It is designed to show existing conditions, near term and long-term airport development.

PROJECT REQUIREMENTS

- (a) All proposed airport improvement projects must be shown on an approved ALP. If an Aerodrome Operator is proposing an airport project not on the current ALP, an ALP update will be required before receiving the Authority's approval for the proposed project.
- (b) The Aerodrome Operator must not make or permit any changes or alterations in the airport or any of its facilities that are not in conformity with the ALP, as approved by the Authority, which might adversely affect the safety, utility or efficiency of the airport.
- (c) The individual sheets that comprise the Airport Layout Plan drawing set will vary with each planning effort. The ALP preparer must work closely with the Aerodrome Operator, the Authority, and if appropriate, other applicable state agency(s), to define the requirements, standards, and criteria to be employed and must determine which sheets are necessary during the project scoping activities. To ensure that the ALP is comprehensive, all parties must agree to its content and standards.

1.6 Airport Master Plans and Airport Layout Plans

- (a) The goal of a master plan is to provide guidelines for future airport development which will satisfy aviation demand in a financially feasible manner, while at the same time resolving the aviation, environmental, and socio-economic issues existing in a community.
- (b) An Airport Master Plan is a concept of long-term development of an airport that defines the current, short-term and long-term needs of the airport. It provides a schedule for airport improvements, which helps maintain the airport category minimum standards and its projected demands. The AMP provides detailed information on both airport and runway design criteria, which is necessary to define relationships with applicable standards. The design of the airport shall be guided by the SLCAR's Part 14A.
- (c) The Master Plan displays this concept graphically in the form of an ALP and documents the data and logic upon which the plan is based. A master plan therefore provides narrative report and an ALP which is prepared as part of a master plan. The narrative report is a brief written description of the individual elements represented in the set of Airport Plans for the airport. These drawing set is called Airport Layout Plans (ALP).
- (d) An ALP is a scaled drawing depicting existing and future facilities and property necessary for the operation & development of the airport. It is a key

“communication” and “agreement” document between the Airport Applicant and the Authority.

- (e) Airport Layout Plans are prepared either as first time ALPs (i.e. part of AMP), or formal revisions based on changes to the airport, or informal revisions based on minor improvements to the airport. Informal revisions often referred to as pen-and-ink revisions, can be made to individual sheets of the ALP set.
- (f) If the ALP is prepared separately as an ALP Update, an ALP narrative report is required. The narrative will typically describe ALP development criteria and the rationale for the development shown on the ALP. Examples of these include airport reference code-related design criteria unique to specific areas of the airfield, or known or proposed modifications to the Authority design standards.
- (g) The quantity and form of ALP drawing sets must also be defined by the Aerodrome Operator, the Authority and other relevant state agencies. A reproducible, signed original copy and multiple paper copies of the drawings set may be required. Distribution requirements shall be established during the project scoping.
- (h) Airports construction or improvements must be approved by the Authority, following the submission of a “Letter of Notification” accompanied with the completed ALP and the proposal for construction.
- (i) The four primary functions of the AMP that define its purpose are:
 - (i) An AMP creates a blueprint for airport development by depicting proposed facility improvements. The AMP provides a guideline by which the Aerodrome Operator can ensure that the development maintains airport design standards and safety requirements, and is consistent with airport and community land use plans.
 - (ii) The AMP is a public document that serves as a record of aeronautical requirements, both present and future, and as a reference for community deliberations on land use proposals and budget resource planning.
 - (iii) The approved ALP enables the Aerodrome Operator and the Authority to plan for facility improvements at the airport. The approved ALP will also allow the Authority to protect the airspace required for facility or approach procedure improvements.
 - (iv) The ALP can be a working tool for the Aerodrome Operator, including its development and maintenance staff.

1.7 Update Frequency

- (a) SLCAR Part 14A Chapter 1, Section 1.5.2 requires the Aerodrome Operator to maintain an AMP that;
 - (i) contains a schedule of priorities including a phased implementation plan; and

- (ii) be reviewed periodically to take into account current and future aerodrome traffic .
- (b) A Master Plan must be completed or updated approximately every five years or when an airport experiences unexpected, rapid growth in activity. ALP must be updated depending on the type and size of the airport. If an AMP is less than 10 years old and there are significant changes in proposed airport expansion not shown on the current ALP, the preparation of a new ALP will be required. Minor changes may only require sheet updates.
- (c) If an AMP is more than 10 years old and the airport is proposing a project not shown on the ALP or if the current ALP does not meet the existing standards required under these guidelines, a new AMP update will be required.
- (d) If the proposed project is something that is normally not shown on an ALP (such as pavement maintenance work), an updated ALP may not be required prior to the project but should be done within a reasonable timeframe.
- (e) ALP drawing set, although the responsibility for review rests with the Aerodrome Operator, approval must still be coordinated with the Authority.
- (f) The Airport Master Plan process is guided by the Authority and ultimately results in projections of future growth and an Airport Layout Plan (ALP). An ALP is needed because all development at public airports must be done in accordance with the Authority's approved ALP.

1.8 As-Built Airport Layout Plans

- (a) After completion of airport construction projects shown on the ALP, an as-built ALP shall be completed and submitted to the Authority to update the current ALP on file. The symbology of the completed projects will need to be changed from proposed development to existing conditions. Minor changes, such as construction of hangars, may not require an as-built ALP, but projects that include construction/alteration of any aircraft movement areas will require an as -built ALP. Changes shall be made on all applicable sheets, and only those sheets need to be submitted to the Authority.
- (b) No other changes, other than changing proposed development to existing conditions, shall be made to an as-built ALP. If other changes are made, it shall be done as a new ALP update as opposed to an as-built ALP.

INITIAL ACTIONS

1.9 Airport Representative

- (a) An Aerodrome is a complex organisation with many interactive disciplines and functions. Therefore, it is possible that even the simplest of developments may need inter-departmental co-ordination.

- (b) To initiate the development procedure, the aerodrome operator must appoint a project co-ordinator to liaise with the Aerodrome and Ground Aids (AGA) Division of the Sierra Leone Civil Aviation Authority.
- (c) For major airport improvement projects or the development of new airport, an Initial Development Meeting (IDM) will be held to brief the Authority on the project. The aerodrome management will be responsible for providing a written brief and minutes (for this and subsequent meetings).
- (d) Although consultants may attend development meetings, AGA Division will only deal directly with the aerodrome operator or their management representatives, at least one of whom shall always be in attendance. The Authority will not deal with consultants directly unless the Director General of the Authority agrees that this is absolutely necessary for the advancement of a project.

1.10 Airport and Airspace Review process

- (a) After consultation with aviation stakeholders as appropriate, the Authority will conduct and issue a determination to the operator and advise those concerned of the Authority's determination as specified in SLCAR Part 14A Chapter 1, Section 1.5.3.
- (b) Should the proposed development have any effect on the Instrument Approach, Missed Approach, and Visual Manoeuvring (Circling) Procedures, including **SIDS and STARS**, details shall be submitted to the Authority sufficiently in advance of the Initial Development Meeting (IDM) for the full impact to be considered by the appropriate departments.
- (c) Safety risk assessment of the entire cycle of the proposed development life span will form part of the review.
- (d) It should be noted that the processes of Town and Country Planning law are outside the terms of reference of the Authority. Planning and Environmental issues must therefore be channelled through the appropriate local government planning authority.

ALP SUBMITTAL, REVIEW AND APPROVAL PROCESSES

- (a) Based on the conclusion of the Airspace Review, the operator will be requested to furnish the Authority with their Proposed Airport Layout Plan (ALP) or Master Plan.
- (b) The review of the Airport Layout Plan drawing set will typically be completed through multiple submittals. Milestones must be determined by the various reviewing offices, but typically include:
 - (i) Identify planning Project & determine whether new or updated ALP is required.
 - (ii) The Operators review of the "Airport Layout Plan Preparation & Submittal Guidelines"

- (iii) An Initial Development Meeting (IDM) will be held to brief the Authority on the project as indicated above. The aerodrome management will be responsible for providing a written brief and minutes (for this and subsequent meetings).
 - (iv) The Operator and consultant review draft to ensure that the graphic depictions correctly present the sponsor's goals and complete "ALP checklist". Revise or correct ALP as necessary. (The "ALP checklist" in Appendix 10 of this AC) is to help the operator and consultant minimize the amount of time and expense of subsequent review-and-revision cycle).
 - (v) Draft ALP Submittal – The Aerodrome Operator should initially submit one (1) signed Draft ALP drawing set and support documentation with cover letter to the Authority for internal review and comments. Supporting documentation must include ALP checklists and must be predetermined with reviewing agencies. Appendix 1 of this AC provides description and sample transmittal letter.
 - (vi) The Operator will also be required to pay a fee for ALP evaluation and approval. Fees differ depending on the use/category of the aerodrome.
 - (vii) The Authority reviews the ALP and returns the documents to the Aerodrome Operator for corrections to be made if any. Comments provided are intended to strengthen your document.
 - (viii) When the revision is ready, the applicant may schedule a meeting with the appropriate SMEs of the Authority prior to re-submitting. Once the ALP is initially acceptable to the Authority, from the standpoint of Safety, Utility, and Efficiency" then, the operator incorporates further corrections based on the evaluation reports.
 - (ix) Final ALP submittal – The ALP drawing set is revised, as needed, based on the evaluation report. The operator must submit a minimum of six (6) signed copies of the ALP. The ALP drawing set, the accompanying narrative report and a completed ALP checklist (see appendix 10 of this AC) should be sent to the Authority. It shall be noted that, the ALP at this level must be a final version and must be completed to conform to the SLCAR's Part 14A and incorporate all the relevant requirements. Following the Authority's review, if the submittal is incomplete or determined to be not acceptable, it will be returned with comment by the Authority for completion and re-submittal. The Authority will not accept incomplete submittals. ALP's must be submitted on 863.3mm by 558.8mm (ANSI D) sized plan sheets.
- (c) The Authority will provide a letter issuing one of the following:
- (i) ***Unconditional Approval***
 - (1) The Authority may unconditionally approve the Airport Layout Plan drawing set when all proposed development projects are either categorically

excluded from additional environmental processing, have received a Finding of No Significant Impact resulting from an Environmental Assessment.

- (2) The Authority may provide comments (unrelated to Safety, Utility, Efficiency) for a correction/change on the next ALP Update.

(ii) Conditional Approval

- (1) A Condition may also include a need for completion of environmental documentation in-line with Environmental Protection Agency requirements. Early Planning leads to efficient environmental processes. The Aerodrome Operator must coordinate all environmental studies.

Note – an ALP approval does not mean the commitment of the Authority or any state funds for any project/development shown on the ALP and does not constitute any environmental approval. A separate environmental review will be required.

- (2) If the ALP is accepted by the Authority, one copy will be returned to the Aerodrome Operator, one will be retained by the Authority and one each forwarded to the Office of National Security, Ministry of Transport and Aviation, ANS Division and Air Traffic Services Provider. If additional signed copies are desired by the airport or consultant, additional copies may be submitted for signature.
- (3) The ALP becomes a legal document and the operator shall consider placing security controls on the ALP drawing set to prevent unauthorized changes to the drawings.
- (4) The operator scans and embeds (or otherwise attaches) the Authority's final ALP approval letter on the final ALP cover sheets.
- (5) On completion of construction, the Authority shall be contacted for a final inspection of facilities at the aerodrome. The applicant may also wish to invite the Authority at certain phases of the construction. However, the Authority will charge a fee for each inspection conducted.
- (6) If the Authority is satisfied, it shall issue an authorization for the commencement of flight operations at the aerodrome after the appropriate fees are paid.

Note - The above processes focus principally on the planning process. The aerodrome operator and consultants must address the environmental review requirements separately, with due consideration for the time required for analysis, public process (if appropriate) and other steps required, prior to the Authority's action on the ALP.

AIRPORT LAYOUT PLAN COMPONENTS AND PREPARATION

- (a) The Airport Layout Plan (ALP) is a graphic presentation to scale of existing and ultimate airport facilities, their location on the airport and the pertinent clearance and dimensional information required to show relationships with applicable standards that will be required to enable the airport to properly accommodate the forecast future demand. In addition, the ALP also provides detailed information on both airport and runway design criteria, which is necessary to define relationships with applicable standards and must be accepted by the Authority.
- (b) The plan must be prepared in accordance with SLCAR Part 14A. The ALP shall normally present a 20-year, three-stage program that has been developed to support the projected activity at the airport. The stages of development correspond in years as follows: Stage I - 0 to 5 years; Stage II - 6 to 10 years; and, Stage III - 11 to 20 years.
- (c) In the case of smaller airports, some of the following sheets may be combined if practical and approved by the Authority.
- (d) The ALP drawing set can be one or two sheets depending on the complexity of the airport and the proposed development. Separate sheets may be required to delineate major phases of complex development or airfield reconfiguration projects. Typical components to be included in ALP submittals (set) are those listed in the table below.

Table 0-1: Components of ALP Submittals

Component	ALP Drawing Set	Smaller Airport	Larger Airports
1. Transmittal Letter	-	X	X
2. ALP Narrative Report	-	X	X
3. Airport Layout Plan set	Surface Drawing;	X	X
	Airport Departure Surfaces Drawing		X
	Terminal and/ or Building Area Drawing;		X
	Land Use Plan/Drawing;		X
	Airport Property Map	X	X
	Airport/Runway Departure Surface Drawing		
4. Additional plans for larger and more complicated airports	Declared Distance Drawing		
	Airport Access Plans		
	Plan/Profile Drawing of Runway;		
	Facilities Layout Plan;		
	ATCT Shadow Study;		
	Utility Drawing.		

Note 1 - If the ALP report is prepared as part of a Master plan, an ALP narrative report will only be a duplication and will not be required. It is necessary only when the ALP is developed separately as an ALP update.

Note 2 - All components should consider and indicate existing, future, ultimate designs. In some instances, the title sheet may be omitted when its elements are detailed as part of the Airport Layout Drawing.

1.11 ALP Narrative Report

(a) Definition

This is a condensed report explaining reasoning behind proposed airport construction or improvements, and the important features of the ALP. A narrative report should accompany any new ALP and all ALP revisions. The level of detail should be discussed with the Authority prior to starting the ALP update. Additionally, the Aerodrome Operator, and consultant should discuss the following:

- (i) Determine whether a user survey and/or forecasts are needed;
 - (ii) Existing and future approach category
 - (iii) Existing and future critical aircraft;
 - (iv) Existing and planned instrument approach types;
 - (v) Existing and future Building Restriction Line (BRL) setbacks;
 - (vi) Existing and future declared distances (if applicable).
- (b) The narrative report provides useful information in an understandable format to the Aerodrome Operator and facilitates the Authority's final approval process. When ALP preparation is being accomplished in conjunction with a Master Plan Study, the Master Plan Report should contain this information, and an ALP narrative report is not necessary. When periodically updating ALP's, a narrative report is not required unless major changes in airport function, classification or facilities are anticipated.

1.12 Components

- (a) Aviation demand forecasts and facility requirements; aircraft operational characteristics; environmental considerations; and as characterized in the previously noted statement of goals, the general direction of airport development prescribed by airport management. Forecasts are utilized as a basis for planning; however, facilities are only to be constructed to meet actual demand.
- (b) The items included in a narrative report are not limited to, but should include the following:
 - (i) Inventory - Includes data on existing airport facilities, aviation activity (total operations, itinerant operations, and instrument operations), based aircraft and critical aircraft. This element may also include the results of a need study or user survey where the planned improvements require documentation of need.
 - (ii) Forecasts – Basic aeronautical forecast of aviation demand. Includes as a minimum, short (0-5 years), intermediate (6-10 years) and long range (11- 20 years) forecasts for the following:
 - (1) Total annual operations

- (2) Annual itinerant operations
 - (3) Based aircraft
 - (4) Annual instrument approaches
 - (5) Existing and future annual operations by the critical design aircraft. For the critical design aircraft, identify the type of aircraft, (i.e.: design group, approach speed, and gross loading characteristics)
- (c) Demand/Capacity Analysis - Includes a comparison of existing airport facilities and forecast needs to determine facility requirements, such as:
- (i) Length, strength and number of runways
 - (ii) Apron and tiedown requirements
 - (iii) Area requirements for terminal buildings, hangars, and auto parking
 - (iv) NAVAIDS and other airport aids
 - (v) Taxiways
- (d) Site Selection - If a new airport or new runway is being considered, include a discussion of the factors which influenced its location, such as: airspace, environmental considerations, community needs, airport access, land availability, total costs, and engineering factors which may affect site development. For more details on selecting a suitable site location for an aerodrome, see SLCAA-AC-AGA034-Rev.00 “Aerodrome Site Selection Guide”.
- (e) Stage Development – Develop summary for stages of construction and layout sketches depicting the main items of development in that stage. Indicate staging of improvements shown on the ALP, based on short, intermediate and long range (0-5, 6-10 and 11- 20 years) forecasts of aviation activity.
- (f) Economic Feasibility - Show comparisons of annual costs needed to implement the phased development with annual revenues available or forecast to be available. Cost estimates for each stage of the proposed development should be included.
- (g) Wind Data - Discuss the wind data and coverage. Identify the source, period covered, and the number of observations. If applicable, determine the best alignment for the primary and/or the crosswind runway for optimum wind coverage.
- (h) Alternative Analysis - Briefly discuss and analyze the obvious alternatives. Explain why the selected alternative was chosen.
- (i) Approaches - Discuss the existing and future approaches. Determine if there are or will be any obstructions to Obstacle Limitation Surfaces as detailed in Appendix 4 of this publication. If there are obstructions, discuss their penetration and their proposed disposition. Identify any existing determinations of no hazard and the date granted. Determine if any additional determinations of no hazards are necessary. Describe the object and why a determination of no hazard is necessary.

- (j) Waivers & Modifications to the SLCAR's Part 14A Design Standards - Rationale for unusual design features and/or modification not in accordance with SLCAR Part 14A must be submitted to the Authority for approval.
- (k) Compatible Land Use & Coordination - Describe any local and/or regional planning efforts and zoning ordinances in effect or anticipated which would have an effect on or be affected by the airport development. Obtain and append to the Report evidence that the ALP was coordinated with appropriate local and national governmental units (e.g., City, District Assemblies or Metropolitan Planning Authority, Sierra Leone Roads Authority etc.) found to be consistent with their plans.
- (l) Others - remember the primary purpose of the narrative report is to provide **useful** and **understandable** information and guidance to the Aerodrome Operator. It also provides the Authority with important information needed to review and ultimately approve the ALP.

AIRPORT LAYOUT PLAN (ALP) SET

1.13 General Requirements

- (a) ALP clarity is of the utmost importance. Make sure that each sheet is readable and that all line types, widths and colours provide a clear depiction of development. The sheet size, scale, and minimum letter size should be consistent with this guide.
- (b) For all aerodromes, ALP's must conform to the requirements of the SLCAR's Part 14A. Each sheet should show the following:
 - (i) Plan size should be 863.6mm X 558.8mm (ANSI D)
 - (ii) Applicable scale
 - (iii) Title, revision and signature/approval blocks (i.e. completed with signature and date of latest revision).
 - (iv) Existing and ultimate airport development elements
 - (v) All sheets will have a legend depicting existing and ultimate elements with different symbology (*Note - not required on the title sheet*) that explains all pertinent features that are not identified. Existing features should be shown with solid lines, and future and ultimate items shown with dashed lines.
 - (vi) North Arrow - Show True North to the top left of each sheet. Also indicate magnetic variation and the year of the declination used.
 - (vii) Because of the number of obstacle limitation surfaces required by the Authority to be depicted on ALP's, it is necessary to separate ALP's into sections corresponding to Existing, Future (where appropriate), and Ultimate. This separation should apply to Layout Sheets and Approach Sheets.
 - (viii) Numerical and graphic scale, if the plans are reduced after plotting, numerical scale should be blocked out.

- (ix) All coordinates shall be in WGS-84 datum and all ALP elevations should be established using elevations AMSL.
- (x) Identify runways by alphanumerical designation in all references to a specific runway.
- (xi) If the ultimate development is to occur in stages, the ALP must show all phases/stages of construction of the ultimate development in all applicable drawings.

APPENDIX 1 – TRANSMITTAL LETTER

1. Introduction

- (a) Airport Master Plans or ALPs should be sent to the Authority for aeronautical review using a standardized letter duly signed by the chief executive or very senior person of the organisation making the application.
- (b) The letter should contain the following:
 - (i) A statement as to whether the submittal is a first time ALP or an update of previous ALP. If an update, state what the update replaces, e.g., “it replaces an approved ALP dated _____”
 - (ii) A page by page description of the changes made to the previous ALP. (An extra copy of the ALP with the changes highlighted may be submitted to aid the Authority in their review, but it is not required.)
 - (iii) Any request for waivers or “determinations of no hazard” should be stated in the description of the page on which the items in question are shown. State the reason for the request.
 - (iv) The end of the letter should summarize the requested waivers and “determinations of no hazard”. If there are none, it should be so stated.
 - (v) There should be a statement that, “There are no obstructions in the runway strips, or to the safety areas.” if such is the case.

2. Sample Letter

DD/MM/YYYY,
The Director General,
Sierra Leone Civil Aviation Authority,
Freetown.

Dear Sir/Madam,

“XXX” INTERNATIONAL AIRPORT - AIRPORT LAYOUT PLAN

Enclosed for your review and approval is an Airport Layout Plan (ALP) for the “XXX” International Airport. The ALP was developed in accordance with the Standards contained in the SLCAR’s Part 14A. This ALP replaces the previously approved ALP dated “dd/mm/yyyy”. The ALP changes consist of showing updates for the existing conditions and a revised length on the secondary Runway 12/30 (e.g.). The following is a page by page discussion of the changes to the ALP:

Sheet 1 – Title sheet: The pavement configuration has been revised to show current conditions. The Airport Data box has been revised for existing and ultimate

navigational and visual aids. The Design Critical Aircraft for Runway 4/22 is shown as 2A; Runway 13/31 is shown as 4E.

Sheet 2 – Airport Layout Drawing: Runway 4/22 is shown as the primary runway with an ultimate length of 1.8km. The runway will have NPI approaches with 34:1 approach slopes and a full length parallel taxiway on the west side to serve the hangar area. XXX street will ultimately be closed to provide the necessary clearance. Runway 13/31 is the crosswind runway and is shown as paved and reduced in length from 1.2km on the previously approved ALP to 1.04km.

Sheet 3 – Terminal Area Drawing: This drawing has been updated to show new hangars and the cattle fence.

Sheet 4 – Terminal Area Drawing: This is a new drawing showing hangars on the west side of Runway 4/22.

Sheet 5 – Runway 4 Approach Drawing: A 300m extension to the southwest is shown for an ultimate runway length of 1.8km. XXX Street will be relocated outside the ultimate runway strip and Runway Safety Areas. The ultimate property line is shown. Approximately 36 acres would need to be acquired.

The trees (4.1) are obstructions to the existing and ultimate 7:1. These trees provide a visual and noise buffer to the homes located along XXX Street. For that reason, a “Determination of No Hazard” is requested.

Sheet 6 – Runway 22 Approach Drawing: The existing 20:1 approach is shown with Ghartey Road closed to provide the appropriate clearance. The 2014 ALP used a threshold location plane to provide the clearance, but runway strip criteria for night operations won’t allow it. The City decided to close the road rather than displace the threshold. The ultimate approach 22 surface is shown as 34:1. The trees (22.9) are obstructions to the ultimate 7:1 are located in the front yards of adjacent homes. A “Determination of No Hazard” is requested.

Sheet 7 – Runway 13 Approach Drawing: The existing turf crosswind runway is shown to be replaced with a 23m x 1036m paved runway for visual use only. The length on the west end was reduced because of environmental concerns in the proximity of the river. 31 acres of fee or easement property will need to be acquired.

Sheet 8 – Runway 31 Approach Drawing: The existing turf crosswind runway is shown to be replaced with a 23m x 1036m paved runway for visual use only. The length on the east end was reduced to provide clearance over XXX Road, since the City will not be closing the road.

Sheet 9 – Land Inventory Map: No changes.

Design Standard Waivers

- (i) The ALP was completed utilizing the specifications in the SLCAR’s Part 14A. No waivers are requested.
- (ii) Summary of No Hazard Determinations Requests
- (iii) Sheet 5: The trees (4.1) are obstructions to the existing and ultimate 7:1. These trees proved a visual and noise buffer to the homes located along XXX Street. A “Determination of No Hazard” is requested.

Airport Master Plan and Airport Layout Plan

- (iv) Sheet 6: The trees (22.9) are obstructions to the ultimate 7:1. These trees are located in the front yard of adjacent homes. A “Determination of No Hazard” is requested.
- (v) There are no obstructions to the runway strip or the safety area.

We believe public circularization is not necessary, since this is an updated ALP. Please conduct an aeronautical study of this plan and respond with your comments.

If you have any questions, please contact me at the following “telephone number” or through email “email address”

Sincerely,

Airport Engineering Section.

APPENDIX 2 – AIRPORT DATA SHEET

The Airport Data Sheet, also known as the Airport Data Summary provides a quick analysis, aircraft design group and signatures.

1. Features:

Items that must be shown on a title sheet include the following:

- (a) Title and Revision Blocks
- (b) Approval/signature blocks
- (c) Location & Vicinity maps
- (d) Wind rose and coverage analysis
- (e) Airport data table
- (f) Design Critical Aircraft Data Table.

2. Preparation Guidelines:

- (a) At times, elements of this sheet are incorporated in the preparation of Airport Layout Drawing. It is easy therefore to find all the above features on an Airport Layout Drawing. Items that must be shown on a Airport Data Sheet include the following:
 - (i) Sheet size – ANSI D (863.6 x 558.8mm)
 - (ii) Index to sheets
 - (iii) Title and Revision Blocks.
- (b) Submission of final ALPs for the Authority approval must reflect operator's approval of the plan). It should contain revision block and approval/signature blocks for the following:
 - (i) Engineer/Consultant
 - (ii) Aerodrome Operator
 - (iii) The Authority
- (c) Outline of pavements, existing and ultimate, should appear in the middle of the sheet at an appropriate scale.
- (d) Location map – showing general area of the location of the airport. (i.e. showing major trunk roads).
- (e) Vicinity map – showing immediate area around the airport
- (f) Wind data table, wind rose and coverage analysis – All Weather and Instrument Flight Rules (IFR) weather wind rose
- (g) Cite data source (i.e., weather station) and time period covered. If IFR wind rose is depicted, state % of time IFR conditions exist.
- (h) Include individual and combined coverage for:
 - (i) Runways with 10.5 knots crosswind, Runways with 13 knots crosswind,
 - (ii) Runways with 16 knots crosswind, Runways with 20 knots crosswind

- (i) Airport data table. The airport data table should contain the following:
 - (i) Airport use (Basic Utility, General Aviation, Transport/Corporate, Airline/Cargo etc.).
 - (ii) Airport Reference Point - Lat/Long of centre of ultimate development, to the nearest hundredth of a second.
 - (iii) Airport elevation - the highest point of the runways, to the nearest tenth of foot.
 - (iv) Mean maximum temperature of the hottest month.
 - (v) Airport and Terminal Navigational Aids - (VOR, NDB, ILS, GPS, etc.)
 - (vi) Visual Aids - (PAPI, REIL, MALS, etc.)
 - (vii) Miscellaneous Facilities - (Rotating Beacon, segmented circle, taxiway lighting, etc.)
- (j) **Runway Data Table** (Existing and Ultimate, unless there is a significant intermediate step). Include the following runway details:
 - (i) Approach Visibility Minimums - Include designated or planned approach visibility minimums (Visual, 1.6km, 1.2km, 0.8km, CAT II, or CAT III).
 - (ii) Dimensions - Note length and width (for **existing** and **ultimate**) within outline of runway.
 - (iii) Effective gradient expressed as a percentage (%): difference in high and low point divided by the total runway length.
 - (iv) Pavement Design Strength will be included.
 - (v) Orientation - Depict runway end numbers and show true bearing accuracy to nearest 0.01 degree.
 - (vi) Lighting - Depict **existing** and **ultimate** threshold lights with symbols. Show type of lighting (MIRE, etc.). **Don't** depict runway edge lights on drawing.
 - (vii) Marking - Include the type of runway markings (V, NP, or P).
 - (viii) Stage Lengths - Show only **existing** and **ultimate**. (Depict interim stage lengths on stage development sketches in ALP Narrative Report.)
 - (ix) End Coordinates - Note end (existing and ultimate) of each runway - accuracy to nearest 0.01 second.
 - (x) Monuments - Depict the location of all survey monuments and reference markers. As a minimum, monuments should be established to locate the runway centreline at the runway ends and at displaced thresholds. Include a note describing the manner in which these monuments are protected.
 - (xi) Declared Distances - Identify any clearway/stopway portions in the declared distances and any runway portions not included in the declared distances. Include all declared distances for all runway directions in the Runway Data Table. Declared distances associated with each runway direction may also be shown on the drawing (refer to the SLCAR' Part 14A).
 - (xii) Design Critical Aircraft Data Table. Identify the critical aircraft design groups and approach categories which regularly use each runway for existing data

and which are anticipated for ultimate development. The following should be included:

- (1) Runway Identification
- (2) Aircraft Weight - Maximum gross take-off weight of critical aircraft (NOT PAVEMENT STRENGTH)
- (3) Aeroplane Reference Field Length - for category of the critical aircraft using the airport (Category 1, 2, 3 or 4)
- (4) Wing Span - Maximum wing span for the design group of the critical aircraft using the airport (A, B, C, D or F)
- (5) Tail height - Tail Height of critical aircraft
- (6) Airport Reference Code (ARC) – coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport (derived from aeroplane reference field length and wing span/gear span).

Note - The data need not be all from the same specific aircraft. Approach speed can be for a Lear Jet, wingspan for a Citation, etc. depending on the aircraft with a more demanding situation.

APPENDIX 3 - AIRPORT LAYOUT DRAWING

This sheet provides overview of the airport's general layout, navigational aids; aircraft physical characteristics and aerodrome reference code.

This sheet is a detailed, scaled representation of existing and ultimate airport facilities. It provides pertinent dimensions and clearance information pursuant to applicable Standards. This sheet should be scaled to show the entire airport facilities. Zoning and approach slopes are not required to be shown on this sheet.

1. Features:

- (a) General Layout of existing and proposed facilities, buildings and other features;
- (b) Basic airport and runway data tables;
- (c) Legend and building tables;
- (d) Title and Revision Blocks
- (e) Operator's Approval Block
- (f) List of approved modifications to elements in the SLCAR's Part 14A Standards including proposed and planned modifications to standards, such as the use of declared distances for airport design, expected to be approved as part of the ALP review and approval process.
- (g) Outline of pavements, existing and ultimate, should appear in the middle of the sheet

2. Preparation Guidelines:

- (a) Sheet size – 863.6mm X 558.8mm (ANSI D)
- (b) Scale - Determined by airport size. Stay within range 1mm = 2.5m to 1mm= 7.5m.

3. Layout Data

North Point

Indicate both True and Magnetic North and the year of the magnetic declination used. Orient drawing so that north is to the top of sheet.

Runway Data Table

- (a) (Existing and Ultimate, unless there is a significant intermediate step). Include the following runway details:
- (b) Approach Visibility Minimums - Include designated or planned approach visibility minimums (Visual, 1.6km, 1.2km, 0.8km, CAT II, or CAT III).
- (c) Dimensions - Note length and width (for **existing** and **ultimate**) within outline of runway.
- (d) Effective gradient expressed as a percentage (%): difference in high and low point divided by the total runway length.
- (e) Pavement Design Strength will be included.
- (f) Orientation - Depict runway end numbers and show true bearing accuracy to nearest 0.01 degree.

- (g) Lighting - Depict **existing** and **ultimate** threshold lights with symbols. Show type of lighting (MIRE, etc.). **Don't** depict runway edge lights on drawing.
- (h) Marking - Include the type of runway markings (V, NP, or P).
- (i) Stage Lengths - Show only **existing** and **ultimate**. (Depict interim stage lengths on stage development sketches in ALP Narrative Report.)
- (j) End Coordinates - Note end (existing and ultimate) of each runway - accuracy to nearest 0.01 second.
- (k) Monuments - Depict the location of all survey monuments and reference markers. As a minimum, monuments should be established to locate the runway centreline at the runway ends and at displaced thresholds. Include a note describing the manner in which these monuments are protected.
- (l) Declared Distances - Identify any clearway/stopway portions in the declared distances and any runway portions not included in the declared distances. Include all declared distances for all runway directions in the Runway Data Table. Declared distances associated with each runway direction may also be shown on the drawing (refer to the SLCAR's Part 14A Standards).

Airport Reference Point (ARP)

Show location based on **ultimate** airport configuration with latitude and longitude to the nearest second based on WGS-84.

Topographic Information

Show ground contours at intervals of 1m to 3m depending on terrain. Draw in with very light lines.

Elevations

Include the following:

- (a) Runway - at existing and ultimate ends, displaced thresholds, touchdown zones, intersections, high and low points - accuracy to the nearest 1cm where the elevation is not subject to change with time.
- (b) Structures on Airport - If Terminal Area Plan Drawing are not to be included, show top elevations on this sheet. Use table and numbering system.
- (c) Building Restriction Lines - Show on both sides of runways and extend to airport property line.
- (d) Approach Surface Data Table - Include the **existing** and **ultimate** RESA dimensions as RESA width and RESA length beyond the stop end of runway and/or depict the RESA on drawing with dimensions.

Runway End Safety Areas (RESA)

Include the **existing** and **ultimate** RESA dimensions as RESA width and RESA length beyond the stop end of runway and/or depict the RESA on drawing with dimensions.

Runway Strip

- (a) Include the existing and ultimate Runway dimensions in the Runway Data Table as Runway strip width and runway strip length beyond the stop end of runway and/or depict the runway strip on drawing with dimensions.

- (b) Specify "NO OFZ OBJECT PENETRATIONS" when no object other than frangible NAVAIDS penetrates the Runway Strip. Otherwise show the object penetrations and indicate how they will be eliminated. The runway strip may be depicted on the drawing with dimensions to facilitate identifying object penetrations.

Threshold Details

Depict the thresholds with coordinates - accuracy to nearest 0.01 second, elevation, and displacement from runway end. Show any object penetrations and indicate how they will be eliminated.

Holding Position Signs and Markings

Depict the holding position signs and markings distance from runway centreline. Use dimension lines.

Taxiway Details

Include the following:

- (a) Dimensions - Show widths and separations from runway centreline to parallel taxiway, aircraft parking areas, building restriction line, and objects. Use dimension lines.
- (b) Lighting and marking - Indicate by notes in Airport Data Table.

Building Table

- (a) Identify existing and proposed structures by number and include a description of the structure. When appropriate, expand to include a column for the top building elevations if a Terminal Area Drawing is not included.
- (b) Areas reserved for future aviation development and services are outlined, e.g., general aviation, fixed base operations, heliports, cargo facilities.

APPENDIX 4 - AIRPORT AIRSPACE DRAWING

1. Introduction

- a. The Airport Airspace Drawing is based upon Obstacle Limitation Surfaces in the SLCAR's part 14A Standards, which deals with objects affecting Navigable Airspace and how to manage them. In order to protect the airport's airspace and approaches from hazards that could affect the safe and efficient operation of aircraft, Obstacle Limitation Surfaces (OLS) criteria should be established to provide guidance in controlling the height of objects in the vicinity of airports as require in the SLCAR's Part 14A (Aerodrome Design and Operations).
- b. The airspace drawings show obstructions to navigation and indicate areas that an airport owner may need to regulate in order to prevent or remove such obstructions.
- c. Airport Airspace Drawing (ICAO Obstacle Chart-Type B) depicts all OLS around the airport. The airport airspace drawing sheet(s) shall include all obstacle limitation surfaces plus a drawing of the approach surfaces to the full length of the approach surface. The surfaces shown should be for the ultimate runway lengths. The drawing is intended to show the relationship between the obstacle limitation surfaces and the topographical features. Emphasis is on defining significant objects and elevations that are critical to airport operations. Significant objects include all obstacles penetrating the surfaces and close-in obstacles 1.5m below the surfaces.
- d. All obstructions, natural and constructed, within any obstacle limitation surface must be shown in a schedule of obstructions with the proposed disposition. The schedule should show a reference number for all obstructions shown on the plan and profile drawings. The disposition of the obstruction must be shown along with the effective date of the disposition.
- e. The airport owner should protect obstacle limitation surfaces through height limitations on development both on and around the airport and especially in the approach areas and departure areas of the runways.
- f. The ALP may be adopted by reference and used to limit the height of objects that would interfere with airport usage. Such adoption needs to be coordinated with local zoning authorities such as the city or county of jurisdiction. Close coordination with the county or city planning departments is essential for successful implementation of airport zoning.
- g. The Airport Airspace Drawing Includes:
 - (i) Plan view of all obstacle limitation surfaces based on **ultimate** runway lengths.
 - (ii) Small scale profile views of **ultimate** approach surfaces.
 - (iii) Obstruction Data Tables, as appropriate (refer to inner portion of the approach surface discussion).

2. Preparation Guidelines:

- a. **Sheet size** – 863.6mm X 558.8mm (ANSI D).
- b. Title & Revision Blocks
- c. Plan View Details
- d. **Scale** for the plan view (Existing & Ultimate) is 1mm = 12m to 1mm = 36m
- e. Show runway end numbers.
- f. Include 10m elevation contours on all sloping surfaces.
- g. When horizontal and/or conical surfaces overlap the approach surface, draw in the more demanding surfaces with solid lines and the others with dashed lines.
- h. Identify objects, and note top elevations thereof, which penetrate the obstacle limitation surfaces, except those which are within the inner portion of the approach surfaces. For the latter, add note, "Refer to the inner portion of the approach surface plan view details for close-in obstructions."
- i. For precision instrument runways (i.e., approaches 15,000m in length, use a cut line and show the balance of 12,000m approach on a separate sheet.
- j. Include a note specifying any height restriction zoning ordinances/statutes in the airport environs.
- k. Approach Profile Details

Scale: 1mm = 12m to 1mm = 36m for *horizontal* and 1mm = 1.2m to 1mm = 4.8m for *vertical*.

 - (i). Depict the ground profile along the extended runway centreline representing the composite profile based on the highest terrain across the width and along the length of the approach surface.
 - (ii). Depict all significant objects within the approach surfaces regardless of whether they are obstructions (e.g., roadways, rivers, bluffs, towers, etc.). Note top elevation of all significant objects.
 - (iii). Show existing and ultimate runway ends and approach slopes.

3. Obstacle Limitation Surfaces

- (a) The safe and efficient use of an aerodrome, airport or heliport can be seriously eroded by the presence of obstacles within or close to the take-off or approach areas. The airspace in the vicinity of take-off or approach areas (to be maintained free from obstacles so as to facilitate the safe operation of aircraft) is defined for the purpose of either:
 - (i) regulating aircraft operations where obstacles exist; removing obstacles; or
 - (ii) preventing the creation of obstacles.
- (b) An obstacle limitation surface (OLS), define the limits to which objects may project into the airspace associated with an aerodrome yet assure that aircraft

operations at the aerodrome will be conducted safely. They should be protected from obstructions and below are the descriptions of these surfaces;

Note: The size of each such surface is based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of the approach surface applied to each end of a runway are determined by the most precise approach existing or planned for that runway end. Table 11-3 below provides for the dimensions of these surfaces.

(1) Conical surface

- a) Description - Conical surface: A surface sloping upwards and outwards from the periphery of the inner horizontal surface.
- b) Characteristics - The limits of the conical surface shall comprise:
- c) a lower edge coincident with the periphery of the inner horizontal surface; and
- d) an upper edge located at a specified height above the inner horizontal surface.
- e) The slope of the conical surface shall be measured in a vertical plane perpendicular to the periphery of the inner horizontal surface.

(2) Inner horizontal surface

- a) Description -Inner horizontal surface. A surface located in a horizontal plane above an aerodrome and its environs.
- b) Characteristics - The radius or outer limits of the inner horizontal surface shall be measured from a reference point or points established for such purpose.
- c) The height of the inner horizontal surface shall be measured above an elevation datum established for such purpose.

(3) Approach surface

- a) Description - Approach surface: An inclined plane or combination of planes preceding the threshold.
- b) Characteristics- The limits of the approach surface shall comprise:
- c) an inner edge of specified length, horizontal and perpendicular to the extended centre line of the runway and located at a specified distance before the threshold;
- d) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the runway;
- e) an outer edge parallel to the inner edge; and
- f) the above surfaces shall be varied when lateral offset, offset or curved approaches are utilized, specifically, two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the lateral offset, offset or curved ground track.
- g) The elevation of the inner edge shall be equal to the elevation of the midpoint of the threshold.

- h) The slope(s) of the approach surface shall be measured in the vertical plane containing the centre line of the runway and shall continue containing the centre line of any lateral offset or curved ground track.

(4) Inner approach surface

- a) Description - Inner approach surface: A rectangular portion of the approach surface immediately preceding the threshold.
- b) Characteristics - The limits of the inner approach surface shall comprise:
 - c) an inner edge coincident with the location of the inner edge of the approach surface but of its own specified length;
 - d) two sides originating at the ends of the inner edge and extending parallel to the vertical plane containing the centre line of the runway; and
 - e) an outer edge parallel to the inner edge

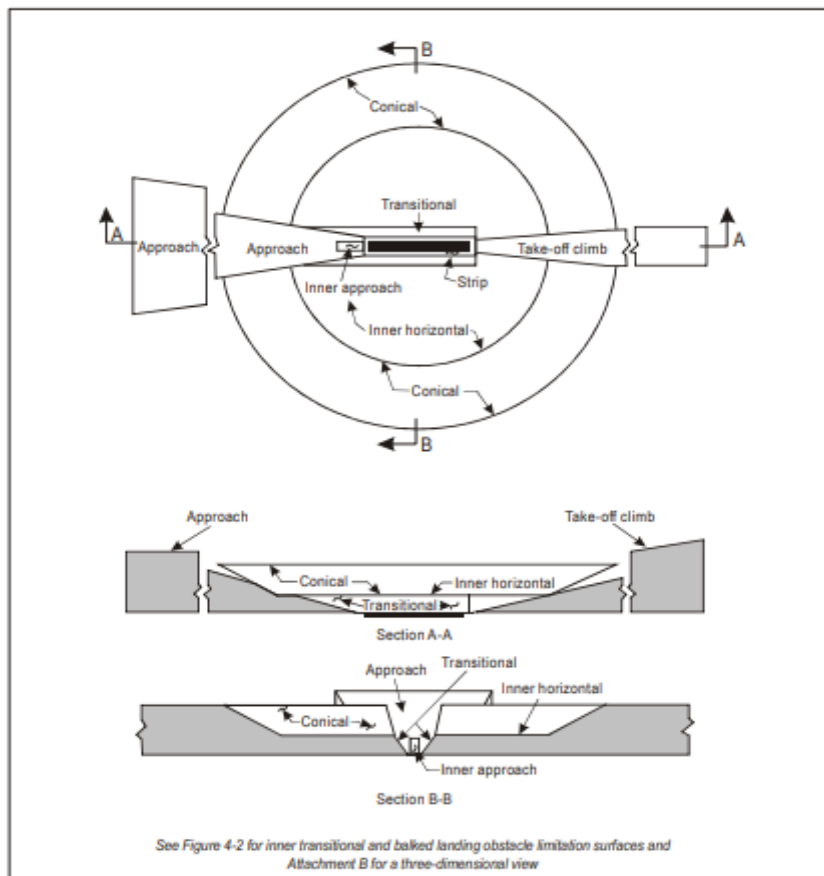


Figure A4- 1: Obstacle limitation surfaces

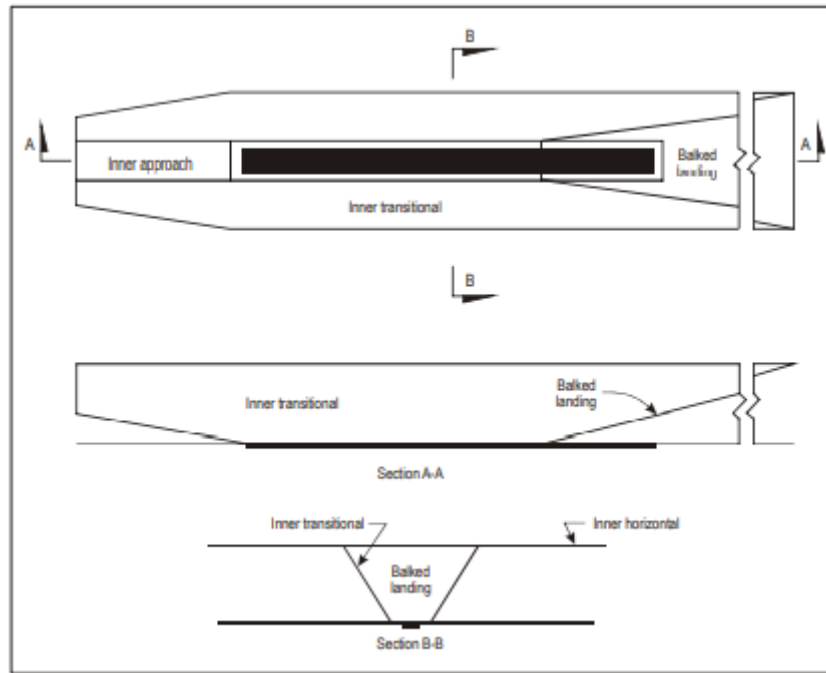


Figure A4- 2: Inner approach, inner transitional and balked landing obstacle limitation surfaces

(5) Transitional Surface

- a) **Description-** Transitional surface: A complex surface along the side of the strip and part of the side of the approach surface, that slopes upwards and outwards to the inner horizontal surface.
- b) **Characteristics-** The limits of a transitional surface shall comprise:
 - i) a lower edge beginning at the intersection of the side of the approach surface with the inner horizontal surface and extending down the side of the approach surface to the inner edge of the approach surface and from there along the length of the strip parallel to the runway centre line; and
 - ii) an upper edge located in the plane of the inner horizontal surface.
- c) The elevation of a point on the lower edge shall be:
 - i) along the side of the approach surface - equal to the elevation of the approach surface at that point; and
 - ii) along the strip - equal to the elevation of the nearest point on the centre line of the runway or its extension.
- d) The slope of the transitional surface shall be measured in a vertical plane at right angles to the centre line of the runway.

(6) Inner transitional surface

Description - Inner transitional surface: A surface similar to the transitional surface but closer to the runway.

- a) **Characteristics** - The limits of an inner transitional surface shall comprise:
- i) a lower edge beginning at the end of the inner approach surface and extending down the side of the inner approach surface to the inner edge of that surface, from there along the strip parallel to the runway centre line to the inner edge of the balked landing surface and from there up the side of the balked landing surface to the point where the side intersects the inner horizontal surface; and
 - ii) an upper edge located in the plane of the inner horizontal surface.
- b) The elevation of a point on the lower edge shall be:
- c) along the side of the inner approach surface and balked landing surface - equal to the elevation of the particular surface at that point; and
 - d) along the strip - equal to the elevation of the nearest point on the centre line of the runway or its extension.
- e) The slope of the inner transitional surface shall be measured in a vertical plane at right angles to the centre line of the runway.

(7) Balked landing surface

- a) **Description** - Balked landing surface. An inclined plane located at a specified distance after the threshold, extending between the inner transitional surface.
- b) **Characteristics** - The limits of the balked landing surface shall comprise:
- i) an inner edge horizontal and perpendicular to the centre line of the runway and located at a specified distance after the threshold;
 - ii) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the centre line of the runway; and
 - iii) an outer edge parallel to the inner edge and located in the plane of the inner horizontal surface.
- c) The elevation of the inner edge shall be equal to the elevation of the runway centre line at the location of the inner edge.
- d) The slope of the balked landing surface shall be measured in the vertical plane containing the centre line of the runway.

(8) Take-off climb surface

- a) **Description** - Take-off climb surface. An inclined plane or other specified surface beyond the end of a runway or clearway.
- b) **Characteristics** - The limits of the take-off climb surface shall comprise:
- i) an inner edge horizontal and perpendicular to the centre line of the runway and located either at a specified distance beyond the end of the

runway or at the end of the clearway when such is provided and its length exceeds the specified distance;

ii) two sides originating at the ends of the inner edge, diverging uniformly at a specified rate from the take-off track to a specified final width and continuing thereafter at that width for the remainder of the length of the take-off climb surface; and

iii) an outer edge horizontal and perpendicular to the specified take-off track.

c) The elevation of the inner edge shall be equal to the highest point on the extended runway centre line between the end of the runway and the inner edge, except that when a clearway is provided the elevation shall be equal to the highest point on the ground on the centre line of the clearway.

d) In the case of a straight take-off flight path, the slope of the take-off climb surface shall be measured in the vertical plane containing the centre line of the runway.

e) In the case of a take-off flight path involving a turn, the take-off climb surface shall be a complex surface containing the horizontal normal to its centre line, and the slope of the centre line shall be the same as that for a straight take-off flight path.

4. Obstacle Limitation Requirements

a. Non-instrument runways

(i) The following obstacle limitation surfaces should be established for a non-instrument runway:

- (1) conical surface;
- (2) inner horizontal surface;
- (3) approach surface; and
- (4) transitional surfaces.

(ii) The heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Table A4-1

(iii) New objects or extensions of existing objects shall not be permitted above an approach or transitional surface except when, in the opinion of the Authority, the new object or extension would be shielded by an existing immovable object.

(iv) New objects or extensions of existing objects shall not be permitted above the conical surface or inner horizontal surface except when, in the opinion of the Authority, the object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplane.

(v) Existing objects above any of the surfaces required by 4(a)(i) in Appendix 4 of this AC must as far as practicable be removed except when, in the opinion of the Authority, the object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplane.

- (vi) In considering proposed construction, account must be taken of the possible future development of an instrument runway and consequent requirement for more stringent obstacle limitation surfaces.

b. Non-precision approach runways

- (i) The following obstacle limitation surfaces should be established for a non-precision approach runway:
 - (1) conical surface;
 - (2) inner horizontal surface;
 - (3) approach surface; and
 - (4) transitional surfaces.
- (ii) The heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Table A4-1, except in the case of the horizontal section of the approach required in Paragraph 4(b)(iii) in Appendix 4 of this AC.
- (iii) The approach surface shall be horizontal beyond the point at which the 2.5 per cent slope intersects:
 - (1) a horizontal plane 150 m above the threshold elevation; or
 - (2) the horizontal plane passing through the top of any object that governs the obstacle clearance altitude/height (OCA/H); whichever is the higher.

Table A4- 1: (SLCAR-Part14A) - Dimensions and slopes of obstacle limitation surfaces - Approach runways

APPROACH RUNWAYS

Surface and dimensions ^a (1)	RUNWAY CLASSIFICATION										
	Non-instrument Code number				Non-precision approach Code number			Precision approach category I Code number			II or III Code number
	1 (2)	2 (3)	3 (4)	4 (5)	1,2 (6)	3 (7)	4 (8)	1,2 (9)	3,4 (10)	3,4 (11)	
CONICAL											
Slope	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	
Height	35 m	55 m	75 m	100 m	60 m	75 m	100 m	60 m	100 m	100 m	
INNER HORIZONTAL											
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	
Radius	2 000 m	2 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m	
INNER APPROACH											
Width	—	—	—	—	—	—	—	90 m	120 m ^e	120 m ^e	
Distance from threshold	—	—	—	—	—	—	—	60 m	60 m	60 m	
Length	—	—	—	—	—	—	—	900 m	900 m	900 m	
Slope	—	—	—	—	—	—	—	2.5%	2%	2%	
APPROACH											
Length of inner edge	60 m	80 m	150 m	150 m	140 m	280 m	280 m	140 m	280 m	280 m	
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15%	
First section											
Length	1 600 m	2 500 m	3 000 m	3 000 m	2 500 m	3 000 m	3 000 m	3 000 m	3 000 m	3 000 m	
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%	
Second section											
Length	—	—	—	—	—	3 600 m ^b	3 600 m ^b	12 000 m	3 600 m ^b	3 600 m ^b	
Slope	—	—	—	—	—	2.5%	2.5%	3%	2.5%	2.5%	
Horizontal section											
Length	—	—	—	—	—	8 400 m ^b	8 400 m ^b	—	8 400 m ^b	8 400 m ^b	
Total length	—	—	—	—	—	15 000 m	15 000 m	15 000 m	15 000 m	15 000 m	
TRANSITIONAL											
Slope	20%	20%	14.3%	14.3%	20%	14.3%	14.3%	14.3%	14.3%	14.3%	
INNER TRANSITIONAL											
Slope	—	—	—	—	—	—	—	40%	33.3%	33.3%	
BALKED LANDING SURFACE											
Length of inner edge	—	—	—	—	—	—	—	90 m	120 m ^e	120 m ^e	
Distance from threshold	—	—	—	—	—	—	—	c	1 800 m ^d	1 800 m ^d	
Divergence (each side)	—	—	—	—	—	—	—	10%	10%	10%	
Slope	—	—	—	—	—	—	—	4%	3.33%	3.33%	

a. All dimensions are measured horizontally unless specified otherwise. e. Where the code letter is F (Table 1-1), the width is increased to 140 m except for those aerodromes that accommodate a code letter F aeroplane equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

b. Variable length (see 4.2.9 or 4.2.17).

c. Distance to the end of strip.

d. Or end of runway whichever is less.

Note.— See Circulars 301 and 345, and Chapter 4 of the PANS-Aerodromes, Part I (Doc 9981) for further information.

(iv) New objects or extensions of existing objects shall not be permitted above an approach surface within 3,000 m of the inner edge or above a transitional surface except when, in the opinion of the Authority, the new object or extension would be shielded by an existing immovable object.

(v) New objects or extensions of existing objects shall not be permitted above the approach surface beyond 3,000 m from the inner edge, the conical surface or inner horizontal surface except when, in the opinion of the Authority, the object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplane.

(vi) Existing objects above any of the surfaces required by paragraph A4.3b(1) shall as far as practicable be removed except when, in the opinion of the SLCAA, the object is shielded by an existing immovable object, or after

aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplane.

c. Precision approach runways

- (i) The following obstacle limitation surfaces shall be established for a precision approach runway category I:
 - (1) conical surface;
 - (2) inner horizontal surface;
 - (3) approach surface; and
 - (4) transitional surfaces.
- (ii) The following obstacle limitation surfaces shall as far as practicable be established for a precision approach runway category I:
 - (1) inner approach surface;
 - (2) inner transitional surfaces; and
 - (3) balked landing surface
- (iii) The following obstacle limitation surfaces for a precision approach runway category II or III:
 - (1) conical surface;
 - (2) inner horizontal surface;
 - (3) approach surface and inner approach surface;
 - (4) transitional surfaces;
 - (5) inner transitional surfaces; and
 - (6) balked landing surface
- (iv) The heights and slopes of the surfaces must not be greater than, and their other dimensions not less than, those specified in Table A4-1, except in the case of the horizontal section of the approach surface as required in Paragraph 4(c)(v) in Appendix 4 of this AC.
- (v) The approach surface shall be horizontal beyond the point at which the 2.5 per cent slope intersects:
 - (1) a horizontal plane 150 m above the threshold elevation; or
 - (2) the horizontal plane passing through the top of any object that governs the obstacle clearance limit;whichever is the higher.
- (vi) Fixed objects shall not be permitted above the inner approach surface, the inner transitional surface or the balked landing surface, except for frangible objects which because of their function must be located on the strip. Mobile objects shall not be permitted above these surfaces during the use of the runway for landing.
- (vii) New objects or extensions of existing objects shall not be permitted above an approach surface or a transitional surface except when, in the opinion of the Authority, the new object or extension would be shielded by an existing immovable object.

- (viii) New objects or extensions of existing objects shall not be permitted above the conical surface and the inner horizontal surface except when, in the opinion of the Authority, an object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplane.
- (ix) Existing objects above an approach surface, a transitional surface, the conical surface and inner horizontal surface shall as far as practicable be removed except when, in the opinion of the Authority, an object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplane.

d. Runways meant for take-off

The following obstacle limitation surface must be considered for a runway meant for take-off:

— take-off climb surface.

- (i) The dimensions of the surface shall be not less than the dimensions specified in Table A4-2, except that a lesser length may be adopted for the take-off climb surface where such lesser length would be consistent with procedural measures adopted to govern the outward flight of aeroplane.
- (ii) The operational characteristics of aeroplane for which the runway is intended shall be examined to see if it is desirable to reduce the slope specified in Table A4-2 when critical operating conditions are to be catered to. If the specified slope is reduced, corresponding adjustment in the length of the take-off climb surface shall be made so as to provide protection to a height of 300 m.
- (iii) New objects or extensions of existing objects shall not be permitted above a take-off climb surface except when, in the opinion of the Authority, the new object or extension would be shielded by an existing immovable object.
- (iv) If no object reaches the 2 per cent (1:50) take-off climb surface, new objects shall be limited to preserve the existing obstacle free surface or a surface down to a slope of 1.6 per cent (1:62.5).

Table A4- 2: (SLCAR-Part14A) - Dimensions and slopes of obstacle limitation surfaces

RUNWAYS MEANT FOR TAKE-OFF

Surface and dimensions ^a (1)	Code number		
	1 (2)	2 (3)	3 or 4 (4)
TAKE-OFF CLIMB			
Length of inner edge	60 m	80 m	180 m
Distance from runway end ^b	30 m	60 m	60 m
Divergence (each side)	10%	10%	12.5%
Final width	380 m	580 m	1 200 m 1 800 m ^c
Length	1 600 m	2 500 m	15 000 m
Slope	5%	4%	2% ^d

- a. All dimensions are measured horizontally unless specified otherwise.
- b. The take-off climb surface starts at the end of the clearway if the clearway length exceeds the specified distance.
- c. 1 800 m when the intended track includes changes of heading greater than 15° for operations conducted in IMC, VMC by night.
- d. See 11.4.d (ii) and 11.4.d (iv)

Existing objects that extend above a take-off climb surface shall as far as practicable be removed except when, in the opinion of the Authority, an object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplane.

APPENDIX 7 – TERMINAL OR BUILDING AREA DRAWING

- (a) This drawing depicts the proposed terminal area development for both commercial terminal area and general aviation terminal area. The purpose of this sheet is to depict all buildings and their related infrastructure at airports for safety and security review. The building area drawing shall show all buildings, existing and planned, aprons with tie down locations depicted, parking areas, fuelling facilities, and the building restriction line with elevations/heights. A table shall also be included listing each building's coordinates, function, and elevation.
- (b) For airports with commercial service, terminal area drawings as well as general aviation (GA) areas, cargo facilities, fuelling facilities, existing and ultimate, including underground storage should be shown.
- (c) They are presented at a larger scale than the ALP so that greater detail of the terminal area can be discerned.
- (d) (The need for this drawing will be decided on a case -by -case basis. For small airports, where the Airport Layout Drawing is prepared to a fairly large scale, a separate drawing for the terminal area may not be needed.)
- e. The following are list of items that may be shown on the drawing:
 - (i) Aircraft boarding gate positions shown, indicated by circles, existing and ultimate positions designated.
 - (ii) Existing and ultimate security fencing with gates shown.
 - (iii) Existing and ultimate buildings shown with critical elevations of highest buildings and buildings closest to the runway. Identify T-hangars and/or corporate hangars.
 - (iv) Existing or ultimate rotating beacon with elevation.
 - (v) Building Restriction Lines (BRL).
 - (vi) Taxiway or taxilane centrelines designated, existing and ultimate.
 - (vii) Aprons, taxiways, clearances, etc. dimensioned.
 - (viii) Existing or ultimate lighted wind cone (with top elevation), wind tee, and segmented circle.
 - (ix) Location, ties, and elevations of any bench marks or monuments in terminal area.
 - (x) Auto parking existing and ultimate shown.
 - (xi) Ground contours shown, if appropriate.
 - (xii) Drainage including any structures.
 - (xiii) Control Tower with top elevation.
 - (xiv) Entrance and access roads, existing and ultimate shown.
 - (xv) Various aircraft aprons, existing and ultimate, and their function shown (passenger, cargo, transient, tie down area with tie downs shown, etc.)
 - (xvi) Legend where necessary.
 - (xvii) Index of buildings and facilities where necessary.

- (xviii) Line of sight, existing and ultimate.
- (xix) Show aircraft parking limit line where appropriate.

Includes:

Large scale plan view of the area or areas where aprons, buildings, hangars, parking lots and other aerodrome features are located.

Preparation Guidelines:

- (a) Sheet size – 863.6mm X 558.8 (ANSI D).
- (b) **Scale** - Range of 1mm = 0.6m to 1mm = 2.4m.
- (c) **Title and Revision Block** - Same as Airport Layout
- (d) **Building Data Table** - For listing structures and showing pertinent information relative to them.
 - (i) Include space and columns for:
 - (ii) Structure identification number (identify structures on plan view with numbers instead of words).
 - (iii) Top elevation of structures.
 - (iv) Obstruction marking (**existing** and **planned**)
- f. **Legend** - Include symbol for indicating planned removal, abandonment, etc

APPENDIX 8 – LAND USE DRAWING

- a) This drawing provides details for current and future uses of property within, and surrounding the airport boundaries. It serves as a planning tool for communities to insure that growth in the area around the airport will be compatible in use and not impede future aeronautical expansion.
- b) The drawing depicts **existing** and recommended use of all land within the **ultimate** airport property line (on airport) and in the vicinity of the airport (off airport to at least 65 DNL). The land uses should be depicted by general use categories (e.g., agriculture, recreational, industrial, aviation, commercial, etc.).
- c) The sheet should be sufficiently detailed to allow the airport management to determine which areas must be kept in mowed grass and which areas are restricted to low growing crops. The safety areas and runway strips must be kept mowed and free of crops. High crops are allowed outside the primary surface, the runway safety areas, and the runway visibility zones.
- d) Property use and zoning (on and off the airport) should be identified as agricultural, residential, commercial, industrial, recreational park, etc. with standard drafting symbols (shading, cross hatching, etc.) as well as all appurtenant topographical data, including waterways, man-made structures, and significant contours. Additionally, as the sheet size allows, show as much as possible of airport. If available it is recommended that an aerial photo be used as a background for this mapping.
- e) This provides airport management with a plan for leasing revenue-producing areas on the airport. It also provides guidance for determining allowable proximity of farming operations to runways and taxiways.
- f) Identify the date and type of any zoning ordinance in effect. Depict boundaries of local government.
- g) Depict the location of all public facilities (schools, hospitals, parks, etc.) in the vicinity of the airport.
- h) At a minimum, the drawing must contain land within the 65 DNL (Day-Night average sound level) noise contour. For general aviation airports or low activity commercial service airports, where noise issues are less important, on-airport land use and off-airport land use drawings may be combined.

Preparation Guidelines:

Sheet Size – 863.6mm X 558.8mm (ANSI D).

Scale - Same as Airport Layout Drawing

Title and Revision Block - Same as Airport Layout Drawing

- (i) **Base Map** - Use aerial photos when available.
- (ii) **Legend** - Within the various parcels and/or areas on and off the airport, use standard drafting symbols (i.e., shading, cross hatching or other tonal effects) to identify

recommended land uses by general category (e.g., agricultural, recreational, industrial, commercial, residential, aeronautical, etc.). Use notes to identify **existing** land uses by general category.

- (iii) **Public Facilities** - Depict the location of all public facilities (e.g., schools, hospitals, prisons, parks, etc.) in the vicinity of the airport.
- (iv) **Drawing Details** - Normally limited to **existing** and **future** airport features (i.e., runways, taxiways, aprons, runway protection zones, terminal buildings and NAVAIDs). The drawing should be sufficiently detailed to allow the airport management to determine limit lines for areas which must be kept in grass or restricted to low growing crops.

APPENDIX 9 – AIRPORT PROPERTY MAP

- a) This sheet serves an inventory of existing and future land/property rights owned by the airport.
- b) The drawing indicates how various tracts of land within the airport boundaries were acquired (e.g., compulsory acquisitions, state funds, surplus property, local funds only, etc.). Easement interests in areas outside the fee property line should also be included.
- c) The airport property map must show all parcels within the airport property and identify those tracts of land that have been recommended for future acquisition. This allows the Airport the ability to ensure its future viability and capability to meet development both during the period covered under this ALP Update as well as beyond the planning horizon of this document. Given the continued expansion of developed land uses in the immediate airport environs, it is important that a property envelop sufficient to provide for airport needs well into the future, be defined and acquired. This minimizes the acquisition of costly developed property in the future to meet airport development needs.
- d) Parcels must be clearly defined with parcel numbers and parcel flagging. Existing and ultimate property lines must be clearly defined. A property table should be included which indicates parcel owners, size, date of purchase and cost.
- e) The airport property map will identify easements beyond the airport boundary that were acquired to develop the airport, and the method of acquisition. The airport alternatives analysis may benefit from an inventory of parcels surrounding the airport boundary, particularly in areas of anticipated airport development. Being able to identify these parcels by size and use may also benefit potential subsequent environmental studies. The ALP preparer, the Authority, and Aerodrome Operator should determine if expanding the property map to include these areas is necessary.

Preparation Guidelines:

- (a) **Sheet Size** – 863.6mm X 558.8mm (ANSI D).
- (b) **Scale Range:** 1mm = 0.6m to 2.4m (Same as Airport Layout Drawing)
- (c) **Title and Revision Block** - Same as Airport Layout Drawing.
- (d) **Legend** - Use standard drafting symbols (i.e., shading, cross hatching or other tonal effects) and legend table to indicate the type of acquisition involved with each track or area.
- (e) **Data Table** - A data table with a numbering or lettering system should be used to show pertinent data applicable to property acquisitions. As a minimum, the date the property was acquired should be included.
- (f) **Drawing Details** - Normally limited to existing and future airport features (i.e., runways, taxiways, aprons, runway protection zones, terminal buildings and NAVAIDs) which would indicate aeronautical need for airport property.
- (g) Details should be subordinated to property lines and tract outlines by half toning, screening, or other similar techniques.
- (h) A screened reproducible of the Airport Layout Drawing may be used as the base for the Airport Property Map.

- (i) Airport boundary lines and lines depicting property interest areas should be bold so as to stand out from background details.

APPENDIX 10 – AIRPORT LAYOUT PLAN (ALP) CHECKLIST



SIERRA LEONE CIVIL AVIATION AUTHORITY AIRPORT LAYOUT PLAN (ALP) CHECKLIST

The Authority prepared this checklist for use Aerodrome Operators, and consultants to ensure that all pertinent information is reflected on the airport layout plan (ALP) set of drawings.

ALPs and/or Master Plans must conform to this checklist as required by the Authority. Failure to include a completed and signed checklist along with the ALP and/or Master Plan will result in rejection for review.

This checklist shall be used for small airports as well as for larger, more complex ones, and therefore, every drawing or item in the checklist may not apply in all situations. However, certain drawings in the checklist are required in every case. The table below shows drawings that are required for certain projects.

The need for other drawings will be decided on a case-by-case basis. This decision as well as the determination as to which of the individual checklist items for each drawing applies to a given airport situation will be made at the time the scope of work is being prepared for the development of the new or updated ALP.

This involves the Safety Inspectors working closely with the Aerodrome Operator and their consultant to evaluate and reach an agreement on the use of the checklist in airport planning projects. The individual ALP checklist items as well as the case-by-case drawings that apply to a given airport situation depend on the nature and complexity of the facility and the objectives identified during the scope of work development process. If, during or after this process, the Aerodrome Operator or their consultant disagrees with the Safety Inspectors regarding the applicability of any element of the checklist to a given ALP project, they should provide the rationale for any such concerns to the Safety Inspectors. The Safety Inspectors shall determine whether or not the rationale is acceptable and make the appropriate determination.

In summary, this checklist is part of the ALP's scope of work process, the preparation of the ALP, and the draft and final ALP reviews.

AIRPORT LAYOUT PLAN COMPONENTS

(1).	Normally Required Drawings	Yes	No	Remarks
a.	Narrative Report			
b.	Airport Layout Drawing			
c.	Airport Airspace Drawing			
d.	Inner Portion of the Approach Surface Drawing			

e.	Airport Property Map			
(2).	Case-by-Case Drawings			
a.	Land Use Drawing			
b.	Terminal Area Drawing (if applicable, or include a Building Table with top building elevations within the Airport Layout Drawing)			
c.	Declared Distances Drawing (if applicable)			
d.	Airport/Runway Departure Surface Drawing (i.e. the 1:40 slope for inst. Dep. Runways);			
e.	ATCT Shadow Study;			

All sheets should be standard sized 863.6mm X 558.8mm (ANSI) All sheets should contain title and revision blocks.

In the case of smaller airports, some of the following sheets may be combined if practical and approved by Authority.

SIGNATURE PAGE

Airport Identification (to be completed by Aerodrome Operator)

Name of Airport _____

Airport Owner _____ Four-Letter Code _____

Location of Airport _____

Airport Reference Code (ARC) _____

Included

	<u>Yes</u>	<u>No</u>	<u>N/A</u>	Remarks
AIRPORT LAYOUT PLAN COMPONENTS				
Report (Narrative or Master Plan)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Airport Layout Drawing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Airport Airspace Drawing;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Inner Portion of the Approach Surface Drawing;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Airport Departure Surfaces Drawing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Terminal and/ or Building Area Drawing;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Land Use Plan/Drawing;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Airport Property Map	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

ALP Submission Information (to be completed by Aerodrome operator)

ALP Prepared by _____

Name of Consulting Firm

Name of Individual & signature

Date

Title

Telephone

Email address

Sponsor Review _____

Name of Individual & signature

Date

Title

Authority's Review (to be completed by the Authority)

Name of Individual

Date

		Yes	No	N/A	Remarks
I. Narrative Report					
1	Aeronautical Forecast (0-5, 6-10, 11-20 years)				
	(a). Local operations All Aircraft Current Design Aircraft Future Design Aircraft				
	(b). Annual itinerant Operations All Aircraft Current Design Aircraft Future Design Aircraft				
	(c). Total Annual Operations				
	(d). Design Aircraft (approach speed, wingspan, weight)				
	(e). Number enplanements				
	(f). Airport Reference Code- existing/ future				
2	Explanation of proposed development items				
3	The Authority's approval Block for Modification to Standards (Rationale for Non-Standard Conditions and/or Modifications to the Authority). A separate written request, including justification, should accompany the modification to design standards). This item must be either in the narrative report or clearly explained on the ALP.				
4	Obstructions & Obstacle Limitation Surfaces				
5	Summary of staged development (including				

	drawings, schedules, project cost estimates) for 0-5, 6-10, 11-20 years				
6	Letters of Coordination with all levels of Govt. units, as needed. (Highways, Planning Agencies, etc)				
<i>Remarks</i>					
		Yes	No	N/A	Remarks
II. Cover Sheet					
Index to sheet					
Sheet size 863.6mm X 558.8mm (ANSI D)					
		Yes	No	N/A	Remarks
III. Airport Data Sheet					
Sheet size 863.6mm X 558.8mm (ANSI D)					
1	Title and revision blocks				
2	Airport owner approval block				
3	Date of ALP (date the Aerodrome Operator/consultant signs the ALP)				
4	Index of sheets				
5	The Authority Approval Block				
6	Location map (general area)				
7	Vicinity map (general area showing specific airport location)				
8	Wind Rose and coverage analysis (all weather and IFR) (latest 10-year period, using 36-point)				

	(a). Crosswind coverage (include individual and combined) for; <input type="checkbox"/> Runways with 10.5kt crosswind, <input type="checkbox"/> Runways with 13kt crosswind <input type="checkbox"/> Runways with 16kt crosswind <input type="checkbox"/> Runways with 20kt crosswind				
	(b). Source of data and time period of data collection				
9	Airport data table				
	(a). Airport elevation (nearest m)				
	. ARP coordinates (nearest second); indicate by symbol				
	(b). Mean maximum temperature of hottest month				
	. Airport and Terminal Navigational Aids (TVOR, NDB, ASR, Beacon, etc.)				
	. Miscellaneous facilities (lighted wind cone(s), ceilometer, etc.)				
	(c) Design Critical Aircraft Data for each runway or airfield components				
	<input type="checkbox"/> approach category				
	<input type="checkbox"/> design group				
	<input type="checkbox"/> tail height				
	(d) Airport Reference Code (ARC)				
<i>Remarks</i>					

		Yes	No	N/A	Remarks
III. Airport Data Sheet (continued)					
Sheet size 863.6mm X 558.8mm (ANSI D)					
10	Runway Data Table for each runway (Existing and Ultimate)				
	(a). Identify runway as “Instrument”, “Utility” or “Other Than Utility”				
	(b). Approach visibility Minimums (V, 1.6km, 1.2km, CAT II, CAT III)				
	(c). Runway orientation (end nos.)				
	(d). Threshold True Bearing (nearest 0.01" degree }				
	(e). Runway Dimensions - length & width within the outline of the runway				
	(f). Declared Distances (if applicable) (TORA, TODA, LDA, ASDA)				
	(g). Airport Reference Code for each runway				
	(h). Approach Type (precision, non-precision, visual)				
	(i). Approach Surface slope ratio for each runway (2.5%; 2%; 2%)				
	(j). Threshold Elevation				
	(k). Runway Marking (V, NP, or P) for threshold, hold lines offsets				
	(l). Magnetic Declination and date				
	(m). Pavement Strength (Weight Bearing Capacity) & Type				
	(n). Percentage Wind Coverage				
	(o). Effective Runway Gradient (%)				
	(p). Runway Safety Area Dimensions – Width, Landing. Threshold and Runway End (existing				

	and ultimate)				
	(q). Runway Strip dimensions				
	(r). Displaced Threshold length				
	(s). Runway Threshold/End Coordinates – existing and ultimate (WGS-84 to nearest 0.01 second)				
	(t). Displaced threshold coordinates (if applicable) to the nearest 0.01 second				
	(u). Runway high/low points (existing and future)				
	(v). Runway Touchdown Zone Elevation (highest point within first 914.4m of RWY)				
	(w). Runway Threshold Lighting Type (HIRL, MIRL, LIRL)				
	(x). Runway Electronic Aids (ILS) for each runway end (i.e. Localizer, Glideslope, MALSR.....)				
	(y). Runway Visual Aids for each runway end (REIL, VGSI (i.e. PAPI etc.)				
<i>Remarks</i>					

IV. Airport Layout Drawing		Yes	No	N/A	Remarks
Scale 1mm = 0.6m to 2.4m					
Sheet size 863.6mm X 558.8mm (ANSI D)					
1	Title and Revision Blocks				
	(a). Name and location of the airport				
	(b). Name of preparer				
	(c). Date of drawing				
	(d). Drawing title				
	(e). Revision block				
	(f). the Authority disclaimer				
	(g). Approval block				
2	North Arrow				
	(a). True and Magnetic North				
	(b). Year of magnetic declination				
	(c). Orient drawing so that north is to the top or left of the Sheet				
3	Airport Data Table				
	(a). Airport Elevation (nearest m)				
	(b). ARP coordinates (nearest second); indicate by symbol				
	(c). Mean maximum temperature of hottest month				
	(d). Airport and Terminal Navigational Aids (i.e. TVOR, NDB, ASR, Beacon, etc.)				
	(e). Aircraft Design Group & Approach Category				
	(f). Survey Source and Type				
	(g). Miscellaneous facilities (lighted wind				

	cone(s), ceilometer, etc.)				
	(h). Design Critical Aircraft Data for each runway or airfield components				
	<input type="checkbox"/> approach category				
	<input type="checkbox"/> tail height				
<i>Remarks</i>					
		Yes	No	N/A	Remarks
IV. Airport Layout Drawing(continued)					
4	Runway Data Table for each runway (Existing and Ultimate)				
	(a). Identify runway as “Precision Runway”, “Non-Precision Runway” or “Non-Instrument Runway”,				
	(b). Approach visibility Minimums (V, 1.6km, 1.2km, CAT II, CAT III)				
	(c). Runway Designation No.				
	(d). Threshold True Bearing (nearest 0.01" degree }				
	(e). Runway Dimensions - length & width within the outline of the runway				
	(f). Declared Distances, if applicable (TORA, TODA, LDA, ASDA)				
	(g). Airport Reference Code for each runway				
	(h). Approach Type (precision, non-precision,				

visual)				
(i). Approach Surface slope ratio for each runway (2.5%; 2%; 2%)				
(j). Threshold elevation				
(k). Runway Marking (V, NP, or P) for threshold, hold lines offsets.				
(l). Magnetic Declination and date				
(m). Pavement Strength (Weight Bearing Capacity) & Type				
(n). Percentage Wind Coverage				
(o). Effective Runway Gradient (%)				
(p). Runway Safety Area Dimensions – Width, Landing Threshold and Runway End (existing and ultimate)				
(q).RunwayStrip dimensions				
(r).DisplacedThreshold length				
(s). Runway Threshold/End Coordinates – existing and ultimate (WGS-84 to nearest 0.01 second)				
(t).Displaced threshold coordinates (if applicable) to the nearest 0.01 second				
(u). Runway high and low points (existing and future)				
(v). Runway Touchdown Zone Elevation (highest point within first 914.4m of RWY)				
(w). Runway Threshold Lighting Type (HIRL, MIRL, LIRL)				
(x). Runway Electronic Aids (ILS) for each runway end (i.e. Localizer, Glideslope, MALSR.....)				
(y). Runway Visual Aids for each runway end REIL, VGSI (i.e. PAPI etc.)				

5	Runway separation distances				
	(a). Aircraft Parking				
	(b). Building Restriction Line				
	(c). Parallel Runway				
	(d). Parallel Taxiway/ Taxilane				
<i>Remarks</i>					
		Yes	No	N/A	Remarks
IV. Airport Layout Drawing (continued)					
6	Taxiway Details				
	(a).Dimensions – length and width (existing and ultimate)				
	(b).Taxiway safety area dimensions				
	(c). Taxiway Centreline Separation from:				
	i. Runway centreline				
	ii. Parallel taxiway				
	iii. Aircraft parking				
	iv. Objects/safety areas				
	(d). Taxiway Lighting & Marking				
7	Legend Tables (existing and future)				

	airport facility and buildings)				
	(a). Airport Reference Point (ARP)				
	(b). Buildings				
	(c). BRL (Building Restriction Line)				
	(d). Fencing				
	(e). Property Lines				
	(f). Roads				
	(g). Rotating Beacon				
	(h). Threshold				
	(i). Trees				
	(j). PAPI (Is PAPI pad shown on the drawings?)				
	(k). Wind Cone/Segmented Circle, beacon				
8	Non-Standard Conditions and/or Modification to Standards Block				
9	Topographic Info (Contours 0.61m to 3.05m), lightly drawn				
10	Building Restriction Line (BRL) and associated OLS height at the BRL				
11	Monuments (survey monuments & markers)				
12	Fences (identify height)				
13	Apron <input type="checkbox"/> Locations <input type="checkbox"/> Dimensions <input type="checkbox"/> Aircraft parking				
14	Roads				
15	Building table (including building elevations) If a terminal area plan is not included, show top elevations of structures on this sheet.				

16	Any ATCT line of sight shadow areas (use separate sheet if necessary)				
17	General Aviation development area (i.e., fuel facilities, FBO, hangars, etc.) – greater detail can be shown on the terminal area drawing				
18	Existing and future airport property lines and easements				
19	Major airport drainage ditches				
	Facilities and movement areas that are to be phased out, if any, are described				
<i>Remarks</i>					
		Yes	No	N/A	Remarks
V. Airport Airspace Drawing					
Scale : <i>For Plan View (Existing & Ultimate) : 1mm = 12m to 36m</i> <i>For Approach Profile View: Horizontal is 1mm = 12m to 36m</i> <i>Vertical is 1mm = 1.2m to 4.8m</i>					

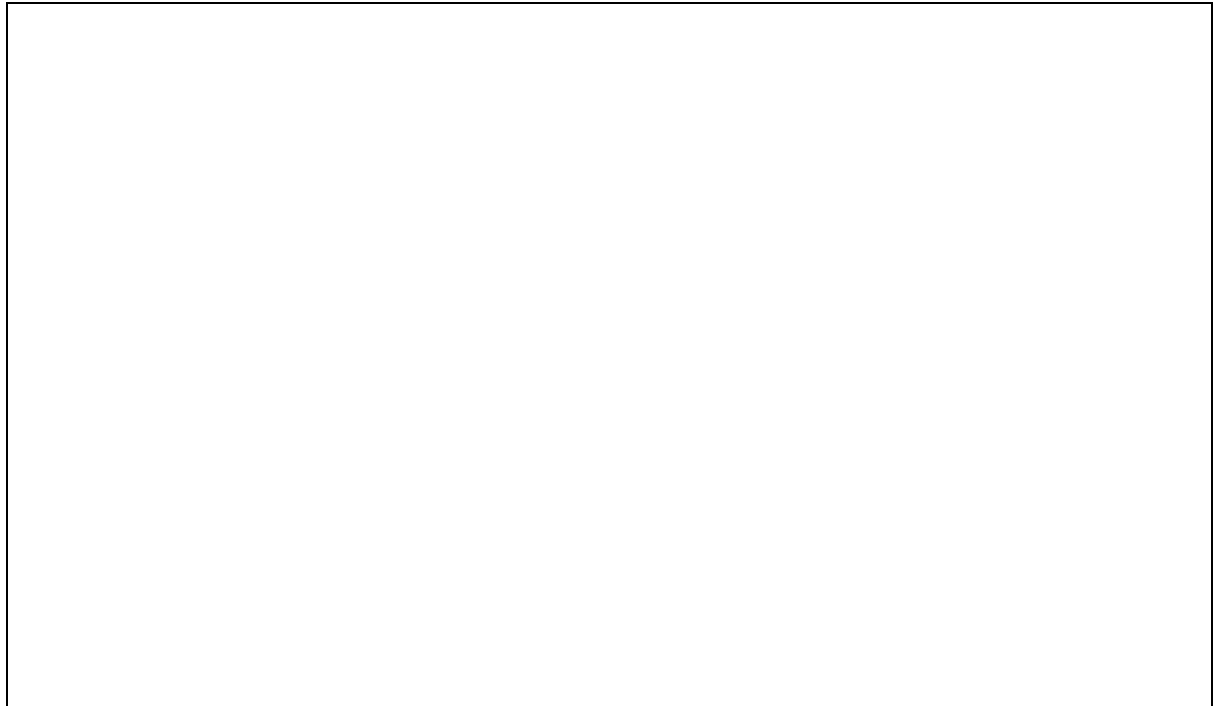
Sheet size: 863.6mm X 558.8mm (ANSI D)					
1	Title and Revision Block (same as airport layout drawing)				
2	Operator's Approval Block				
	Plan view of all surfaces (based on ultimate runway lengths)				
	(a). Runway Designation numbers				
	(b). Elevation Contours (even 15m elevation intervals on all sloping surfaces)				
	(c). Top elevations of penetrating objects (add notes for penetrations located within the inner portion of the approach surface)				
	(d). Show close-in obstructions as well as all objects within 1.5m below surfaces				
	(e). For precision instrument runways, show balance of 12.2km approach on separate sheet.				
	(f). Note specifying height restriction (ordinances/statutes)				
3	Profile view (existing and ultimate)				
	(a). Ground profile along extended runway centreline representing the composite profile, based on the highest terrain across the width and along the length of the approach surface.				
	(b). Significant objects (rivers, roads, schools, towers, etc.) and top elevations within the approach surfaces, regardless of whether or not they are obstructions				
	(c). Show existing and ultimate runway ends and approach slopes				
4	Obstruction Data Tables				

	(a). Obstruction identification number				
	(b). Obstruction Elevation				
	(c). Description of Obstruction				
	(d). Amount of surface penetration				
	(b) Proposed or existing disposition of the obstruction				
<i>Remarks</i>					
		Yes	No	N/A	Remarks
VI. Inner Portion of the Approach Surface Drawing					
1	Sheet size 863.6mm X 558.8mm (ANSI D)				
2	Plan View (Existing & Ultimate) – Scale (1mm = 2.4m)				
	(a). Inner Portion of approaches (usually limited to the RPZ areas)				
	(b). Aerial Photo for base map when available				
	(c). Obstructions (identified by numbers)				
	(d). Depict Property Line within the approaches				

	(e). Elevations of Road & Railroad (RR), movable objects height (at points where they intersect Approach Surface & extended runway centreline. Also show computed vertical clearance in the approach				
	(f). Physical End of RWY, End Number, Elevation				
	(g). Airport Design Surfaces				
	i. Runway Safety Area				
	ii. Runway Strips				
	(h). Ground Contours at intervals of 0.6m to 3.05m, lightly drawn				
3	Profile View - Scale (1mm = 2.4m horizontal and 1mm = 0.24m vertical)				
	(a). Projected View of Plan View				
	(b). Approach Surface				
	(c). Depict Terrain and significant items in extended centreline especially in the Safety Area (fences, roadways, streams, etc.)				
	(d). Identify Obstructions (same numbers as plan view)				
	(e). Touchdown zone elevation (highest point in first 914.4m of RWY)				
	(f). Cross Section of Roads & Railroads with dashed lines at edge of approach				
4	Obstruction table details				
	(a). Separate table for each Approach Surface				
	(b). Obstruction identification number				
	(c). Description of Obstruction				
	(d). Obstruction Elevation				
	(e). Amount of surface penetration				

	(f). Proposed disposition of Surface obstructions				
	(g). Triggering Event (i.e., Runway extension) – Timeframe/expected date for removal				
<i>Remarks</i>					
		Yes	No	N/A	Remarks
VII. Terminal Area and /or Building Drawing					
Scale - Range 1mm = 0.6m to 2.4m) Sheet size 863.6mm X 558.8mm (ANSI D)					
1	Title and Revision Blocks				
2	Legend				
3	Plan view of aprons, buildings, hangars, parking lots				

4	Building data table (list structures and show pertinent information about them. Include space and columns for:				
	(a). Structure identification number				
	(b). Top elevation of structures (AMSL)				
	(c). Obstruction marking/lighting (existing/future)				
5	Buildings Restriction Line (BRL) (Identify use and (note structures to be removed or relocated)				
6	Fuelling facilities, existing and future				
7	Aircraft gates positions shown, indicated by circles (existing/future)				
8	Existing and future security fencing with gates				
9	Taxiway or taxilane centrelines designated				
10	Aprons, taxiways, clearances, etc. dimensioned				
11	Auto parking (existing/future)				
12	Entrance Road				
13	Major airport drainage ditches				
14	Special Use Area (i.e., Agricultural spraying)				
<i>Remarks</i>					



		Yes	No	N/A	Remarks
VIII. Land Use Drawing					
Scale Range: 1mm =2.4m to 7.2m Sheet size 863.6mm X 558.8mm (ANSI D)					
1	Title and Revision Blocks				
2	Arial base map				
3	Land use legend (symbols and use descriptions)				
4	Airport Property lines (existing and future) including easement (i.e. zoning of adjacent property to airport				
5	Plan view of land uses by category (Agricultural, Aeronautical, Commercial, Residential, etc.)				
6	Boundaries of local government				
7	Public facilities (schools, hospitals, parks, churches etc.)				
8	Show on and off-airport property use (include industrial, residential etc.) to at least out to 65 LDN contour, if available				

9	Drawing Details - show Aprons, BRL, Property Boundary, Runways, Taxiways, Safety Runway protection zones & Nav aids				
<i>Remarks</i>					
		Yes	No	N/A	Remarks
IX. Airport Property Map					
Scale Range: 1mm = 2.4m to 7.2m) Sheet size 863.6mm X 558.8mm (ANSI D)					
1	Title and Revision Blocks				
2	Legend – shading/cross hatching, symbols indicating type of monumentation, survey monuments, etc.				
3	Plan View showing Tracts and Parcels of Land				
	(a). Property line (Fee) - existing and future				
	(b). Property interest areas (Easement) - existing and future				
	i. OLS protection				

	ii. Compatible Land Use				
	(c). Type of acquisition indicated				
4	Township/Range and vicinity map				
5	Data Table (Property Status)				
	(a). Number or letter and area of each parcel or easement				
	(b). Date property was acquired or property status				
	(c). Mode under which property was acquired.				
	(d). Acreage				
	(e). Show existing and future airport features (i.e. runways, RESA, navigational aids and so forth) that would indicate a future aeronautical need for airport property.				
<i>Remarks</i>					

	Yes	No	N/A	Remarks
X. Airport Departure Surface Drawing				
Scale: <i>Plan View:</i> 1mm = 12m <i>Profile View:</i> Horizontal is 1mm = 12m to 24m Vertical is 1mm = 1.2m Sheet size 863,6mm X 558.8mm (ANSI D)				

	Large scale plan and profile views of departure surfaces for each runway end that is designated primarily for instrument departures. The one-engine inoperative (OEI) obstacle identification surfaces (OIS) should be shown for any departure any departure supporting air carrier operations. Drawing covers distance out to 3.05km beyond runway strip (i.e. 3.11km beyond RWY end) for a slope ration of 1: 40				
1	Plan View Details				
	(a). Aerial photos for base maps				
	(b). Obstacle identification numbers				
	(c). Depict property line, including easements				
	(d). Identify, by numbers, all transverse ways with elevations and computed vertical clearance in the departure surface				
	(e). Depict runway end numbers and elevations				
	(f). Show Ground contours (lightly drawn)				
	(g). Runway Safety Areas				
2	Profile View Details				
	(a). Depict terrain along extended centreline of runway (significant objects including fences, roadways, rivers, structures, buildings)				
	(b). Obstructions identified by numbers (also shown on plan view)				
	(c). Show roads and railroads with dashed lines at edge of the approach				
3	Obstruction Table				
	(a). Prepare separate table for each departure surface				
	(b). Obstruction identification Number				
	(c). Description of Obstruction				
	(d). Obstruction Elevation				
	(e). Amount of surface penetration				

(f). Proposed disposition of Surface obstructions					
<i>Remarks</i>					
		Yes	No	N/A	Remarks
XI. Declared Distances Drawing					
Scale Range: 1mm = 2.4m to 7.2m) Sheet size 863.6mm X 558.8mm (ANSI D)					
1	Clearway Identified (152.4m x 304.8m on a 1.25% plane or 1:80 slope)				
2	Stopway Identified				
3	Displaced Threshold identified				
4	Relocated Threshold identified				
5	End Coordinates of each threshold				
6	Declared Distances Table				
	(a). Take-off Run Available (TORA)				
	(c). Accelerated Stop Distance Available (ASDA)				
	(d). Landing Distance Available (LDA)				
7	Runway Safety Area				
<i>Remarks</i>					

